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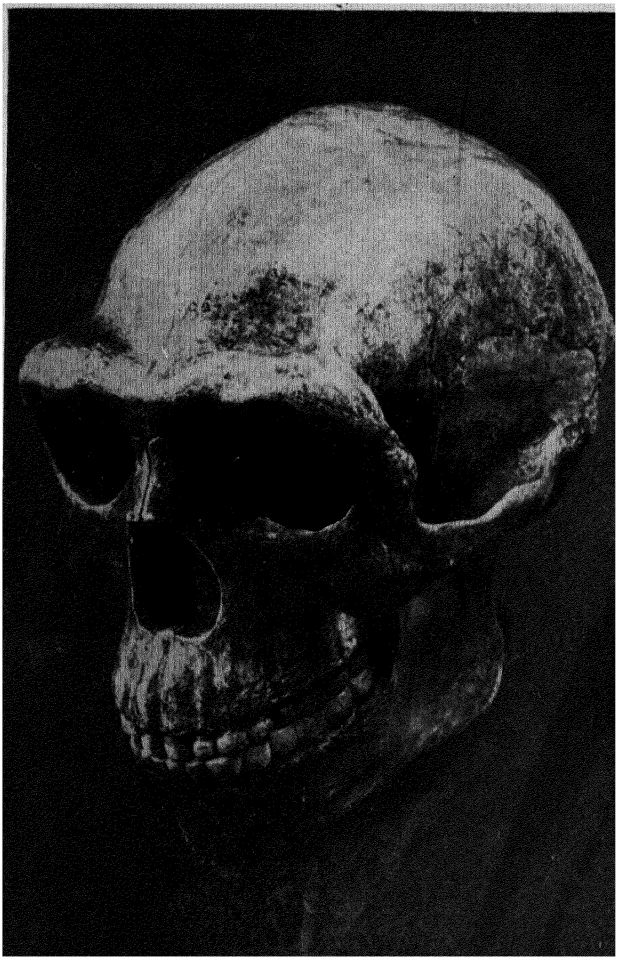
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EARLY MAN

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North Africa (Oxford)
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Parts of Barbary
Beyond the Burma Road
Cross Channel



Reconstituted skull of a female *Sinanthropus*
(*See also Fig.* 11)

EARLY MAN

A Survey of Human Origins

by

ALAN HOUGHTON BRODRICK

In nova fert animus mutatas dicere formas corpora.
Ovid.

HUTCHINSON'S
SCIENTIFIC AND TECHNICAL PUBLICATIONS
London New York Melbourne Sydney Cape Town

THIS BOOK IS PRODUCED IN
COMPLETE CONFORMITY WITH THE
AUTHORIZED ECONOMY STANDARDS

Printed in Great Britain at St Albans
by the Mayflower Press (of Plymouth).
William Brendon & Son, Ltd.
1948

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PREFACE

As this book is a summary and a survey of our present knowledge concerning the physical origins of Man, its plan is rather different from that of other works dealing with prehistory and human palaeontology. Traces of ancient men were first found in western Europe, and it was from Europe that until quite recent times the bulk of the material relating to early men was forthcoming. It is from sites in France that the industries of Man have been named. It was from excavations in France that the succession of industries and of human types was first established. It was, therefore, explicable that greater attention should have been paid and more space devoted in works about ancient man to the European evidence and material than to that, very scanty, available from other regions.

While it is clear that Europe played a most important part in the evolution of Upper Palaeolithic cultures, perhaps as important a part as that continent played later in the history of civilization, we must not search in Europe for evidence of Man's physical origins. As far as we can see, Europe has always been an area towards which immigration was directed. The evidence for Man's most remote origins must be sought elsewhere.

So, after an introductory chapter in which with some notice of recent discoveries in Europe is mingled an outline of our knowledge of tool techniques and of the succession of climatic changes—that though possibly affecting most of the globe are only marked as a succession of Ice Ages in Europe and North America—we move over to eastern Asia to a region where, up to now, at least, has been found the most illuminating evidence for our origins. The chapter devoted to Europe is comparatively short and although the men of the Upper (and Lower or Middle) Palaeolithic are dealt with in some detail, the merest sketch is offered of human developments in the Mesolithic and Neolithic times. The fact is that in Europe from the time of the Neanderthaloids onwards, at any rate, we are dealing with human types whose evolutionary story was already a long one before they reached Europe. In the present state of our knowledge indeed we are not authorized to say that any human type underwent such modification in Europe that that continent can be claimed as a 'differentiation area.' Further discoveries may lead us to modify this point of view, but, for the present, it looks as though the essential story of Man's physical origins lies outside our continent.

After the first chapter, the rest of the text deals with our story's evidence as it is forthcoming from Australia, south-eastern and

eastern Asia, America, central and western Asia, Africa and Europe. Such a presentation, on geographical lines, will be, it is hoped, the easiest for the reader, but, since in the Conclusion a summary is offered of all the chapters it is recommended that the concluding chapter be read twice, perhaps before the rest of the text and then after it.

I must here express my thanks to a few of the many whose help has been most valuable to me in the preparation of this survey. I would mention, especially, the names of Professor A. C. Blanc of Rome, of Professor H. Breuil, *membre de l'Institut de France*, Professor at the *Collège de France* and at the Institute of Human Palaeontology, of Professor van den Broek of Utrecht, of Dr. van Bork-Feltkamp of the *Indisch Instituut* in Amsterdam, of Dr. J. Felhoen Kraal of the same Institute, of Mr. W. H. Johnson, Mr. Harper Kelley of the *Musée de l'Homme*, Paris, of Dr. P. Rivet, Director of the *Musée de l'Homme* and Professor at the Museum of Natural History in Paris, of Professor Sergio Sergi of the University of Rome, of Professor H. V. Vallois, Director of the Institute of Human Palaeontology in Paris.

But none of these scientists is, of course, in any way responsible for my marshalling of the facts presented in the survey and, still less, for my proffered interpretations of them.

* * * * *

A. H. B.

London,
1947.

FOREWORD

BEFORE attempting an interpretation of what evidence we have bearing on the origins of the human race, we must, first of all, endeavour to establish a chronology. And this chronology must be arrived at from two directions.

On the one hand, we have to consider what we may call 'geological time'; and, on the other hand, what we may call 'human time.'

Let us examine, first of all, what we mean by 'geological time.' It is now thought that the earth has borne a solidified crust for an immense period that may be calculated at between 2,000,000,000 and 2,500,000,000 solar years. Some form of life may have existed upon this crust, or in the waters that covered much of this crust, in very remote periods, but the so-called 'Archean' formations (that underlie and are anterior to those of the first—or 'Primary' —of the recognized 'eras') have yielded few traces of fossils.

Changes in the shape and aspect of the earth's crust have gone on throughout 'geological time' but the changes which took place during the Pleistocene Period—that for which we have evidence of the existence of Man and his forerunners—were, on the whole, less extensive and profound than the changes recorded for some other Periods. However, this Pleistocene Period has been the shortest of any in 'geological time.'

For convenience, 'geological time' is divided into four main Periods: the Primary, Secondary, Tertiary and Quaternary (or Pleistocene). To these may be added the most recent or Holocene— following after the Pleistocene and lasting from some 12,000 years ago to the present time. This Holocene Period, it may be added, should be regarded, at least from the geological evidence, as a division of the Pleistocene.

The Primary, Secondary and Tertiary Periods are sometimes called (from the type of animal that dominated during them) the 'Age of Fishes,' the 'Age of Reptiles' and the 'Age of Mammals.' We may estimate (although such figures can only be regarded as the merest approximations) the duration of the three Periods at 75,000,000, 15,000,000 and 10,000,000 solar years respectively.

The story of Man and his immediate forerunners, as far as we know to-day, falls entirely within the Quaternary or Pleistocene Period, although it is clear that the ancestors of Man must have branched off during the Tertiary Period from the common stem they shared with the ancestors of the great apes.

The story of animal life during these immense reaches of time

has been a story of evolution. And evolution is still going on although we may bear in mind, firstly, that it takes, apparently, some half a million years for a new species to arise; and, secondly, that although, in a general way, evolution is everywhere proceeding, some lines or stocks reach what seems to be their limit of evolution. There has been no essential change in the human body since the first appearance of 'modern' or *sapiens* type of Man in Europe towards the end of the Pleistocene Period, or, perhaps, some 30,000 years ago.

As far as we can see, the first creatures that we can class as 'hominids'—or animals sufficiently close to men to be grouped with them—were the so-called pithecanthropoids, that is the *Pithecanthropus* of Java and the *Sinanthropus* of northern China. Apparently both these hominids stood upright, chipped rough stone tools and probably used articulate speech. They certainly flourished several hundred thousand years ago and possibly even then represented antique stocks.

'*Human Time*'

The late H. G. Wells once pointed out that if, for the sake of illustration, we reduce, in terms that we can easily seize, the period of Man's story to a span of ten hours, then, the whole of recorded history (a tale of about 5,000 years) would be represented by a gleam of five minutes' duration. And this five thousand years, or so, covers the whole of what we may call 'historical time' from the *beginnings* of civilization in the Near East to the present day.

In this book, however, we are concerned mainly with the origins of the human race and we may remember that the first man-like creatures we know of lie back some hundred times farther from the beginnings of recorded history than we, to-day, are removed from those beginnings.

Our knowledge of early Man is based, in the main, on three types of objects, firstly, the relics of Man himself, that is to say, of his bones, generally preserved only imperfectly; secondly, of Man's tombs and dwellings; and thirdly, of the tools, instruments, or artefacts Man fashioned in the past.

Such objects, of which the classification and identification began in France, have now been recovered from many parts of the Old World. It does not seem that Man penetrated into the Americas until comparatively late.

The earliest hominids known to us (i.e., the *Pithecanthropus* of Java and the *Sinanthropus* of China) are certainly more ape-like than any later forms of Man we know of. Still, these pithecanthropoids are not only (as might be expected) rather far removed from any living ape, but they are also rather far removed from

any fossil ape of which we have knowledge. It is evident that we have to go back well beyond the pithecanthropoids to find the first ancestors of Man.

Of course, no responsible person would to-day suggest that men are 'descended from apes,' but it is generally agreed by all authorities that men and apes had a common ancestor and also by many authorities that this common ancestor flourished longer ago than was thought probable until recently.

The reading of this book will indicate how very far we may have to go to find this common ancestor, but this book will also show how certain we can be that such an ancestor existed.

If the pithecanthropoids are hominids without being men in *our general acceptation of that term* (although essentially the pithecanthropoids *are* men), when we get to the Neanderthaloids we are face to face with types of men, different it is true from any now existing, but no more different from us than are some 'breeds' of horses or dogs from others.

The successor (and probably partially descendant) of the Neanderthaloids in Europe is 'modern' Man generally referred to as *homo sapiens*, though *sapiens* obviously is not to be taken as meaning 'wise' either for our remote ancestors or for ourselves.

These 'modern' men (and we are referring to those whose traces have been found in Europe) were the makers and users of the stone tools we call 'Upper Palaeolithic' or those of the Later Old Stone Age. Such tools are clearly distinguishable from those of the preceding 'Middle Palaeolithic' or 'Lower Palaeolithic' types. The study and classification of early Man's instruments or artefacts have now developed into flourishing scientific disciplines conducted by Prehistorians. The special names affixed to each type of tool (or 'industry') have, for the most part, been derived from the names of the sites in France where such types were first recognized.

The word 'culture' as used in this book, and in Prehistory generally, may be taken to refer to the whole of the manifestations of any given sort of human group-activity. Therefore, for the earliest stages 'culture' will generally mean just the type of tools and instruments. Later on, in Upper Palaeolithic times, will have to be added cave-paintings, engravings, statuettes, objects of personal adornment, and so forth. And 'cultures' become more and more rich and complex until we reach the first civilizations.

And now to conclude this Foreword are two Tables.

One gives in outline a record covering the whole of 'geological time' with a note of the flora and fauna flourishing in the different eras. The material for the preparation of such a Table is, of course, that afforded by the geological strata making up the earth's crust and that afforded by the fossils found in the strata. And the dating

of the fossils is, roughly, computed by the position of the strata in which they are found. But although it is, generally speaking, true that a fossil found at a lower level is earlier in date than one found at a higher level, still strata are often so twisted and distorted that the more ancient are sometimes found above the more recent.

The other Table gives, also in outline, a record covering the whole of 'human time' (as we know it), that is to say, a record of the succession of human cultures.

These two Tables should be regarded as preliminary to the more detailed Tables given on pages 59 and 61–62.

Approximate duration in years	Geological Divisions	Flora	Fauna
12,000 (up till to-day)	Holocene or Recent	as at present	
perhaps 500,000	Pleistocene or Quaternary. divided into (*a*) Upper (*b*) Middle (*c*) Lower and by the succession of Ice Ages. (*a*) Würm (*b*) Riss (*c*) Mindel (*d*) Günz	Largely as at present with, in Middle and Lower Pleistocene, some survivals of Tertiary forms.	Man: *sapiens* Neanderthaloid, other non-*sapiens* forms such as Heidelberg and the pithecanthropoids.
10,000,000 ?	TERTIARY divided into (*a*) Pliocene (*b*) Miocene (*c*) Oligocene (*d*) Eocene		Australopithecus Siwalik apes Rusinga Jaw Apes and lemurs
15,000,000 ?	SECONDARY divided into (*a*) Cretaceous (*b*) Jurassic (*c*) Triassic	Flowering plants Ferns Palms	Toothed birds Saurians Reptiles
75,000,000 ?	PRIMARY (*a*) Permian (*b*) Carboniferous (*c*) Devonian (*d*) Silurian (*e*) Cambrian	Tree-ferns, conifers Mosses Seaweeds Sponges	Amphibians Fishes Brachiopods Trilobites & Fishes Corals
?	ARCHEAN	Few traces of any living creatures	

The figures for Tertiary, Secondary and Primary may be much greater than those given above which would seem to be minima.

OUTLINE TABLE OF THE PLEISTOCENE PERIOD

Divisions of the Pleistocene	Ice Ages and Interglacials	Main Divisions of Cultures	Human Types
Upper Pleistocene	Post-Würm Würm II glaciation Interstadial	Upper Palaeolithic	Modern Man *homo sapiens*
Mid Pleistocene	Würm I glaciation Riss-Würm Interglacial	Mid Palaeolithic	Neanderthaloids of (later) 'classical' and (earlier) 'generalized' type. Ehringsdorf Steinheim
Lower Pleistocene	Riss glaciation Mindel-Riss Interglacial Mindel glaciation Günz-Mindel Interglacial Günz glaciation	Lower Palaeolithic	Swanscombe? Heidelberg (Mauer)?

The position in chronological order to be assigned to the pithecanthropoids (i.e., the *Pithecanthropus* and the *Sinanthropus*) is doubtful. They are sometimes referred to 'Mid Pleistocene' but if they are so placed then the frontiers of the Mid Pleistocene must be pushed backwards. But the pithecanthropoids though very 'primitive' may not be much older than the latter part of the Lower Pleistocene and they are possibly later in date than Mauer.

It will, of course, be understood that any attempts to express these very early dates in years are purely conjectural and that very few authorities agree, discrepancies among them ranging anywhere from 5 per cent to 50 per cent. Almost all that can usefully be said is that the 'Recent' period goes back some 12,000 years, that 'modern' man appeared in Western Europe perhaps 35,000 years ago (that is in the warm interval between the two peak periods of the last glaciation) and that the total age of the earth as a body with a solid crust may be about 2,500,000,000 years.

INTRODUCTION

'Ne reçevoir jamais aucune chose pour vraie qu'ils ne le connoissent évidemment être telle.'

DESCARTES.

IT is just a hundred years since Boucher de Crèvecoeur de Perthes described his finds of man-fashioned flints or artefacts from the Somme Valley of north-eastern France. In the same year, 1846, Ceselli announced his discovery in the Tiber's alluvial gravels of stone tools (of the sort now known as 'Mousterian') associated with the remains of mammals long extinct in Italy.

These men had had forerunners. In England, Conyers as long ago as 1700 and John Frere in 1797 had held that the so-called 'thunder-bolts' were man-fashioned tools and that they indicated that men had lived in remote ages. But the words of Conyers and Frere attracted no attention from the scientific world of their day.

In the early nineteenth century, Schmerling in Belgium, Buckland and MacEnery in England, Jouannet, Saussure, Tournol, Dumas and Christol in France all thought that they had found human bones or man-made tools in association with the remains of extinct or long migrated animals. The observations of these men were only in part justified, for disturbance of the soil had often jumbled together the relics of different ages. The finds of these men, insofar as they called forth any comment at all, aroused violent controversy. The existence of pottery in some of the deposits was (rightly) held to indicate a late age, since pottery was an invention of New Stone Age times. Many other, and quite invalid, objections were advanced, since the prejudices of the time were strongly opposed to the belief that Man could have existed in remote epochs or that his bones could be contemporary with those of the rhinoceros and hippopotamus long extinct in Europe. The story of the Biblical Flood overshadowed, in those days, all discussion of these matters.

The famous Cuvier, until his death in 1832 the dominating figure among the 'naturalists' of Europe, was stout in his declaration that there was not and that there 'could not be' any such thing as 'fossil man.' And his influence survived him. Despite the publication in 1833 of Schmerling's account of his finds near Liège, little was heard of 'fossil man' for some years.

Boucher de Perthes

Boucher de Perthes was no naturalist but an amateur man of letters whose official position was that of director of the customs at

Abbeville. His was a curious life and its pattern counted, perhaps, for some of the disapproval with which his discoveries were regarded. Jacques Boucher de Crèvecoeur de Perthes was born at Réthel in 1788, the son of a father who was an amateur botanist as well as the head of the Abbeville customs house. Boucher's mother traced her descent to one of Joan of Arc's brothers. Boucher's own scientific activities occupied only part of his time. He was man-about-town, novelist, poet, 'metaphysician' as well as his father's successor in the Abbeville customs house. At seventeen years of age he met Pauline Bonaparte, Napoleon's sister, at Genoa and years later (in 1852) published as *Quelques Lettres de Femme*, love-letters supposedly provoked by this romantic episode in his life. But all Boucher's writings were a little imaginative and his memoirs, *Sous Dix Rois*, are, as sober history, highly suspect. He died at the good old age of eighty in 1868.

Such was the queer career of the man to whom we owe the foundation of the science of prehistory and the proof of the immense antiquity of Man. Never had scientific discipline so strange a founder.

Boucher was, at Abbeville, surrounded by men who were, for those days, excellent naturalists—the members of the *Société Polymathique* of his town. At Abbeville, Boucher had observed that Neolithic remains were being thrown up by a dredger along the Somme Canal. There were broken bones, chipped flints and polished axes—one of them hafted in stagshorn. His friend Picard aroused his interest in these 'Celtic Remains.' Boucher began to collect the chipped flints unearthed by the workmen at the Moulin-Quignon and Menchecourt quarries at the gates of Abbeville.

From 1837 onwards Boucher devoted much of his time and thought, and, it must be admitted, his considerable natural ability, to the problems presented by these ancient instruments. In 1847 he published an account of his discoveries in *Antiquités Celtiques et Antidiluviennes*, whose very name indicates how far he was then from discarding the traditional dogmas about Man's history. The book pleased no one. The scientists of the time were put off by Boucher's preconceptions concerning the Biblical Flood and also by the fact that in an earlier work (*La Création*) he had advanced theories with no sort of proof to support them. The 'Fundamentalists' of a century ago would, of course, not hear of Boucher's discoveries at all.

Men did not declare outright that Boucher was a liar or a forger but they maintained he had been fooled by his workmen and that his enthusiastic nature had got the better of his judgment. And, indeed, he *was* often fooled by his workmen who, encouraged by the premiums he offered, buried Neolithic tools in the pits,

themselves fabricated 'artefacts' and, in one notorious instance, introduced a jaw-bone from some burial-ground into the gravels and let Boucher find the relic himself. This was the famous 'Moulin-Quignon' mandible that, though obviously of quite modern type, was, for long, held by some to constitute proof that men like ourselves lived in northern France in remote geological ages.

But together with the fakes were real, authentic ancient chipped stone instruments discovered in the same strata as the bones of long extinct mammals.

Prehistory Founded as a Science

By 1854, however, Boucher made a convert of mark. A Dr. Rigollet of Amiens, a noted naturalist of his day, came to confound Boucher at the gravel pits at St. Acheul (from which place was derived later the term 'Acheulian' for one of the most ancient types of artefacts), a suburb of Amiens, but there he found stone axes in the so-called 'diluvial' gravels of the old Somme's course. Little by little some of the more enlightened French scientists came round to Boucher's side—Geoffroy Saint-Hilaire, Quatrefages and Littré —and to realize that Boucher had stumbled on to evidence for the existence of men, not just before the Biblical Flood, but in times so remote that to locate them in the world's record all the existing ideas of antiquity would have to be revised.

Despite, however, the favourable impression produced upon some French authorities, the authenticity of Boucher's discoveries was established by British men of science. In 1859, Prestwich, a celebrated geologist, Falconer, who had already distinguished himself by his researches into the Siwālik fossil fauna of north-western India (see p. 91), Flower, and a young archaeologist called John Evans, went over to Abbeville and to St. Acheul in order to test Boucher's claims. They themselves found artefacts *in situ* and they left for England convinced that Boucher was right. Then in the Thames Valley gravels they found analogous artefacts.

The science of Prehistory had been founded.

From that time, also, the search for Fossil Man for the remains of the men who had made the instruments went on apace.

Lartet's Work

Edouard Lartet, whose investigations in Pyrenean caverns had been fruitful,[1] one day received a box of bones and flints from a collector of fossils, who stated that he had removed the specimens from a cave at Les Eyzies in the Vézère Valley of the Dordogne

[1] Lartet in 1861 conducted the first systematic examination of a cave (that of Aurignac —hence the word 'Aurignacian'—in the Haute-Garonne) and in his report disclosed for the first time something of the life of Palaeolithic Man.

Department in southern France. The sender added that 'all the Périgord' was rich in similar objects. Lartet communicated this story to an English friend, Henry Christy, who, in 1863, financed the first season's explorations in the Vézère Valley.

The results of the excavations were startling. The Vézère region was revealed as one exceptionally rich in the relics and remains of early Man, so rich indeed that it is from the typical Dordogne sites that most of the names have been coined to designate the industries of prehistoric men.

Lartet was enabled, as the result of his researches in the Les Eyzies district, to sketch out a provisional and rough classification of prehistoric eras under zoological and palaeontological names, e.g., 'The Hippopotamus Age,' 'The Great Bear and Mammoth Age' and 'The Reindeer Age.' His classification, with modifications, held the field until about 1880. Then Gabriel de Mortillet, of the French National Museum of Antiquities at Saint-Germain, began his substitution of archaeological designations for the zoological or palaeontological. The 'Hippopotamus Age' became the 'Chellean' (from the site of Chelles, near Paris), some of the 'Mammoth and Great Bear Age' became the 'Mousterian,' and so on.

Science of Human Palaeontology Founded

In 1863, also, the same year that Lartet and Christy were working at Les Eyzies, Sir Charles Lyell published his 'Geological Evidences of the Antiquity of Man.'

The science of Human Palaeontology had been founded.

Although the first evidences for the new sciences were found in France and Frenchmen played an essential part in the foundation of these two disciplines, the collaboration of British scientists was capital.

The creation of the Science of Man was a Franco-British achievement.

In 1865 at a special meeting of the Italian Society of Natural Sciences (held at Spezzia) it was decided to create an International Congress of Anthropology and Prehistoric Archaeology. And this Congress[1] still flourishes.

Man is a primate—a member of the group that includes the great apes (anthropoids), monkeys and lemurs. And Man is a primate, anatomically, physically and indeed psychologically, closer to the great apes than are these latter to other monkeys. Such differences as we show from the great apes are differences

[1] Now, however, divided into two: (*a*) The International Congress of Anthropological and Ethnological Sciences, and (*b*) The International Congress of Prehistoric and Protohistoric Sciences.

not of kind but of degree. In our physical and in our psychical composition we show distinct signs of our lowly origin.

Unfortunately the fossil material for the study of the extinct apes is scanty and it is not sufficient to enable us to work out with any degree of satisfaction the relationship between existing apes and monkeys and the fossil forms. We shall see, later on, what the evidence is.

However, for our own particular line of descent, the evidence has in recent years greatly accumulated and is still accumulating. And if we cannot yet view clearly the whole course of Man's prehistory, the main lines of his story are plain enough. And prehistory merges into protohistory and that again into written history. There is no violent breach of continuity. Our roots strike down very deep into the past.

We are still doing things—and thinking things—first done and thought by men who left no written records.

It is held by some that prehistoric archaeology and anthropology should form a basis and foundation of education. The axiom is hardly extravagant. There are no studies more calculated than these to make us less nationalistic, provincial and prejudiced.

The Scope of Prehistorical Anthropology

The late Henry Fairfield Osborn exposed the aim and scope of prehistorical anthropology when he wrote in 1927:

'Of all the incomprehensible things in the universe, man stands in the front rank, and of all the incomprehensible things in man the supreme difficulty centres in the human brain, intelligence, memory, aspiration and powers of discovery, research and the conquest of obstacles. The approach to this unknown field of future human advance—the seat of the human mind and the constitution of the human mind—is along the great paths of human and comparative anatomy and of human and comparative psychology and behavior. Yet this approach will yield only a tentative conclusion, the final solution of the problem of problems—the rise of man—will come only through unremitting exploration and the chance of finding somewhere in the Eurasiatic continent of actual fossil remains of the Oligocene pro-man, of the Miocene and Pliocene Dawn Man and, finally, of the early Pleistocene ancestors of the large-brained modern man.'

Osborn's statement was, for the time when it was made, reasonably encouraging if we compare it with that of the veteran anthropologist, E. B. Tylor, writing in 1910:

'The existence of man in remote geological time cannot now be questioned, but, despite much effort in likely localities, no bones, with the exception of those of the much-discussed *Pithecanthropus*, have been found which can be regarded as definitely bridging the gulf between man and the lower creation. It seems as if anthropology has, in this direction, reached the limits of its discoveries.'

Commenting upon this opinion—that seemed almost justifiable when it was made although the language in which it is couched appears to us antiquated and even tendentious—Elliot Smith was able to declare in 1921:

'This prediction has fortunately been stultified almost every year since it was made.'

Still, as recently as 1922, Hugo Obermaier could justly note in his *El Hombre Fósil* that:

'In other parts of the world'—i.e., other than in Europe—'the ancient past of humanity is as yet unexplained and shrouded in impenetrable obscurity.'

But in the last quarter of a century the mass of material brought to light has surpassed in importance, in variety and in significance the relics and remains of ancient man at our disposal twenty-five years ago. And this material comes not only from Europe (Gibraltar, England, Italy), but also from many regions beyond our continent —from China, from Java, from central Asia, from Palestine and from Africa.

Works on Man's Prehistory

In these circumstances it is not surprising that the general works dealing with Man's prehistory and anthropology are out of date.[1] The most comprehensive and valuable of the existing surveys is still that of the late Marcellin Boule—*Les Hommes Fossiles*, of which he prepared a third edition before his death in 1942.[2]

But material is accumulating fast. Each new discovery forces us to readjustment and revision of our ideas. The full significance, for instance, of the Neanderthaloid skeleton found in Uzbekistan just before the late war, is hardly yet agreed upon. During the war Dr. v. Königswald's sensational report from Java on his find of the jaw he attributes to *Meganthropus* attracted relatively little attention, but the discovery is momentous.

A general work on Man, his origins and his prehistory, will soon have to be an encyclopaedia compiled by an association of geologists, biologists, anthropologists, archaeologists, prehistorians,

[1] E.g., those excellent works—W. J. Sollas, *Ancient Hunters and their Modern Representatives* (2nd ed. London, 1914); H. F. Osborn, *Men of the Old Stone Age* (New York, 1915); M. Burkitt, *Our Early Ancestors*, 1926. Even so comparatively recent a book as Keith's *Antiquity of Man* (London, 1929) might have been written several years earlier. The same author's *New Discoveries Relating to the Antiquity of Man* (London, 1931) carries a statement that in five years' time a supplementary volume would be needed. Now fifteen years have passed.

[2] This third edition, revised by H. V. Vallois, Director of the Institute of Human Palaeontology in Paris, was published in 1946 by Masson (Paris).

astronomers, climatologists, palaeobotanists, ethnologists, physicists—and others. Until such a work can be undertaken—and it would probably be out of date before it could be published—we must content ourselves with works dealing with one aspect of a vast subject.

Aim of this Book

In these pages I have endeavoured to present a summary of our knowledge concerning Man's physical origins.

The physical origin of Man is therefore the theme of this book and an attempt has been made to subordinate to this main subject all the other considerations that must in some measure be touched upon if the principal theme is to be exposed with clarity.

I have not hesitated, however, when mentioning some regions that have been the seats of high cultures to suggest lines which might be followed in a search for links between the prehistoric and the remote historic past.

On the other hand, as the greater part of the book is devoted to a consideration of evidence as to origins (that is, differentiation of types) the Upper Palaeolithic and later periods are dealt with only in sufficient outline to enable those interested in the origins of human cultures and civilizations to link what has been presented regarding physical origins with other evidence offered in books mentioned either in the notes to the text or in the bibliography.

Highly technical terms have been, as far as possible, avoided. Sometimes, indeed, the juggling with such terms serves but to hide —or to accentuate—the tenuity in some directions of our knowledge. Yet, if clumsy and tiresome periphrases are not to alienate the reader, some technical terms—and common words used in a special sense—must be employed.[1]

Men's Bones and Men's Artefacts

Men's bones may, one day, tell us nearly all we want to know about Man's physical evolution. But the interpretation of the objects of Man's handiwork may always be, in a measure, doubtful. Why certain things were made in a certain way and why certain ceremonies were (apparently) performed may never be fully understood—perhaps partly because the remote makers and performers could not themselves have given or even imagined a full explanation of their works.

Archaeologists and prehistorians are a little inclined, like 'primitive' men, to see magic in everything they cannot understand.

[1] Most special terms are explained in the text or in the notes. For easy reference a short glossary has been appended.

We must be on our guard against making unjustifiable deductions prejudiced by our own preconceptions and by comparisons with the habits or professed beliefs of existing men, though, in some cases, the parallels between very ancient practices and existing ones seem striking enough to be noted.[1]

[1] Throughout the text I have used 'modern' Man as the equivalent of *homo sapiens*, that is to say of the sort to which belong all living men. On the rare occasions when 'ancient' Man is referred to the term is used as an alternative for Neanderthaloid Man. When the word Recent is used it indicates the latest or Holocene geological period.

CHAPTER ONE

CIRCE'S MOUNT

MONTE CIRCEO, though a peninsula to-day, has been often in the past an island. Indeed, it seems an island as, perhaps lolling idly from a fishing-smack, you come upon it from the waters of the Tyrrhenian Sea.

You must double the north-western point of the promontory to sight the low-lying sand-dunes binding Circe's Mount to the Pomptine Marshes or, as they are now more fitly called, the Pomptine Fields.

Eastwards, at the *Torre del Fico,* the rocky mass falls, cliff-like, not to the waves but to shelving strand and land-locked lagoon.[1]

In later Roman times the Mount was a seaside resort. Both Tiberius and Domitian, it is said, owned villas on slopes still strewn with Roman ruins.

Up from the little village of San Felice, fastened upon the sun-rise face of the hill, you pass a rock-cut inscription naming this crag *promunterium veneris* or Venus Cape. Then, about three hundred feet or so above the hamlet you come upon an enclosure of fine polygonal masonry preserving the entrance to a circular and sub-terranean beehive-form 'tholos.' San Felice may cover the site of a most ancient settlement of which this walled area would have been the citadel, since the houses of the village are set upon Cyclopean foundations less skilfully wrought than is the stone-work of the citadel—if such it be.

The way to the summit is steep but sweet, for the flanks of the Mount are softened with a low bush of scented shrubs—rosemary, myrtle, lentiscus and the perfumed plants of the Mediterranean South. It will take you over two hours' scramble to reach the peak, where the superb views are evocatory and the air is stimulating. Here are some tumbled traces of building where, the old authors tell us, stood Circe's fane, a flashing white beacon lighting all the Latin shore. To the north-west you can see the Dome of Saint Peter's and to the south-east Ischia, Capri, Vesuvius and the waters set with Ponza's islets.

This Monte Circeo was, at least in later legend, held to be the Island of Circe where was settled by her father the daughter of the Sun by Perse the Ocean nymph. Here it was that Circe—whose name, we may remember, means a female hawk[2]—bewitched her

[1] Monte Circeo is a mass of liassic limestone lying some eighty miles south of Rome and rising to 1,775 feet above sea-level.

[2] And in all hawks the female is larger and more powerful than the male.

admirers into beasts. Here it was that Ulysses dallied with her and here she revealed to him how he might sail to the Land of Shades, lying upon the edge of the Ocean Stream, and there learn his fate from the ghosts.

Monte Circeo is linked in legend with the remote past of Mediterranean men.

The Secret of Monte Circeo

Just where the Mount's cliffs drop down jagged to the beach you may find the principal hotel and restaurant in Saint Felix of the Circean Mount—an admirable juxtaposition of names—and it is owned and run by Signor Guattari. This inn is one of those charming and unpretentious places not uncommon along the Italian shores where you can live in your bathing-dress all day and under gaudy umbrellas eat savoury southern food while you watch the ever-changing shades and colours of the Inland Sea.

In the year 1938 Signor Guattari, in view of his ever-increasing summer business, decided to enlarge his restaurant's terrace and to do that by cutting away some of the limestone rock abutting on his property.

Guattari

While they were hacking away at the hill-side Guattari's workmen extracted a number of animal bones, and these, curiously enough, were carefully put aside. Guattari's foresight was, perhaps, in some measure suggested by the presence nearby of Professor Blanc,[1] who, from 1936, had been methodically investigating the caves with which Monte Circeo is pitted on its seaward face. Moreover, the works undertaken for the draining of the Pomptine Marshes had allowed Blanc to study the changes of sea-level and coast-line during the Pleistocene Period.[2] Furthermore, he had gathered on the plain a rich harvest of prehistoric stone implements.

Blanc, indeed, came not infrequently to lunch or to dine at the *Ristorante Guattari* and to chat with its owner. In February, 1939, Guattari showed the scientist some of the bones. They were fossilized and, for the most part, of deer, horse and ox. Things of no great interest although some of them showed what looked like man-made fractures.

[1] Baron A. C. Blanc of Rome University.

[2] The gravel terraces of rivers afford evidence of glaciation fluctuations. In some phases the valleys were partially filled up with detritus that, in other phases, was carried out to sea. The glacial successions are not, however, solely responsible for the river terraces. The lower ends of the terraces and the 'beaches' of the shores seem to indicate a time of land-subsidence when the rivers could not carry out the detritus to sea. But since these old sea-beaches, in the Mediterranean area, are strewn with the fossils of 'warm' fauna the formations rather suggest an interglacial than a glacial period.

Since by this time it was clear that the labourers had hit upon an ancient breach or fissure filled up with limestone conglomerate, Blanc told the *ristoratore* to keep all the bones he might come across.

'A Neanderthaloid Skull'

By mid-February Blanc was again at Guattari's and was shown two cases of bones. All of them, apparently, were fossilized and most of them were of the larger sorts of deer.[1] Blanc in congratulating his host upon his diligence, added jokingly:

"Keep a sharp look-out, you never know what might happen, you may come across that rare and precious object, a Neanderthaloid skull."[2]

On 24th February, 1939, Guattari's men found the conglomerate readily yielding at one spot to their pick-axes. Soon, the entrance to what looked like a narrow corridor was revealed.

Into this tunnel—whose entrance is some fifteen feet above sea-level and some hundred and fifty yards from the shore—the men began to creep, followed by Guattari himself and one or two of his household's ladies—there is an excellent tradition in 'Latin' lands that ladies should be present at all important events.

And this was a most important occasion.

For these Italian peasants, after worming their way into the bowels of the rock, beheld something hidden from sight for tens of thousands of years.

The Caves of Monte Circeo

Monte Circeo is, like most limestone hills, pitted and burrowed with caves.[3] The grottoes on the Mediterranean face are, for the most part, not deep although nearly all of them bear traces of having been at one time or another inhabited by men—at periods when the sea-level was lower than it is now.

Two Climates Indicated

The Monte Circeo grottoes had been visited by curiously-minded explorers as long ago as 1817, but no systematic examina-

[1] 'Fossil' meant, of course, joriginally, ust anything dug up from the earth. But, as technically used in archaeology, 'fossilized' signifies 'preserved in the strata of the earth and having been subjected to chemical or other changes in texture'—that is, generally speaking, mineralized as ancient buried bones all tend to be to a greater or lesser degree, although degree of mineralization alone is not much criterion of age.

[2] The word 'Neanderthaloid' is formed from 'Neanderthal', the name of the place near the village of Hochdal between Düsseldorf and Elberfeld, in Germany, where in 1856 were found the remains of 'Neanderthal Man'.

[3] The great majority of limestones are, of course, of organic formation consisting of the debris of innumerable animals' bones—essentially the caves, caverns, crypts, coffins and sanctuaries of early Man are hollowed out of the same substance as his own skeleton —carbonate of lime.

tion of the caves was undertaken until 1883, and as short a time ago as 1936 only four of them had been scientifically investigated. In one of the four, nicknamed *grotta delle capre*, had been laid bare a lower layer stuffed with the remains of beasts known to have flourished only in a comparatively warm climate—the fauna was, indeed, what is called 'typically Tyrrhenian' with *strombus* (a spiral-shelled mollusc) and hippopotamus. The upper layers of this 'goats' grotto' revealed great quantities of ibex bones (hence the 'goats') together with lumps of charcoal charred from the wood of silver firs. Thus it was clear that while men still inhabited these caves a cold period had followed upon a warm, that is to say, a period when silver firs grew on the shores of Latium followed a period when hippopotami swam in the lagoons of the Pomptine Marshes. In fact, in the 'goats' cave' was evidence for the Riss-Würm Interglacial followed by the onset of the Würm glaciation (No. 1).

In 1937 and 1938 Blanc undertook the systematic examination of twenty-seven further grottoes. All their entrances were some yards above sea-level and as the caves gave on to the sea they could be reached only by boat. By the end of 1938, ten of the caves had given up Old Stone Age tools and animal bones. The essence of the knowledge gained from the caves was that during the 'warm' period when the hippopotami were floundering about in Italy the men who lived in the Monte Circeo caves were using and making 'Mousterian'[1] tools and whenever human remains have been found associated with Mousterian artefacts those human remains have been of 'Neanderthaloid' man. On the other hand, some of the stone implements found with the 'cold' fauna were 'Aurignacian' and as far as we know 'Aurignacian' artefacts were made and used exclusively by 'modern' type men like ourselves.[2]

Within the Caves

Guattari and his followers had seen remarkable things though he hardly realized how astounding they were. But he at once

[1] We must examine all the species present in a given deposit or for a given 'horizon' to determine whether we are faced with a 'cold' or 'hot' fauna—or one, indeed, flourishing in a temperate climate. Reindeer are, for instance, to-day the only large mammals (except Man) inhabiting the extreme north of Europe. But we should not conclude from this observation that when reindeer roamed over much of France the whole surface of that country was tundra like parts of northern Eurasia. All animals are adaptable within rather wide limits and what may have been 'northern' and 'southern' forms of the same species are not of necessity distinguishable from their fossil bones. There is reason to think that the lions of Europe were beasts adapted to a temperate climate and it is known that hippopotami flourished in the rivers of what is now Cape Colony (where water not infrequently freezes in winter) as late as the seventeenth century.

[2] 'Aurignacian' is a term derived from the French site of Aurignac in the Haute-Garonne. 'Mousterian,' a term derived from the site of Le Moustier in the Vézère valley of south-western France (see page 217), refers to the tools characteristic of Neanderthaloid Man.

sent for Blanc and on the next day after the discovery—25th February, 1939—the two men grovelled through the passage until the rising roof allowed them to stand upright.

The ceiling of the first cave hung with stalactites and the floor was irregular with the jumbled fossil animal-bones interspersed with chips and blocks of stone detached from the roof. The bones —and most of the stones—were coated with limestone concretions, as were also parts of the walls. All of the bones were not, however, cemented together and there was no continuous varnish of stalagmitic matter. The animal bones were of deer, of oxen, of horses, of hyaenas and there were many coproliths.[1]

'Mousterian' Living-room

Here, then, was the floor of a 'Mousterian' living-room—the finest and most beautiful of all Neanderthaloid men's dwellings, and undisturbed and preserved intact.

But before the explorers stretched other chambers and in the second of them was a pool whose extent and depth—judging from the discoloration of the walls—had often varied with the seasons.

From the tools and indeed from the animals' bones in the cave it was evident that this was no place to look for magnificent wall-paintings such as those adorning the Upper Palaeolithic caverns of France and Spain (see p. 238); this Guattari grotto had been a dwelling of men not of 'modern' type at all. It had been the habitation of men who, as far as we know, left behind them no 'art' at all. It was a cave of Neanderthaloids.

Man Takes to Caves

Man took to the caves when throughout northern and western Europe a 'cold' fauna succeeded to the 'hot' one, for, not only had the climate become less clement, but need was felt for protection against new and more ferocious beasts. It is true that some human-inhabited caves show traces of a 'hot' fauna,[2] for cave-dwelling has, perhaps, been a human habit from very early times, but some sort of temporary habitation in the open must have been frequent in more clement climates.

[1] i.e., fossilized excreta indicating the use of the cave by beasts in the absence of Man.

[2] e.g., in Italy, in the Grimaldi caves near Mentone, and generally, in Spain. Palaeontologists are apt to look upon animals as sharply divided between 'hot' and 'cold' groups. But lions are a 'cold' group in Pleistocene Europe. Mammoths, again, are not especially a 'cold' fauna, but rather one adapted for life in the open country, whereas elephants are less a 'hot' fauna than one specialized for life in forests. Groups of the steppe and the forest mingled and we know that elephants and mammoths were contemporaneous. It is true that the later we progress into the Pleistocene the 'colder' the fauna seems, but there was probably progressive adaptation to the cold throughout the Pleistocene and it may not be fanciful to see in the later and more rugged (and 'specialized') Neanderthaloids a form of man especially resistant to cold.

Moreover, before caves could be used for man's purposes they had to have ceased as channels for subterranean waters.

History of Guattari Grotto

The history of the Guattari grotto is easy to reconstruct.

It was, at one time, invaded by the waters of the Tyrrhenian Sea which left behind a marine strand (with *strombus*, a typical warm-sea shell), then the sea waters receded and soon afterwards the cavern was inhabited by man, by hippopotami and by hyaenas, by rhinoceri, lions, panthers, great horses and fallow deer. The latter is characteristic of the 'hot' fauna which lingered on in the Mediterranean regions during the beginning phase of the Würm glaciation. A landslide, however, sealed up the Guattari grotto before the last 'hot' fauna disappeared from the Pomptine region, although the numerous ibex remains prove that under the lash of glacial climate Apennine beasts had already reached the coastal plains.[1] The Guattari grotto is not by the water's edge so its entrance was protected from invasion for many thousand years.

Treasure

When Guattari and Blanc reached the last cave, they were standing in an innermost sanctum, a chamber nearly circular—about fourteen feet by eighteen—and with a roof lofty enough for a man of medium height to stand upright with ease.[2]

The walls of the cavern showed, down to within a few inches of the floor, a blackening (due to magnesium oxide stain), but below the line thus formed the walls are whitish and free from discoloration. The presumption is that the demarcation indicates an old water-level.

Bones of deer, oxen and horse were scattered about the floor and together with them were some of elephant, of leopard and lion as well as many hyaena bones. Some of these remains were neatly heaped in little mounds around the walls.

Just about on the median line drawn from the entrance, not, however, in the middle of the floor but rather near the face of the farther wall, was, scooped in the earth, a shallow hole, surrounded with a ring of small stones tracing a fairly true oval.[3]

[1] Elephant and leopard and even lion had survived in this part of southern Italy to the time of the Guattari grotto's sealing-up. However, we may imagine the lions of late Pleistocene Europe as well fitted to endure the cold as are the Siberian tigers of to-day.

[2] That is, a modern man of medium height. Neanderthaloid men seem, in general, to have been, by our reckoning, rather short, though no shorter than many extant varieties of men. The Chapelle-aux-Saints specimen—that is about the best preserved of all the Neanderthaloid skeletons (and mostly we have only skulls to work on)—would give a height of about 5 ft. 2 in. The Neanderthal and Spy specimens may have been, when alive, some 5 ft. 4 in. tall.

[3] The stones bear traces of fire.

When Guattari had entered the cave the day before there lay within this circle of stones a round, smooth object.

It was a skull.

It was indeed the Neanderthaloid skull about which Blanc had joked.

At his first visit and under the cranium Guattari found two fore-foot bones (metacarpi)—one of an ox and the other of a fallow-deer. Both showed signs of apparently intentional fractures. The mingling of beasts' bones with those of men is not rare in antique sites.

On the first day one of the girls picked up a fragment of a human lower-jaw which she seems to have further broken in handling, since one of the edges shows a clean, fresh fracture. In any case, the jaw, although that of a Neanderthaloid man, does not belong to the skull whose own mandible was not discovered.

Guattari had picked up the cranium on his first visit. When he and Blanc saw the skull together it was lying upside down, that is to say, reposing on the vault or top of the head. But the parts covered with calcareous concretions and the area of discoloration indicated clearly enough that the cranium had lain for long ages on the left (orbital) side with the right hind or occipital region turned upwards. Guattari, indeed, admitted that he was by no means certain that he had replaced the relic in exactly the same position as he had found it, remarking that what had struck him most when he entered the chamber was the roundness of the object inside its ring of stones.

Tens of thousands of years ago Neanderthaloid men were holding some sort of 'ritual' feast and setting out skulls in a manner recalling the practices of some living men to-day.

Whether or not we accept the 'solar radiation curve' (see below), by which the age of the Monte Circeo relic would be about 70,000 years, it is certain that the cranium is very ancient indeed.

Monte Circeo Skull

'The undelectable habit of cutting away, or bashing in, the base of human skulls—presumably to secure the tidbit brain—is nearly the most ancient human trick we know. Picking someone else's brain is an old family custom . . . and perhaps the first symbolic act.'—PROFESSOR A. E. HOOTON.

The skull is a remarkably well-preserved one if we reflect that it *may* have lain within its miniature and protecting Stonehenge for seventy thousand years or so. The left side, which had been partially buried in the earth, was almost intact. The right side, which had suffered from exposure to damp and water, was mutilated.

In the region of the right temple the skull had been dealt a violent blow or blows sufficient to cause death. This evidence for murder is interesting for although many skulls of early men show what are apparently traces of having been cracked while their owners were alive, most of these crania have been subjected to such pressure and crushing in the earth that it is by no means easy to decide when the splitting of the bones occurred. Moreover, up to the time of the Monte Circeo discovery (with the exception of the Saccopastore specimen that we shall deal with presently) most of the Neanderthaloid remains recovered had been either fragmentary or had been the bones from intentional burials whose subjects usually show no traces of violence.

The upper jaw is toothless and since the tooth-sockets have closed up, the teeth must have been lost during the lifetime of the individual. Such loss of teeth is by no means evidence of great age (by our reckoning), but a Neanderthaloid without teeth must have been brought very near starvation and death.

'*Picking Someone Else's Brain*'

Now, not only had Monte Circeo man been killed but he had also, apparently, been eaten—or part of him had been eaten—since the *foramen magnum*, as we have seen, had been hacked out into a gaping hole measuring some $3\frac{1}{2}$ by $2\frac{1}{2}$ inches. There can be little doubt that this opening had been made in order to extract the brain. This 'old family custom of picking someone else's brain,' as Professor Hooton has aptly called it, seems to be very ancient indeed.[1] The Ngandoeng skulls (see p. 79) from Java and the Ofnet crania (see p. 248) from Germany are examples of ancient utilization of skulls as goblets or dishes in which either the brain was served up or which were used 'on the table' after the succulent titbit had been removed and eaten. Whether such cannibal feasts had, from very remote times, a ritual significance or whether such feasts became ritual with the passage of time and the fixation—by oral tradition—of rites and dogmas arising out of rites, we cannot say. But ritual meals and communions are antique practices.

'*Ritual*' *Position*

And the Monte Circeo specimen not only affords us evidence of cannibalism tens of thousands of years ago, but we must recognize that the skull was placed in what must be called a 'ritual' position. We have a number of Neanderthaloid burials with objects of (apparently) magic import. What seem to be protective fences of

[1] In many lands and times, the skull is a powerfully magic object. Some modern Oceanians keep their ancestors' skulls about the house. The (possibly only modern) explanation for the custom is that the skulls 'attract good fortune.'

animal horns or bones are an almost regular feature of early graves. But the Monte Circeo arrangement is unique. Here we have no burial but a lay-out preserved for us by the hazard of a landslide. That no living Neanderthaloids were trapped in the Guattari caves may, of course, have been due to a fluke. The cave's inhabitants may have all been out hunting, or it may have been summer and they were camping in the open. But it is also possible that they did not live in the caves at all, but that they used them only for ceremonial or ritual purposes as did doubtless the much later 'modern' type men who painted the astounding pictures on the cavern-walls of Spain and France (see p. 238). In any case, the Monte Circeo arrangement appears to have had some ritual and quasi-magical import. Skull-magic runs all through the human story and this Italian cranium within its circlet of stones posed in the bowels of the earth suggests so many later things—some of which are still with us—that we are justified in concluding that in the heart of Circe's Mount we have the first recorded 'religious' ceremonialism of mankind, or at least the first recorded ceremonialism not immediately connected with burial and funerary rites.

The Neanderthaloids

It is some indication of the growth of our knowledge concerning early men that just over two hundred years ago (in 1726) Scheuchzer (the Swiss *savant*) published a description of a fossil salamander from the Miocene formations of Oeningen in Baden and labelled the relic as *homo diluvii testis*—'Man a Witness of the Deluge.'

It is, moreover, only within the last two or three generations that the existence in Europe, during remote times, of (at least) two distinct types of men has been established.

The Neanderthaloids, as we have seen, appear in Europe during the genial Riss-Würm Interglacial and they lived through the rigours of the first Würm glaciation. They were, indeed, as far as we can see, the first men to conquer the cold in Europe.

'Sudden' Appearance in Europe

The record of their bones would tend to make us think that they appeared as 'suddenly' as they seem to have disappeared during the interstadial between the first and second phases of the Würmian glaciation. But what may appear 'sudden' in the palaeontological and geological record may, in effect, have taken centuries to accomplish. Moreover, the mingling of 'industry' types suggests contact between Neanderthaloids and other sorts of men. We shall see, later, that there is indeed some reason to think that some at least of the Neanderthaloid stocks merged into the stem of 'modern' man.

Two Main Groups of Neanderthaloids

Until comparatively recently the Neanderthaloids were generally held to constitute a very homogeneous group. In fact, one French anthropologist put the thing in a nutshell when he declared that 'Extant men show as many variations as do dogs. Neanderthaloids are as like each other as wolves.' The aphorism is, however, hardly true without some qualification.

The changing view of the Neanderthaloids is reflected in the very use of the term 'neanderthal*oid*.' Until a short time ago the word 'Neanderthal' was used to define the whole group with the implication that the specimens we possessed resembled the 'original' Neanderthal remains (see p. 213) found near Düsseldorf in 1858.

It is now, however, quite clear that the Eurasiatic Neanderthaloids fall into two main divisions. The 'Neanderthaloid,' or quasi-Neanderthaloid, remains from e.g. South Africa and Java we can, for the moment, leave on one side.

These Eurasiatic Neanderthaloids must be separated thus: (*a*) the 'classical' Neanderthaloids, of which the Neanderthal remains or those of La Chapelle-aux-Saints or of Monte Circeo may be taken as typical, and (*b*) a more generalized, less specialized and less rugged group of which the Ehringsdorf skull from Germany or the two Saccopastore skulls from near Rome or the Tabūn woman's skeleton from Palestine may be taken as typical.

We may note further that the most heavy 'hyper-masculine' types of (*a*) are not the more ancient but on the contrary the more recent, dating all of them, apparently, from the time of the Würm glaciation (1st phase), whereas the less heavy, less specialized Neanderthaloids of (*b*) are the more ancient, dating, it would seem, from the Riss-Würm Interglacial, and these older Neanderthaloids were, as we shall see, less strikingly unlike 'modern' men than the more 'specialized' forms.

Suggested Interpretation of Evidence

We may interpret this evidence in several ways. Perhaps the first Neanderthaloid invasions of Europe were composed of men of the more 'generalized' type. Or perhaps this type is the result of hybridization between a Neanderthaloid form and another human group already settled in Europe. Again, the later more 'specialized' Neanderthaloids may represent fresh waves of invasions from the East. Or they may owe their rugged features to evolution *sur place* of a type fitted to stand the rigours of the Würm (1) glaciation. It may be that the mutations leading to the 'classical' Neanderthaloid type may not only have accentuated the general 'line' adopted by the Neanderthaloid group, but such mutations may have

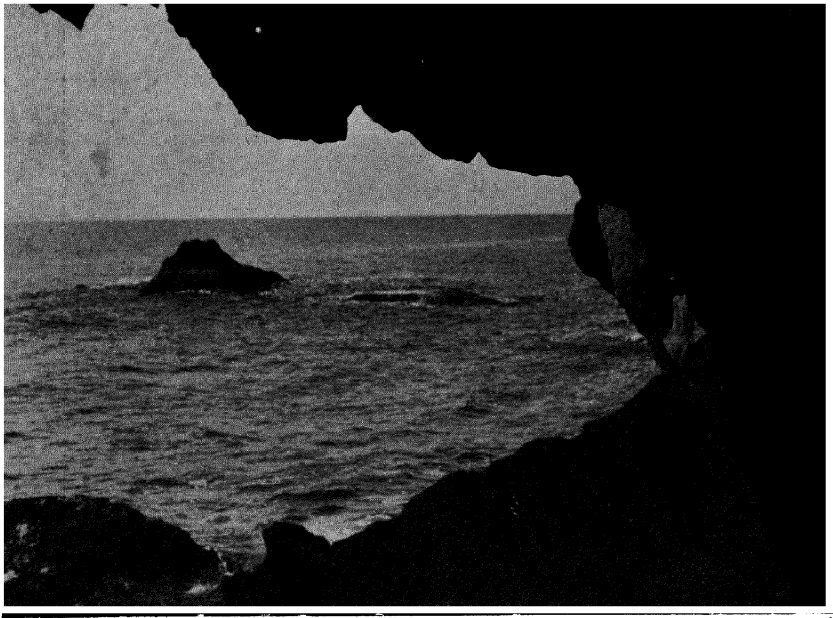


Photo. Prof. A. C. Blanc

FIG. 1.—Looking from the interior across the Tyrrhenian Sea from one of the Monte Circeo caves inhabited by Prehistoric Man

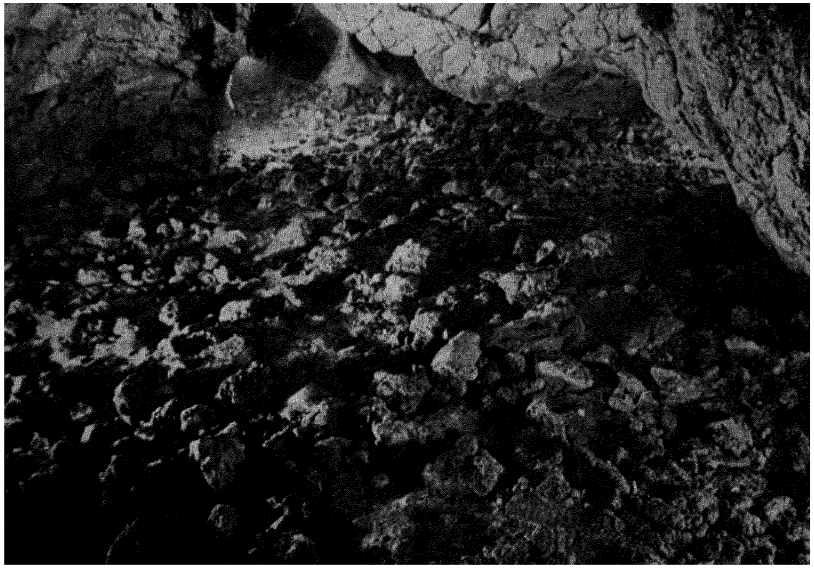


Photo. Prof. A. C. Blanc

FIG. 2—The undisturbed floor of a Neanderthaloid Man's dwelling

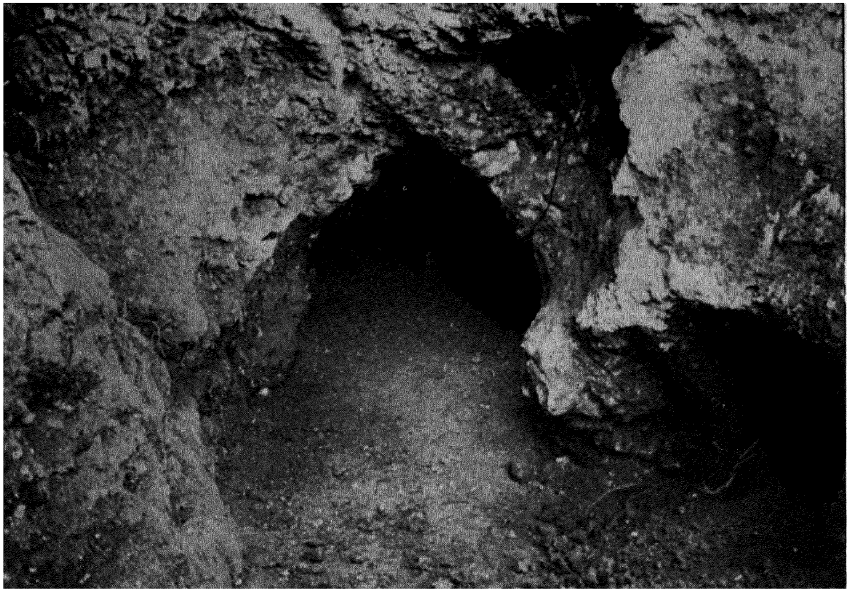


Photo. Prof. A. C. Blanc

FIG. 3—The entrance of the tunnel leading into the Guattari Cave as it was laid bare by the workmen's picks in 1939



Photo. Prof. A. C. Blanc

FIG. 4—Inside the Guattari Caves. To the left is the entrance into the chamber where was discovered the skull (Figs. 5, 6 and 7)

proved favourable for survival during the very severe climatic conditions of the Glacial.

In any case, the 'classical' Neanderthaloids show features of what we may call 'over-specialization' indicating a group towards the end of its survival-capacity. It is the members of this group who are 'as like each others as wolves' and among human beings, at any rate, a high degree of physical uniformity among a population is a sign of ill-omen. It is in physical—and spiritual—diversity that human groups best maintain the adaptability necessary for long survival.

Among 'modern' men an excess of pituitary activity or a pathological enlargement of the pituitary gland will produce either (or both) an augmentation of certain parts of the skeleton ('acromegaly') and an augmentation of all parts of the skeleton ('gigantism'), sometimes accompanied by pseudo-Neanderthaloid appearance of the skull. In 1927 F. C. C. Hansen of Copenhagen received from Greenland a cranium unearthed at a place called Gadar in the south-west of the island, and this Gadar (or Ikaliko) relic (found in a modern grave—there were Norse settlements in the ninth century and by the eleventh there was a cathedral at Gadar), had it been discovered in a 'Mousterian' context would have been probably accepted as Neanderthaloid.

But although the 'classical' Neanderthaloids may have wilted in the genial conditions of the first Würmian Interglacial, although their physical evolution may have led them along a line to a dead end, and though these 'classical' Neanderthaloids disappear as a distinct type, their 'blood' (as the metaphor goes) may have run into the veins of the Upper Palaeolithic 'white' men of Europe.

'Classical' Neanderthaloids

The 'classical' Neanderthaloids of Europe—we shall consider the other Neanderthaloid groups later on—differ characteristically from 'modern' men—men now extant—in many particulars.

The long bones of the arm and of the leg, the shoulder-blades and some of the ankle-bones are of a form and shape never found in *homo sapiens*. The long bones are especially heavy and thick in the shaft with large joints and such marks of muscle-attachments as indicate very considerable physical strength, probably exceeding that of any normal man now living. The ribs are thicker and less flattened than in 'modern' man and give the thorax a 'barrel-shape.'

The 'classical' Neanderthaloid skull is unmistakable and no one who has examined such a cranium can fail to recognize the type. Perhaps the most striking feature is the huge brow-ridge or 'supra-orbital torus' forming a heavy bar right across the face

and not flattened above the nose as in all varieties of 'modern' Man. The orbits or eye-sockets are larger than in our skulls and compared with that of *homo sapiens* the face is long (and seems longer because of the low skull-vault) and the nasal aperture is wide.[1] The space between the nose and the upper teeth is greater than in 'modern' men and the cheek-bones slope backwards. But this formation of the face is not ape-like since the 'higher' monkeys have marked cheek-bones. The 'canine fossa' (a depression in the upper jaw beneath the orbits) is wanting in the Neanderthaloid skull and it is almost always present in 'modern' Man.

The mastoid process (the little bump or tubercle behind the ear) is smaller in the Neanderthaloids than in our crania. There is a marked ridge at the back of the head (the occipital torus) and the head is always long compared with its breadth (that is to say it is 'dolichocephalic'), while the attachments for the neck-muscle generally extend farther upwards than they do in 'modern' Man.

The palate is long, broad and U-shaped—not parabolic as in *homo sapiens*—and there is generally only a slight (and often no) indication of the chin-protuberance at the tip of the lower jaw.[2]

The molars or grinding-teeth often show a condition known as 'taurodontism' (i.e., 'ox-toothedness') with a considerable enlargement of the pulp-cavity extending downwards from the crown to the roots.[3]

Neanderthaloid Skull

The skull is low-pitched and is somewhat constricted about the temporal region (i.e., above the temples), although the average volume of the Neanderthaloids' brain seems considerably to have exceeded that of most 'modern' men. But the latter have the top of the head more elevated, the parietal walls more abrupt and the frontal region relatively larger and better filled out.

On the other hand, the *foramen magnum* (the main opening at the base of the skull through which the brain is connected with the spinal cord) is generally held to have been in the Neanderthaloids not only of characteristic contour (oval instead of round) but also placed farther back than the analogous opening in 'modern' men's skulls. From this position evidence has been accepted to support the theory that Neanderthaloid man's head was held forward in an

[1] The lower border of the nasal aperture is generally sharp and the spine of the nose exceptionally prominent.

[2] The evolution of the chin has not been by an excrescence growing out of the lower jaw but by way of a recession of the lower jaw's teeth.

[3] But 'taurodontism' does not occur in all Neanderthaloid skulls. All Neanderthaloid teeth examined up to now have been free from decay though often much worn down from abrasion by foodstuffs.

'ape-like' manner. However, the Saccopastore Neanderthaloid skull (see p. 37) shows a *foramen magnum* in shape and position like that of 'modern' Man.

Now, most of the Neanderthaloid skulls recovered have been crushed in the earth and have had to be reconstituted (generally it must be said in a most able manner) and it is a thousand pities that the only well-preserved and uncrushed Neanderthaloid cranium—that of Monte Circeo—should have its base so hacked about that nothing can be deduced therefrom as to the exact position of the *foramen magnum*. The belief in the ape-like jut of the Neanderthaloid head is largely based upon Boule's classical description of the La Chapelle-aux-Saints Neanderthaloid skull from south-western France.[1]

Chapelle-aux-Saints and Monte Circeo

But the La Chapelle remains had to be remounted and it is probable that they were to a certain extent distorted, so that the cranium as it is presented to-day is elongated and both the backwards position of the *foramen magnum* and the prognathism of the jaws (i.e., their 'snouty' appearance) have been exaggerated. In any case, the Monte Circeo skull (that we may remember is of the same 'classical' type of Neanderthaloid as the La Chapelle cranium) shows little projection of the upper jaw.

For the rest, the Monte Circeo and La Chapelle specimens are strikingly similar. Both would appear to be of males of approximately the same age (forty to fifty years).[2] The cranial capacity of the Monte Circeo skull is great—perhaps as much as 1,550 c.c.—(which is higher than the average of any group of 'modern' Man), there is the usual U-shaped palate, the face is somewhat narrow for its height (and for a Neanderthaloid) and the nasal bones indicate a fleshy nose both higher and wider than that recorded for any other Neanderthaloid up to now.[3]

[1] Boule's description (in *Les Hommes Fossiles*) of the La Chapelle-aux-Saints skeleton (which has been taken as valid for all the Neanderthaloids) is, essentially, thus: 'Corps de petite taille, très massif. Tête très volumineuse. Indice céphalique moyen. Crâne très aplati, arcades orbitaires énormes formant un bourrelet continu. Front très fuyant. Occiput saillant et comprimé dans le sens vertical. Orbites très grandes, rondes. Une attitude bipede ou verticale moins parfaite, que chez les hommes actuels. Jambes très courtes. Capacité céphalique moyenne d'environ 1,400 centimètres cubes.'

[2] On this vexed question as to the validity of the evidence for age in the Neanderthaloids it may be noted (*a*) that the sutures in the Great Apes close earlier than in 'modern' man, and (*b*) tooth attrition in the Neanderthaloids agrees in degree with that of 'modern' men nourished on what we may consider an analogous diet to that of the Neanderthaloids. Thus, a Neanderthaloid skull showing (by suture occlusion) an age that (in 'modern' Man) would be set at, say, forty years, also shows the same degree of tooth-abrasion as a 'modern' Man of the same age who has fed on comparable foods.

[3] The Monte Circeo skull is rugged and 'characteristic' enough of the 'classical' Neanderthaloids. The frontal torus over the eyes is strongly developed and the occipital or hind region projects in the usual manner (cf. not only La Chapelle, but also La

Carriage of Neanderthaloids

As to the upright posture of the Neanderthaloids, the vertebral column is just that part of the skeleton about which we know least, but what we do know hardly induces us to think that these men's posture was markedly slouching. The slight flexure of the knee-joint (indicated by the shape of the tibiae) can indeed be paralleled among many types of 'modern' men who habitually squat.

In any case, it would be gratuitous to conclude that any Neanderthaloid was the shuffling ape-like creature presented to us by fanciful 'reconstructions' ranging from the ludicrous statue at Les Eyzies to the drawings that adorn some 'popular' (and indeed unpopular) 'science' booklets and books.

Saccopastore Skulls

The story of Saccopastore is less exciting than that of Monte Circeo but it is no less illuminating.

Saccopastore is a piece of land belonging to the *duca* Grazioli and it lies near the bridge on the old *via nomentana* some two miles from the Porta Pia just where the new suburbs of Rome merge into the Campagna. We are here on classical ground.[1]

In 1929 some workmen digging in a gravel-pit unearthed a human skull from a level where were also recovered remains of a hot fauna (e.g., *elephas antiquus*, *rhinoceros mercki* and *hippopotamus major*). The gravels and sands hereabouts are stuffed with volcanic scoriae swept down by the rivers at a time when the lower valley of the Tiber was taking on its present form and shape. Saccopastore is in the vale of the Aniene (the ancient Anio) stream and this low terrace where was found the skull is just above the Flandrian 'inundation plain,' that is to say the formation laid down when the waters of the Mediterranean reached far inland. The skull, therefore, belongs to the Riss-Würm Interglacial and thus antedates the Monte Circeo cranium. When the Saccopastore skull became buried the Monte Circeo cavern was filled with the waters of the Tyrrhenian Sea. According to the Milankovitch 'curve' the age of the Saccopastore relic would be about 130,000 years.

Ferrassie specimen from south-western France). Boule estimated the capacity of the La Chapelle skull at 1,620 c.c. That of La Ferrassie probably exceeded 1,700 c.c. The Belgian anthropologist Fraipont judged the capacity of the Spy I skull to be about 1,562 c.c. and that of Spy II at 1,723 c.c. These figures he communicated to the late Marcellin Boule who could not bring himself to publish them as he considered that they were *effrayants*. The maximum length of the Monte Circeo skull is 0.204 metres and the maximum breadth 0.155 metres. As the Monte Circeo skull was discovered on the eve of the late war, the literature (with the exception of short notices in, e.g., *L'Anthropologie*) is all Italian. Professor Sergio Sergi, of Rome University, published a preliminary notice in the *Rivista di Antropologia* (1939) under the title, 'Il Cranio Neandertaliano del Monte Circeo.' See also his monograph by the same title in the *Rendiconti della R. Accademia Nazionale dei Lincei* (1939).

[1] Within ten miles of Rome six Mousterian stations are known and within a radius of a hundred miles no less than twenty-seven have been identified.

The skull is not quite complete. The supraorbital torus was chipped off by the workmen's pickaxes as they disengaged the cranium from its resting-place. The zygomatic arches (the bony arches formed of part of the malar and temporal bones of the face) were lost in very ancient times. And in the vault of the cranium there is a roughly circular hole also made at the time of the discovery. But, for the rest, the specimen is in an excellent state of preservation and must be accounted one of the finest and most important of Neanderthaloid relics. Most of the facial bones are intact, and most interesting of all, the Saccopastore skull is the only one of its type for which the whole of the base has been preserved. The palate is high. There is some asymmetry of the face, due, it may be, to post-mortem distortion.

'Generalized' Neanderthaloids

The specimen is undoubtedly 'Neanderthaloid' but it is of a sort of Neanderthaloid differing rather markedly from, for instance, that of Monte Circeo. There is the same relatively large face compared with the vault of the skull (that is noticeably low). The jaws (or rather the upper jaw—the lower is wanting) are set far forward although the upper jaw is not 'snouty.' The cranial capacity is small and may not reach 1,200 c.c. From the state of the cranial sutures and the teeth, Sergi sets the specimen as that of a woman aged about thirty years. Although the skull looks long when seen from the side (*norma lateralis*) it is, as a matter of fact, owing to its great breadth almost brachycephalic (i.e. 'broad-headed' in the anthropological sense, that is, possessing a ratio of head length to head breadth of between 81.0 and 85.4). Although the back of the head or occiput is prominent there is by no means the marked occipital torus of the 'classical' Neanderthaloids (e.g. that of Monte Circeo). The lambda region at the back of the skull contains a whole series of little 'supernumerary' bones very rare in 'modern' man and these have been held by Sergi to indicate a 'morphological instability of the superior occipital region that is in process of evolution.'[1] The protuberance of the skull in the region of the third frontal convolution of the brain may indicate a good development of the area associated with the possession of articulate speech. The position and the inclination of the *foramen magnum* suggest a fully erect posture for Saccopastore man.[2]

[1] Supplementary small bones in the lambdoid region are, however, characteristic of the Neanderthaloids as a group (e.g., La Chapelle, La Quina, Monte Circeo, Spy)—such signs of 'morphological instability' may point to (*a*) recent evolution or (*b*) further evolution in a 'modern man' direction—perhaps.

[2] So also would the *foramen magnum* of the Gibraltar skull which is (*vide infra*) of the same type of Neanderthaloid as that of Saccopastore.

The long face has huge orbits and a large and low nasal aperture with a nasal spine projecting sharply.

In July 1935, A. C. Blanc and the eminent French prehistorian the *abbé* Breuil, during a visit, in search of fossil molluscs, to the Saccopastore gravel-pit, discovered a large fragment of another skull—or rather the small fragments embedded in a block of conglomerate, added up to a large fragment when they were pieced together. The fragment consists of most of the face with the right zygomatic arch and the right-hand portion of the supra-orbital torus. For its reconstitution the skull took four years of patient labour. It is clear even from this incomplete specimen that Saccopastore II is very similar to Saccopastore I.

These Saccopastore men made and used Mousterian tools as did all the other Neanderthaloids of Europe—as far as we can see—and they lived on the plain of Latium at the time when violent volcanic eruptions constantly shook the land.

The Saccopastore type of Neanderthaloid (and we shall see there are others which must be classed among this general 'Saccopastore' group in the sense that although the differences between the members of the group are in some ways considerable, still, they all are rather sharply distinguishable from the more homogeneous 'Monte Circeo' or highly specialized group of Neanderthaloids) is, on the whole, less unlike 'modern' man than the 'classical' (and, we may remember, later) Neanderthaloids. In fact, the 'generalized' group, had we sufficient specimens of its members to study, would probably have to be divided up into a number of sub-groups (S. Sergi already proposes that Saccopastore I and II and the Gibraltar specimens should be classed as what he calls the 'Mediterranean' variety of Neanderthaloids) and this variety of type points, perhaps, to evolutionary activity as compared with the 'static' quality of the later 'classical' Neanderthaloids.[1]

The Neanderthaloid Problem

Here, then, we have exposed for us by these important Italian specimens the main lines of the Neanderthaloid problem as far as it concerns the evolution of mankind. During the Riss-Würm Interglacial Europe was inhabited (exclusively?) by Neanderthaloids of the more 'generalized' type, i.e. by Neanderthaloids less unlike ourselves than the later Neanderthaloids. Yet the mixtures of tool-types in the Middle Palaeolithic do not suggest that we are faced in this age with one homogeneous population and it may well be

[1] See Sergio Sergi: *Craniometria e craniografia del primo paleantropo di Saccopastore* (*Ricerche di Morfologia*, Rome, 1944) and *Sulla morfologia cerebrale del secondo paleantropo di Saccopastore, Craniografia del secondo paleantropo di S.* and *Craniometria ed iconografia del secondo paleantropo di S.*, all publications of the *Accademia d'Italia* and issued respectively at Rome in 1942 and at Florence in 1943.

that the Acheulian 'hand-axe' makers were fused into a Neanderthaloid population just as their artefacts were adopted into the Mousterian stone-implement 'complex.'

In any case we hardly know for the Europe of the Riss-Würm Interglacial (but see p. 211) any human types but those of the 'generalized' Neanderthaloids (e.g. Ehringsdorf, Steinheim and others and perhaps the enigmatical Swanscombe, see p. 210). The question is, Are such generalized Neanderthaloids the product of hybridization with other stocks of men (e.g. the Acheulian hand-axe makers?) or are they Neanderthaloids in process of evolution towards a 'modern' Man type?

These earlier Neanderthaloids seem to have disappeared from Europe before the peak of the first Würmian glaciation when Europe, as far as we know, was inhabited only by Neanderthaloids of the rugged 'classical' type (Monte Circeo, of Neanderthal and of La Chapelle-aux-Saints, etc.).

On the face of it, it certainly looks as though Neanderthaloids of the Saccopastore type were moving in a general 'modern' man direction. For instance, the development of the protuberance of the skull corresponding to the third frontal convolution of the brain (region of articulate speech) looks more 'modern' than the same area in the 'classical' Neanderthaloid skull and the cerebral imprint of Saccopastore II cranium is like that of *sapiens*.[1]

Of the evolution of the Neanderthaloids from general pithecanthropoid stock there can be little doubt. Morphologically, as Weidenreich has demonstrated, there is a convincing series from *Pithecanthropus* through *Sinanthropus* (see p. 106) to the Neanderthaloids (and he would have it to 'modern' Man). The problem which interests us is that of the relation of the Neanderthaloid type to 'modern' men like ourselves. We shall see how the evidence lies.

For the moment we have examined on Italian soil the capital specimens enabling us to establish for our story some fixed points both in type and in time.

Classification

Before we go farther it may be as well to say a few words about classification. We are all, more or less, taxonomists even if we do not realize that we are, since 'taxonomy' just means 'classification' although our classifications—of ourselves as well as of our fellow-

[1] Of course, as we shall have occasion to note later on, the existence of an elaborate and highly technical artefact-industry is in itself an indication that the makers of the tools must have been able to communicate with each other in speech. As Hooton well puts it, 'Would men have gone on making the same inefficient handaxes throughout the greater part of the Glacial Epoch unless they had been subjected to the compulsion of oral tradition (education, if you like), e.g., the cutting edge went right round the base so that it scored the horny palm of the user "because that's the right way to make them."'

human beings—are, for the most part, based upon cultural considerations and are informed with much prejudice some of which may, of course, be excited or sustained by physical differences as between one variety of man and another.

Zoological classification dictated by anatomical, morphological and typological considerations is satisfactory enough until we come to Man. There is, indeed, no general agreement as to how his various types should be grouped. However, some arrangement must be presented or we shall be endlessly confused by a vague terminology.

'Species'

It is, perhaps, best to start with an attempted definition of the word 'species.' There is among taxonomists perhaps only one generally accepted definition of the 'species' concept:

'a species is a community, or a number of related communities, whose distinctive morphological characters are, in the opinion of a competent systematist, sufficiently definite to entitle it, or them, to a specific name.[1]

This is pleasingly reminiscent of Sydney Smith's definition of an archdeacon as one 'who performs archidiaconal functions.'

But we want some valid definition of 'species' as applied to Man.

And, for our purpose, we may hold that 'interbreeding without loss of fertility' can be accepted as the criterion of a 'species.'

As all extant sorts of Man are indefinitely interfertile it is clear that we cannot group the different stocks of living men into classes dignified with any more significant name than that of 'sub-species'—at the most.

Time Needed for Formation of Species

New types are born. Other types die out. Types in full vitality evolve.

Such is the image of life.

On the palaeontological evidence alone, it does seem that types evolve in a definite direction but the palaeontologists are unable to define what may be the 'internal urge' determining the evolution in a definite direction. It may be that the role of natural selection is primordial though such selection must operate, it would seem, with mutations as they arise.[2]

[1] Tate Regan.

[2] Teilhard de Chardin has cited the example of those Chinese burrowing rodents sometimes known as 'rat-moles' which have long evolved in a closed environment free from outside interference. The line of the 'rat-moles' is represented from the Pontian to the present time and these mammals present a whole series of 'progressive' evolutions relating to body-size, form of cranium and of vertebral column, formation of teeth, etc. All this evidence seems to point to 'orthogenetical' evolution.

As opposed to the palaeontologists, the geneticians favour the conclusion that physical transformations are effected, mainly, in a discontinuous manner, that is, by brusque jumps and without any definite direction.

It may be that in biology, as in other sciences, what is true upon one scale is not true upon another and that new determining factors appear at certain scales.

But most of the geneticians admit that natural selection plays an important part in maintaining an equilibrium among the multiplicity of mutations thrown up.

So we may be led to a synthetic theory of evolution wherein is united the phenomena of natural selection with the infinite variety of phenomena presented by mutations.

The formation of 'species'—that is to say of morphologically cognate groups whose members are not interfertile—or, at least, not indefinitely interfertile—takes very long. The time demanded may vary from group to group and in differing conditions. Evolution seems to be jerky, with periods of comparatively rapid differentiation alternating with periods of prolonged, apparent quiescence. More sub-species would seem to be thrown off by young (i.e. lately differentiated) species than by 'old' ones. Still, there is good reason to hold that the *minimum* period demanded for the formation of a fresh species is in the region of half a million years. No new species of European mammal has appeared since the last (Riss-Würm) Interglacial—a very long time ago.

And half a million years may take us back to the time of *Sinanthropus* and *Pithecanthropus* which *may* have been archaic forms subsisting after the differentiation and evolution (from common ancestors with them) of men less unlike ourselves, but, on the other hand, it is *possible* that these Peking and Java men were the direct ancestors of *homo sapiens*.[1]

Classification of Men

Some systematists would subdivide to the extent of regarding *homo sapiens* and the Neanderthaloids as forming a *genus* distinct from that of the pithecanthropoids (i.e., *Pithecanthropus* and *Sinanthropus*). These same taxonomists, moreover, would class such different types of extant men as Negroes and Mongoloids into different species. But if a Negro is specifically different from a Mongoloid then we must have some quite new definition of the word 'species.' At any rate, non-interfertility will not do as a test of specific difference since all extant men (as were probably *homo sapiens* and

[1] But the time seems short and it may be more prudent to think of *Pithecanthropus*, for instance, as one (albeit an antique and 'ancestral' form) of several types of hominids coexisting in Mid Pleistocene times.

Neanderthaloid) are (for their normal and sexually active members) interfertile.[1]

Leaving for the moment the pithecanthropoids on one side, it may be expedient to recognize but one *Species*—Man, with *sub-species* such as Neanderthaloid and *sapiens*, and the *varieties* of sapiens—Negroid, Mongoloid and so forth.

'*Race*'

'Physical anthropology got itself into trouble by attempting to divide mankind into sub-groups that were supposed to be, or once to have been, mutually exclusive.'[2]

When we come to the word 'race' we find greater confusion than with the word 'species.' After all, species is a specialist's concept. 'Race' is a term of every-day speech.

Scientific vocabulary is of modern invention and those disciplines owing little to past prejudice and to pre-scientific and deductive reasoning have, for the most part, escaped the imprecision of terms which clogs our minds when we discuss human beings. We cannot wholly divorce ourselves from prejudice, however, in our study of Man for the reason, if for no other, that we must use in this connection at least some words which are at once vague and charged with bias.

In most fields a strict definition of terms generally will be found to dissipate grounds for disagreement. But, of course, most of us wish to disagree with others about many things and, therefore, we are hostile to strict definition of the terms we use in our arguments.

As Alceste says in *Le Misanthrope*:

"*Moi, je veux me fâcher, et ne veux point entendre.*"

It has been acutely noted that we rarely feel deeply and violently about a subject we can clearly define. It is the vague and the imprecise which really move us. Moreover, we are inclined, if pressed, to agree that any given word must (*a*) mean something definite, and (*b*) describe something having a 'real' existence. But, of course, neither of these propositions is, necessarily, true.

It is not, indeed, expedient, and it would probably be useless, to demand a universally agreed definition for all the words in

[1] It is hardly necessary to state that there is no interfertility of any sort (i.e., confined to one generation or indefinite) between men and our nearest living relations the anthropoid apes. From this, alone, we should be inclined to surmise (what is suggested by other evidence) that apes and men branched off from a common stock a very long time ago. But although there is no interfertility between Man and the apes precipitin blood-tests allow us to estimate the degree of *one sort* of relationship between ourselves and the anthropoids. On the basis of the precipitin tests chimpanzees come nearest to us, then orang-utans, then Old World monkeys, New World monkeys and lastly the lemuroids —which are hardly relations at all.

[2] A. J. Fleure, F.R.S.

common use, since, did such a definition exist, nine-tenths of what we have to read and hear would be recognized for what it really is—that is non-sense. In any scientific discipline, however, we must have agreed definitions of main terms—otherwise we are beating the air.

'Race' was a word pretty loosely used until quite recent times. When it—and its equivalent in other tongues—was seized upon as a slogan, there was a counter-movement, at least among scientific workers, to remove the 'race' from the class of imperative nonsense-words to that of the clearly defined terms. But this counter-movement has been only partially successful. Much time has been spent—and largely wasted—in attempts to settle what the word 'race' should mean both for scientists and for educated and unprejudiced men generally. No definition has been agreed upon. Or, at least, no positive definition has been agreed upon, although there *is* agreement that the word 'race' should not be employed to describe any group of human beings differentiated from other groups by cultural characteristics only.

It may be arguable that 'race' can be legitimately used to describe 'varieties' of human beings—though most human groups are so intricately interbred and intermixed that there will probably always be disagreement as to what constitutes a 'variety' *senso strictu.* It would be better to drop the word 'race' altogether from the anthropological vocabulary.

There is for us only one race of men. The Human Race.

Artefacts

During his excavations in the Pomptine Fields—whose bordering sand-dunes are set with the fossil stumps of such silver-firs as now deck the mountains of the Norwegian coasts—Blanc unearthed both 'Mousterian' and 'Upper Palaeolithic' types of stone tools.[1] The scrapers, points and discoidal cores making up the Mousterian industry of this region differ slightly in type from the 'classical' Mousterian of farther north (e.g. France) and they rather resemble the Mousterian tools from the Castillo grotto in Spain or those recovered with the Gibraltar skull.

The surface of the Guattari grotto, however, yielded only a few worked flints and some limestone pebbles that had been used as 'percutors,' together with a much more numerous collection of flinty pebbles of varied Mousterian types. These latter were, indeed, identical with those from the lower strata of the *Grotta del Fossellone* (one of the Mount's seaward caves) and from the peat levels of the

[1] Blanc calls this Pomptine Mousterian 'Pontinian'—it is, however, not unlike that from the 'Abri Jourdain' in south-western France. The Upper Palaeolithic of the Pomptine is an Aurignacian industry called by Blanc 'Circean.'

'Mussolini' Canal in the Pomptine Fields or from the ferruginous sand-dunes of Nettuno fringing the beaches where the battle raged so fiercely at the time of the Allied landings in 1943.

No tools of Upper Palaeolithic, that is of 'modern' man,[1] were to be found in the Guattari caves since the landslide had blocked and hidden their entrance before his appearance.

The record of man's artefacts is, indeed, a complicated one all the implications of which are, as yet, by no means fully apparent.

Ways of Making a Stone Tool

Now, there are two main ways of making out of a piece of stone a tool or artefact. We can chip away bits of the stone so as to leave a more or less sharp-edged core, or, we can strike a flake from the stone and use the flake.

Although in dealing with Man's 'industry' most of the material consists of stone objects, it is possible, perhaps probable, that they were not the first artefacts used by Man. After sticks and wooden batons it may be that broken and chipped bone tools were the earliest tools and weapons. It is certain that bone implements were extensively used over a vast period of time and we must keep in mind the existence of a bone industry parallel with a stone one.[2]

Core *and* flake artefacts are found together from very early times though it is possible that instruments of the core type were the first stone artefacts to be fashioned. Flint is generally used. It has advantages over any other sort of stone but substitutes were employed (e.g. quartzite, chalcedony, obsidian and so forth) when flint was unobtainable.

Flints

Early men seem to have lived, if they could, in a flint area—and flints are by no means scattered about everywhere on the earth's surface—and flints may have been one of the first of Man's imports and exports.[3]

[1] That is to say before the appearance of 'modern' Man which is attested for the so-called 'Laufen' warm interstadial period between phases I and II of the Würm glaciation, although 'modern' Man may have existed earlier in Europe (*vide* p. 211).

[2] Menghin, the Austrian prehistorian, would schematize early cultures into a northern bone culture, an eastern flake culture and a southern hand-axe culture. He assumes a general stage of wooden tools and weapons and then a primitive stage of bone instruments. It is possible, also, that bone implements continued to be used ritually after they had ceased to be employed generally. So stone survived ritually into the metal ages and bronze cult-objects were maintained long after iron had for ordinary use ousted other metals.

[3] Though early men may well have preferred to a bulky consignment of flints, a few much less bulky but very efficacious substances of magic import.

Two Ancient Provinces

In the early Stone Age, that is in early Palaeolithic times, the Eurasiatic continent seems to have been divided into two vast 'provinces.' To the north of the great mountain-barrier which scores the double-continent from west to east, flakes only have been found. To the south of this Great Divide, flakes and cores occur together. But the most remarkable thing is, perhaps, the unity of technique over huge areas. There stretches, for instance, a great belt of Abbevillian-Acheulian core-tools or 'hand-axes' from Portugal to India and even Java.[1]

Do these two 'provinces' of material culture correspond to two areas inhabited by different sorts of men?

If we could answer 'yes' to this question the problems of prehistory would be considerably simplified.

But there are overlappings, intermediate types and apparent resurgences. The whole record of men's artefacts seems even more involved than it did even a few years ago. The problems are (among others), can we correlate such a record with evidence for (*a*) the contemporaneous existence of different types of men? or for (*b*) the cultural—and therefore probably the physical—intermingling of different types of men? or for (*c*) the reappearance of certain types of men in regions formerly abandoned by them?[2]

As we shall see the physical relics of men in these times of the early Stone Age are slight in the extreme. It is *possible* that men of approximately 'modern' type existed much longer ago than was only recently suspected. In these circumstances are we to attribute the European core-cultures to a 'modern' type of Man as long ago as, say, the Günz-Mindel Interglacial and are flake tools essentially associated with types of men we may roughly call 'Neanderthaloid'? No answer can be given, though we shall see later what the indirect evidence suggests.[3]

But if we could attribute certain types of artefacts to certain types of men, since it is clear that from very early times there has been intermingling of industry-types, as we examine the evidence it may strike us that men have been cross-bred from a period of remote antiquity.

'Northern Province'

As far as we can see the 'northern province' begins with the crudely chipped cherts and quartzes (so-called 'Pre-Mousterian')

[1] It must be noted, however, that we are still far from being able to present any general scheme of artefact classification applicable to the whole world.

[2] The European core-cultures may have had an eventual Asiatic origin, possibly in a region to the south of the mountain-barrier, e.g., north-western India or the Iranian plateau.

[3] In any case we may take it as certain that glacial action in those regions subjected to it swept away most of the physical remains of very early Man.

found with the remains of Peking Man (*Sinanthropus*) and ends its Middle Stone Age with a developed Mousterian type of tools.

As yet there has been forthcoming from northern Asia no evidence for Lower and Middle Palaeolithic flake tools other than of these two types. There is no trace of the other flake artefacts (so common in Europe, the Near East and Africa) and still less of any of the early core-cultures that figure so prominently in regions farther west.[1]

'Southern' Province

Disregarding consideration of the so-called 'eoliths' and even of the 'rostro-carinates'[2] from East Anglia, the first core industry we find in Europe is that for long called 'Chellean' but now 'Abbevillian.' Boucher de Perthes' first hand-axes found in the Somme gravels were crude almond- or pear-shaped flints, roughly flaked on both sides and with two sinuous faces converging to a point. These artefacts were fashioned from flint cores or entire pebbles. These objects *may* be dated to the Günz-Mindel Interglacial and they are apparently contemporaneous with the 'Clactonian' flake-culture[3] and the 'Cromerian' 'blade' culture. The earliest Abbevillian artefacts are indeed found (near Abbeville in the Somme Valley of northern France) overlying what is probably a Günz 'solifluxion' gravel. And the associated faunal remains are those of 'hot' beasts indicating an Interglacial climate.

Men in Glacial Europe

We may not be wrong in supposing that in these very early times the greater part of Europe was inhabited only during the genial (but immensely long) Interglacials. During the Glacial Epochs, men—who were then, and until comparatively recent times, rather rare animals—either died, or moved, off.

We do not know that any sort of men weathered the harsh conditions of an European Ice Age until the Neanderthaloids braved the Würm I glaciation.

It is possible that during the rigours of the Mindel glaciation, European men with their Abbevillian culture retreated to Africa since there is a great Eurafrican core-tool province over which is distributed a generalized type of Abbevillian tool. These hand-axes last long in Africa and the types merge into each other with an

[1] But see p. 112 for a solitary core-artefact from Locality 15 at Choukoutien.

[2] The Norfolk 'Crag' strata may be of Günz Glacial times for the next Norfolk deposit —the 'Cromer Forest Bed'—has a fossil fauna similar to that found in association with the 'Mauer Jaw' (see p. 206) and that follows directly after a Günz 'horizon' or Glacial complex, and has an industry possibly comparable with the first stage of the 'Abbevillian.'

[3] 'Clactonian' was found *in situ* at Swanscombe (see p. 210) with *elephas antiquus*, rhinoceros and hippopotamus, all 'warm' or 'hot' beasts indicating a sub-tropical climate in England at the time they flourished there.

unbroken continuity suggesting no great climatic change involving disappearance and reappearance of populations.

Acheulian Cultures

When the hand-axe makers returned to Europe—or to northern and western Europe—after the end of the Mindel glaciation, a new sort of artefact, the so-called 'Lower Acheulian,' appears fully developed and Acheulian core-production lasted in Europe throughout the Middle Palaeolithic and was caught up and integrated into the later 'Mousterian complex.' During the long Mindel-Riss Interglacial the core-tools of north-western Europe were exclusively of 'Early' and 'Middle' Acheulian types. Since this Acheulian type of tool appears in Europe as a fully developed industry, its origins must, most probably, be sought outside Europe. The Acheulian hand-axes are thinner, finer and better-made than the Abbevillian and the Acheulian tool can be reproduced by striking a flint core (held in one hand) with a wooden baton.

Clactonian Artefacts

However, after the passing of the Mindel Glaciation, the so-called 'Clactonian' flake-tool is still found, so it may have survived during the Mindel glaciation in relatively favoured parts of Europe.

In the Clactonian technique a core of flint has a flake knapped off to furnish a striking platform on which the knapper struck a blow obliquely (as the core rested upon an anvil of rock) so as to detach a sharp-edged and fairly flat flake. Later Clactonian artefacts were produced by means of 'pressure-flaking' with wood and in this manner finer and more regular trimming was effected. All Clactonian tools have the striking-platform at an angle of about 120° to the long axis of the flake.

This Clactonian technique looks, however, like a continuation—or a renewal—of the old Cromerian flake-technique.

Thus, in Mindel-Riss interglacial times we have in Europe both Acheulian core-industries and Clactonian flake-industries existing side by side.

There seems to have stretched east of the Rhine a zone of flake-cultures. In north-western Europe, a northern continuation of the Clactonian flake-culture (East Anglian 'Breckland') overlaps the Acheulian and a southern continuation of the flake-culture intrudes as 'Tayacian' into the predominantly 'Acheulian' country of southern France.

Abbevillian and Acheulian[1] artefacts are found scattered about

[1] In their final form the Acheulian hand-axes become small, flat, triangular pieces and hand-axes of this general type have been found not only in western Europe, but in North Africa, in the Great Lakes region of East Africa, in South Africa, in Syria, in Palestine and in India.

the mountain spine of Italy and especially on the Adriatic side. On the Island of Capri and at Terranova di Venosa, the core 'bifaces' are found with the remains of *elephas antiquus*, of hippopotamus and of rhinoceros (*mercki*) and Abbevillian cores and Clactonian flakes have been unearthed at the gates of Rome. Italy, as from its position and southern exposure we should expect, was undoubtedly peopled—and possibly continuously peopled—from very early times.[1]

Levalloisian Technique

And, before the onset of the Riss glaciation this evolved Clactonian appears to have given rise to a new flake-culture—the 'Levalloisian.'

The Levalloisian flake was detached in a peculiar manner. First of all blows were directed to produce a facetted striking-platform, then a blow aimed inwards stripped off a flake with a base at right-angles to the long axis. The Levalloisian type of instrument can be reproduced (and perhaps only produced) by vertical blows delivered by a hammer-stone on to a nucleus. This technique was a great improvement on the Clactonian which consisted essentially in bashing a flint against a stone anvil. There was none of the careful preparation of a plane of percussion as in Levalloisian (and Mousterian) flake tools. Levalloisian seems to have preceded Mousterian in western Europe, at least, for Levalloisian is found in Riss glaciation deposits and, according to Breuil, during the Mindel-Riss Interglacial.

Difficulties of Artefact Manufacture

When we wonder at the immense ages which elapsed with no change in the technique of tool-fashioning we may bear in mind two factors: (*a*) the making of a serviceable tool by chipping, bashing, flaking or splitting flints with no instruments other than stones, is difficult as anyone may prove by trying to fashion one, and (*b*) the influence of precept, tradition and pattern is immensely strong. Indeed, the existence of clearly marked and differentiated types of stone artefacts in very remote times offers, without any evidence of men's bones, a cogent reason for thinking that even in the far-off days men must have been able, to some extent, to speak and communicate with each other in language. 'That's the right way to do it, and ask no questions,' must have been among the first of the word-phrases uttered by our antique ancestors.

So much for the Lower Palaeolithic, that is to say, up to the period of the Riss glaciation.

[1] It is interesting to note that Theodor Mommsen (1817–1903), in his day regarded as the greatest authority on all things pertaining to ancient Rome, held to his death that men appeared in Italy only during the Bronze Age!

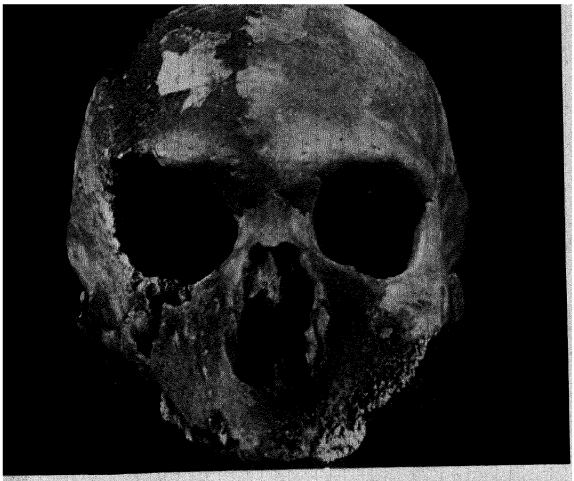


Photo. Prof. S. Sergi

FIG. 5—The Neanderthaloid skull of Monte Circeo, *norma facialis* view

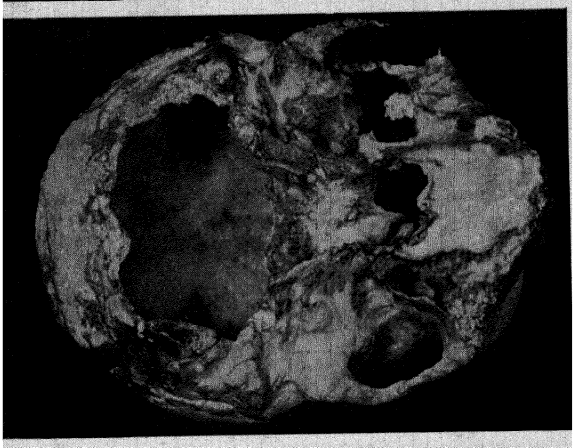


Photo. Prof. S. Sergi

FIG. 6—The Neanderthaloid skull of Monte Circeo, *norma basalis* view, showing the large aperture gouged in the base presumably to extract the brain for use as food

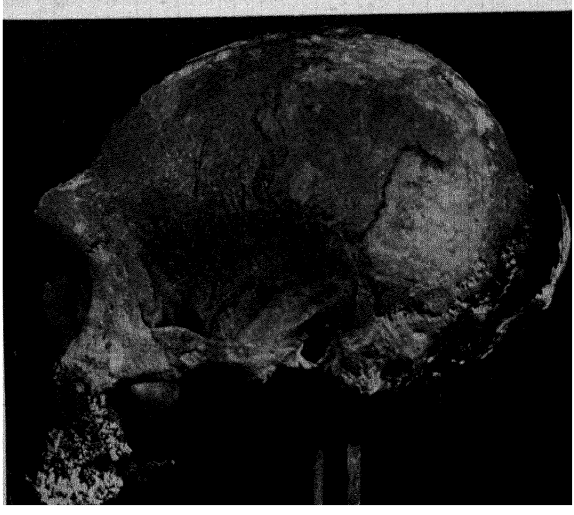


Photo. Prof. S. Sergi

FIG. 7—The Neanderthaloid skull of Monte Circeo, *norma lateralis* view



Photo. Prof. S. Sergi

FIG. 8—The fragment of a Neanderthaloid lower jaw (that does not belong to the Monte Circeo skull) found in the Guattari Cave.



Photo. Prof. S. Sergi

FIG. 9—*Norma facialis* view (orbito-auricular plane and slightly turned towards the left) of the Saccopastore I Neanderthaloid skull of a type more 'generalized' and less rugged than that of the Monte Circeo skull



Photo. Prof. S. Sergi

FIG. 10—*Norma facialis* view of the Saccopastore II Neanderthaloid skull (of the same type as Saccopastore I) discovered in 1935 by Professors Breuil and Blanc

We may imagine that the inhabitants of Europe during the Mindel-Riss Interglacial moved off when the onset of the ice made life in most parts of our continent impossible for men who had possibly not invented shelters or even clothes.

Neanderthaloid Invasions

Despite all the evidence of the tools and the existence of veritable or supposed relics of Lower Palaeolithic Man, our knowledge of early men *in Europe* begins really with the Neanderthaloid invasions. The Neanderthaloids may have found the continent empty or slowly filling up with some sort of men or sparsely peopled with the survivors of the Lower Palaeolithic.

Mousterian Culture

Although 'Mousterian' type artefacts are found in strata apparently of late Mindel-Riss Interglacial date, whenever such tools have been discovered in association with human bones such bones have always been of Neanderthaloids. All the evidence tends to show that the 'Mousterian complex' was in its essentials a Neanderthaloid importation although the Levalloisian type of artefact survived and the 'Mousterian complex' incorporates hand-axes of Acheulian tradition as well as hand-axes of Levalloisian technique. Mousterian and Levalloisian tools are, indeed, often found side by side. These Mid-Palaeolithic times were quite certainly ones when flake and core cultures were in close contact. They were times of cultural exchange and fusion, times which suggest the existence in Europe, side by side, of two groups of men with differing cultural traditions. Indeed, the 'Mousterian complex' may not have been everywhere the work of the Neanderthaloids.

The onset of the Mousterian leads one to think, indeed, that the 'complex' was not imported as such. The 'disk-industry' known as 'Languedocian' precedes the real Mousterian towards the end of the Riss-Würm interglacial, whereas 'Tayacian'[1]—derived, apparently, from Clactonian but influenced by Levalloisian technique—seems in some measure to be 'preparatory' to 'real' Mousterian.

However in these Mid-Palaeolithic times the 'Mousterian' is the most common non-Levalloisian flake-tool.

The Mousterian artefacts are mostly chipped on one side only so that their reverse shows a bulbar or 'conchoid' surface revealing where the flake has been stripped off the core or nucleus. This typical Mousterian flake has a thick base and is roughly triangular. The other 'general' Mousterian tool—though these two types do not exhaust all the varieties of Mousterian artefacts—is a so-called

[1] 'Tayacian' has been found in Spain, in Italy and in Asia Minor underlying the final phase of Acheulian.

'side-scraper'—flaked on one side and then retouched. There are also a few 'end-scrapers' and occasional 'choppers' or heavy blades with thick backs and edges sharpened on both faces and producing a cleaver-like tool. The names given to the artefacts are, if not wholly fanciful, at least awarded without any clear knowledge as to what was the specific function of each instrument.

In any case the typical Mousterian technique, once studied, is fairly easy to recognize.[1] But some Neanderthaloid bones discovered in Germany (and embedded in travertine) have in association with them, a rough flake industry that has been named 'proto-Mousterian,' and this suggests affinities with the coarse flake and chopper tools discovered at Choukoutien and (presumably) fashioned by *Sinanthropus*. So, one industry brought in by the Neanderthaloids may have been a very primitive one.

Summary

All this complicated story may appear clearer if set out in tabular form thus :[2]

	Glacial Periods	*Cores ('Hand-Axes')*		*Flakes*	
I Lower Palaeolithic	Günz [2]	Abbevillian ('Chellean')		Cromerian	
	Mindel				
II Mid-Palaeolithic		Early and Middle Acheulean	Levalloisian		Clactonian
	Riss	Later Acheulean			
III Upper Palaeolithic	Würm I			Mousterian	
	Würm II	Upper Paleolithic tools (see p. 224).			

On the vexed question of the association of one type of stone-fashioning technique with one type of men only we cannot do better than close with a quotation from a book by Professor Hooton of Harvard, the sprightly and learned American anthropologist. He says:

'I entertain no naive conviction that there is something about a long torus above the eyes which inevitably directs its possessor to make a flake implement or, on the other hand, that a projecting bony chin actuates

[1] 'Mousterian' artefacts with 'cold' fauna are scattered about Italy from Liguria to Calabria. The 'Mousterian complex' is especially complicated in Spain.

[2] Some would set only 'Pre-Chellean' in the Günz-Mindel Interglacial and put Abbevillian (or Chellean) in early Mindel-Riss Interglacial. From the time of Acheulian cultures onwards the dating is generally accepted.

its owner to the preferential fashioning of a core instrument. I can imagine no anatomical configuration which could exert such compulsive influence upon the human animal equipped with emancipated forelimbs and mobile, prehensile digits. Although I believe that behavior is a function of the organization, I am not so credulous as to conceive of any direct causal relationship between anatomical minutiae and the idiosyncrasies of human technology. The idea is rather that in the early types of man human behavior, including technology, evolves with the organism. The organism is modified through selection and interbreeding and spontaneous variation and so is the behavior of the animal including his technology. Both are adapted to his physical environment. But it is the man who creates the culture and not vice versa. He modifies that culture in accordance with his learning, ability, environmental necessities and I know not what organic "drives." Physically similar men (i.e., those of presumably common heredity) do in the first stages of human culture produce tools astonishingly alike.'

It is worth while stressing now and here a point which should be borne in mind whenever we are dealing with types of artefacts. The prehistorians and the artefact specialists are very naturally inclined to indulge in what to the general anthropologist often looks like an excessive sub-classification of their material. Though the main types of man-made stone instruments do undoubtedly fall into distinct classes, we must, perhaps, sometimes accept with reserve the pronouncements of the artefact-specialists. Just what is Levalloisian and just what is Mousterian is often hard to define. And, although we must not underrate the importance of the 'industry' evidence we are only justified in attributing such industry to a definite type of man when we find the instruments in close association with the human bones.

We are justified, in the present state of our knowledge, in asserting that when we find Mousterian type tools (and such tools are of great variety) we may infer the presence nearby in former days of Neanderthaloid men but we are not justified in asserting that Neanderthaloid men made and used only Mousterian tools.

Chronology and Climate

To get our tale into right perspective we must now consider the question of chronology and climate.

The stratified rock-formations of the globe are thought to extend —at least in some places—to as deep as fifty miles. But the layers are not regular. Various earth movements have from time to time displaced, buckled, twisted, contorted and disarranged the strata the total time necessary for whose formation has been calculated by physicists at anything between 1,000,000,000 and 1,500,000,000 years.

Tertiary Period

After the prolonged calm of the Secondary Period the Tertiary swept up into those earth-movements culminating in the profound changes of the Miocene, by the end of which era the world had assumed a new face which it still presents, in its main features, although the disruptive movements of the Tertiary's end modified many regions.[1]

During the Miocene the land surface of the globe was scored by immense mountain-ridges forming the spine of Eurasia from Morocco to Malaya and the backbone of the Americas from the Aleutians to Cape Horn, with the result that to-day as far as we can see the relief of the earth is as varied as at any time in its history.

On the Eurasian continent the mountain barrier cut off the northern plains from the regions lying to the north of the tropical forest-belt. Modern weather and modern climate were established and in these conditions the evolution and mutation of animal forms went forward profusely. So was the world during the Pliocene (following on the Miocene) when, doubtless, the immediate ancestors of Man were becoming differentiated.

But there are no traces—as yet—of any 'Tertiary Man'[2] and the whole of our human story lies within the Pleistocene and Holocene. The all-important feature of the Pleistocene Period was a succession of Ice Ages accompanied by ponderous alterations of climate exercising, no doubt, a powerful influence upon the evolution of men. The study of Pleistocene climate is, therefore, one of capital importance for the understanding of our human story.

Ancient Climates

We know something about ancient climates. For instance, we can say that, in a general way and compared with the present-day climate of a given zone in western Europe, the climate of the

[1] The 'classical' divisions of the earth's geological ages are :
(1) Primary
(2) Secondary
(3) Tertiary subdivided into :
(*a*) Eocene
(*b*) Oligocene
(*c*) Miocene
(*d*) Pliocene
(4) Quaternary or Pleistocene—the Ice Ages and Interglacials.
(5) Holocene or Recent.

The separation of Pleistocene from Tertiary (and still more that of Holocene from Pleistocene) is largely arbitrary and as Breuil has written, '*En réalité et à tous égards nous sommes encore dans l'ère tertiaire.*'

[2] From time to time unfounded reports appear that the remains of 'Tertiary Man' have been discovered. The latest edition of this *canard* was the tale that the French geologist, Father Teilhard de Chardin, had found such remains in Mongolia towards the end of the war. As a matter of fact, Teilhard spent most of the war from 1941 onwards in the Jesuit settlement at Tientsin.

Lower Eocene was temperate while those of the Middle and Upper Eocene were hot. The Oligocene climate was again temperate, but, during the rest of the Tertiary Period, climate was, with backward and forward oscillations, progressing toward the onset of the Ice Ages.[1]

Ice Ages

The relatively warm Pliocene climate (in western Europe) changed gradually into the First Glaciation of the Pleistocene and, after an immensely long epoch, much land was uncovered owing to the accumulation of vast glaciers lowering the sea-level by withdrawing water from the oceans. The shrunken remains of glaciers can still be seen in high latitudes.

It is thought that if all the existing glaciers were melted the general sea-level might be raised by some 120 to 150 feet. At the peak of the Pleistocene glaciation the sea-level may have been about 300 feet lower than it now is. Of course, even if the 'Ice Ages' were confined to North America and to northern and western Europe, the general sea-level would still be everywhere lowered to what is known as a 'eustatic' level.[2]

At the peak of the last (Würmian) glaciation the surface of the seas may have been about 250 feet below the present level.[3]

Causes of Glaciation

We can say quite frankly that nothing is surely known as to the causes of the Ice Ages. There are, it is true, traces of what seem to be extensive glaciations in very ancient rocks but there appears to be little evidence for any Ice Age in the Tertiary although three 'Danubian' cold phases are now thought to have preceded the Günz glaciation of the Pleistocene. Hypotheses as to the great cold's

[1] The beginning of the First (Günz) Glaciation is held to mark the onset of the Pleistocene but over many parts of the earth's surface evidence for this glaciation is quite wanting. But there was, however, throughout the northern hemisphere what seems a sudden spread of certain animal forms, e.g., true elephants, camels (*camelops* and *camelus*) and of cattle of the *bos* group (oxen, bisons and buffaloes), and the monodactyl horse (*equus*). It has been proposed that the appearance of the true horse should be taken to mark the Pliocene's end. Most families of animals continued into the Pleistocene but there was a change of species.

[2] The relations between sea-level and ice-accumulation are complicated. Deformations and displacements due to earth-movements and to the depression of the land-masses bearing the stupendous burden of the glaciers, must be taken into account.

[3] Along the Mediterranean shores there are at least four beaches or marine terraces traceable: they have been named (*a*) Sicilian, (*b*) Milazzian, (*c*) Tyrrhenian, (*d*) Monasterian. The terraces of our low Atlantic valleys of western Europe have been formed by successive periods of excavation accompanied by lateral (solifluxion) fillings, and of washing out of these fillings, all under the influence of rise and fall of sea-level. Alternations of glacial and interglacial conditions produce an alternation of deposit and erosion along a river's banks exposed as 'terraces.' The chronological correlation of these Mediterranean marine terraces, with the evidences for land glaciation, presents some difficulties.

cause vary from vague suppositions that, from time to time, the solar system passes through regions of space containing matter obstructive to the sun's rays, through theories that there has been a 'polar shift' up to the well-worked-out and plausible scheme of changes in the amount of solar radiation received by the earth—a theory that is associated with the names of Milankovitch, of Koeppen, of Wegener and of Soergal.[1]

'Radiation Theory'

According to the 'radiation' theory, the changes in climate are due to inequalities and perturbations of the earth's orbit. In this connection it is worth while quoting at some length Sir George Simpson's comment, since there is, in some quarters, a tendency to treat the Milankovitch hypothesis as almost proven:

'I cannot refrain from saying that the supporters of the radiation theory would have been in a stronger position if it had been found that the first three glaciations had each two peaks and the last glaciation three peaks before Milankovitch had produced his radiation curve and not after. If the evidence for the radiation theory . . . stood alone it would be difficult not to accept it ; but it does not stand alone ; there are many questions of physics involved, and these . . . give answers which are completely opposed to the theory. On the one hand we have the similarity (more or less) of two curves, and on the other certain objective facts of radiation and energy; if the latter cannot be reconciled with the theory, then the former means nothing.'

Milankovitch's theory demands regular glacial epochs stretching right back into the remotest ages.[2]

[1] Milankovitch's theory is essentially a development of that of Koeppen. An excellent study of the Pleistocene Period written round the theory of solar radiation variations was published in 1945 by Dr. F. K. Zeuner under the title, *The Pleistocene Period*. The late Davidson Black (see p. 105) was a protagonist of the 'polar shift' hypothesis but this is open to the objections revealed, e.g., by Klute's researches in the Chilean subtropical Andean region that was, it seems, in Pleistocene times in much the same climatic zone as to-day. Cf. Simpson, 'Ice Ages,' in *Nature*, 141 : 1938, and *L'Anthropologie*, t. 41, p. 323 *et seq.*; t. 45, p. 202 *et seq.*; and t. 46, p. 199 *et seq.*

[2] In any case, it is certain that the form and the relief of the continents have played a great part in determining climatic change. The glacial epochs are not clearly indicated for other regions of the globe than northern Europe and North America. Siberia, for instance, seems never to have been glaciated until comparatively recent times. It has been suggested that there may have been 'islands' in the glaciation but, anyway, no ancient glaciation has, as yet, been traced beyond the Urals eastward. Perhaps this ice-free condition was due to lack of rain and it may be that it was the oceanic climate that favoured the progression of the glaciers. It is true that in East and South Africa, in China and elsewhere, there is evidence for a succession of 'Pluvials' and 'Interpluvials' and these may correspond to the glaciations and interglacials of Europe and North America. Indeed, the correlation of the African Pluvials with the northern European glaciations seems established but, on the other hand, the African 'dry phases' do not correspond exactly with the northern Interglacials. Only the coldest of the northern glaciations are reflected as dry phases farther south.

Effects of Lowering Average Temperature

Again, if we know little or nothing about the causes inducing the succession of Ice Ages, it is clear that a comparatively slight drop in the average temperature would suffice to bring about a great extension of the glaciers. Indeed, it has been calculated that a fall in the average temperature of as little as 5° C. would, by hindering the melting of the winters' ice, favour the piling up, in successive seasons, of fresh ice and thus of procuring a very considerable lowering of the temperature since, automatically, the progressive accumulation of ice would progressively accentuate the cold.

Although the glaciations covered vast areas of what is now habitable land, the glaciers added as much as they took away. The world's desert belt was transformed into rich pasture-lands or forests teeming with game and cut through with mighty rivers.

Glaciations

The Ice Ages of the Pleistocene are primarily divided into four glacial peak periods separated from each other by relatively warm or temperate interglacial troughs. The four classical glaciations are named from localities in Switzerland where the successions were noted. Günz (which may have been comparatively slight), Mindel, Riss and Würm. It may be worth while stressing again that these glacial successions are proved only for north-western Europe although the glacial successions in North America (where they bear different names) can be *more or less* equated with them.

The warmest (and apparently the longest) Interglacial was that between the Mindel and Riss peaks. This was the time of rhinoceros and straight-tusked elephant in northern Europe. The later Riss-Würm Interglacial and the Würm (I) glaciation were the times of the Neanderthaloid Palaeolithic cultures.

The Würm glaciation seems to have comprised two peaks with a warm 'interstadial' separating them. By some (especially those upholding the 'radiation' theory) the Würmian is held to have been treble.[1]

Chronology

To change the relative chronology furnished by the succession of Glacials and Interglacials into an absolute chronology reckoned in solar years presents formidable difficulties.

[1] The oscillations of the Würmian glaciation appear to have been considerable. But what are often taken for oscillations in climate may only have been movements in the retreat of the Würmian glaciers. Stehlin suggests that the three (or even four) 'phases' of the Würmian glaciations may have been due to the sinking of mountains.

Varves

Really 'historic' dates are quite recent. The earliest go back no farther than about 3,500 B.C. for the beginning of the dynastic period in Egypt and Ur. The palaeobotanists (and especially the Swedish worker de Geer and his assistants) have calculated (although their conclusions are disputed by some) from 'varves' (i.e., accumulations of alluvium laid down year by year, one layer of fine black clay in the winter and one of light sand in the summer) and from the pollen-analysis of stratified peats and sediments[2] that, in Scandinavia, the 'Gotiglacial,' i.e., retreat of the Würmian glaciers, began about 13,800 B.C. and the last series of 'varves' in southern Sweden indicates a date of 12,580 B.C. These definite datings seem of themselves to be rather suspicious but we may not be far out if we set a date of about 12,000 B.C. for the retreat of the ice to northern Scania (i.e., the southernmost part of Sweden).

Date of Beginning of Würmian Retreat

We have no analogous evidence to offer from the southern extension of the Würmian ice-sheet (i.e., from the line of 'moraines' or boulder-clays containing ice-borne matter) in northern Germany. However, if, judging from the rate of the Scandinavian retreat (de Geer and his school estimate that 5,000 years after the retreat of the ice to northern Scania the glaciers had reached their present positions) we allow 5,000 years for the recession of the ice-sheet from northern Germany to Scandinavia, we may arrive at a figure of about 17,000 years B.C. for the beginning of the Würmian glaciers' retreat. And we may guess that the Würmian glaciation (II) was at its maximum about 25,000 B.C., if not earlier.

Earlier Dates

For the rest of the ages reaching back to the beginning of the Pleistocene we must rely upon the geologists for a time-table and it is significant that, on the whole, they are not so generous as the 'radiation' theorists. It is significant, also, that the geologists estimate that some 5,000 or 6,000 years have elapsed since the climatic 'optimum' of Atlantic times, whereas the astronomers of the Milankovitch school claim 10,000 years. Thus, at one of the very few points where the 'radiation' experts and the geologists can be confronted the discrepancy in the calculations is in the region of 50 per cent.

[1] Pollen-analysis may be held to reveal by the type of vegetation the sort of climate but pollen belonging to varieties physiologically different (e.g., in their reaction to cold and heat) may, when recovered from ancient sites, be indistinguishable from one another.

Estimates of the Pleistocene's duration vary greatly. The Milankovitch 'curve' sets the end of the Riss-Würm Interglacial at about 126,000 years ago.[1]

Geological and Cultural Designations

As there is often a considerable confusion in the use of terms, it may be as well to recall that only for north-western Europe do the geological and cultural designations coincide. Thus, we can say, for western Europe, that, roughly, the geological Pleistocene Period is also the cultural Palaeolithic Age when men made and used 'Old Stone Age' tools. We must beware of attempting to make cultural sequences in other regions fit in with those of western Europe.

It is true that 'our' Old Stone Age ended perhaps 12,000 years ago. The Tasmanian Old Stone Age ended in A.D. 1871.

Note:

According to the Milankovitch scale the chronology of the Pleistocene would be as follows:

	Years Ago
Beginning of the Würmian glaciations	126,000
The Riss-Würm Interglacial lasted from	190,000 to 126,000
The Riss Glaciation lasted from	240,000 to 190,000
The Mindel-Riss Interglacial lasted from	440,000 to 240,000
The Mindel Glaciation lasted from	480,000 to 440,000
The Günz-Mindel Interglacial lasted from	550,000 to 480,000

As we have evidence that during the Günz-Mindel Interglacial Man's chipped stone tools were scattered about over large areas of the earth tool-making men must have existed during the Günz Glaciation (that is according to Milankovitch from 600,000 to 550,000) or even earlier.

Note:

Below are two tables (1) a Geological and Palaeontological Table for the Quaternary Period *in Europe* and (2) a table (based upon the correlations of the Abbé Breuil) offering a tentative synchronism of human industries with glacial phenomena *in Europe*.

It may be borne in mind when referring to these tables, first, that there is no general agreement as to the time at which the beginning of the Pleistocene should be set. The distinguished French palaeontologist, the late Marcellin Boule, for instance, until his death, included everything from the Günz glaciation to and including the Mindel-Riss Inter-

[1] *Vide* V. Malycheff, *L'Anthropologie*, tome L, June, 1946, pp. 228–233, for a criticism of Milankovitch's last communication on his theory. The pollenic diagrams do not seem to justify our attributing hundreds of thousands of years' duration (as demanded by the 'radiation' theory) to Pleistocene Interglacials. A recent estimate of the Pleistocene's duration by Gams is as low as 275,000 years.

glacial, in the Tertiary Period. Few now, perhaps, follow his example and it may be taken that Pleistocene times began with the Günz glaciation. Palaeontologically, that is to say from the point of view of the fossil mammalian remains, it may well be that the appearance in Eurasia of *true* horses would be as good a signal for fixing the beginning of the Pleistocene as any other. Secondly, it is well to remember that the *correlation* of (*a*) geological, (*b*) palaeontological and (*c*) archaeological phenomena is a correlation we make for the convenience of our studies and that such a correlation must always present some arbitrary features.

We are concerned in this book with the origins of Man and we need to have some fairly simple and fairly effective means of fitting together the varied elements (i.e., geological, archaeological and palaeontological) that have a close bearing upon the story of Man's origins.

Not unnaturally, our difficulties of establishing a correlation between these elements increase as we look backwards. It is generally agreed, for instance, that Upper Pleistocene, Later Palaeolithic and the period of the presence of *homo sapiens* in Europe can be identified.

'Mid Pleistocene date' is a phrase often used and not always defined. If, however, we restrict the term 'Mid Pleistocene' to the last (Würmian) glaciation and equate it with the 'Mid Palaeolithic' culture-period and with the presence in Europe of Neanderthaloid Man, we have, at least, what serves as a clear-cut division, but men of the Neanderthaloid type appear in Europe during the Riss-Würm interglacial and the term 'Mid Pleistocene' should be extended to the end of the Riss glaciation.

In this case, the terms 'Lower Pleistocene' and 'Earlier Palaeolithic' remain to cover an immense lapse of time and widespread (and no doubt long-lasting) types of industries. The human remains, however, which can be referred to the vastly long period (Günz glaciation, Günz-Mindel Interglacial, Mindel glaciation, Mindel-Riss Interglacial and Riss glaciation) are few indeed—Mauer, Swanscombe, and the pithecanthropoids and Solo Man of Asia. In these circumstances, it is, perhaps, as well to leave the 'Lower Pleistocene' as comprehensive as possible.

Indeed, apart from the correlation of the Pleistocene's onset with geological or palaeontological phenomena, the main difference of opinion is between those who would include the Riss-Würm Interglacial in the Mid Pleistocene and those who would place this Interglacial in the Lower Pleistocene. On the whole, it seems more expedient to adopt the former classification.

And, one word more, the geological phenomena (witnesses of the geological past), the palaeontological phenomena (witnesses of past mammalian life) and the archaeological phenomena (witnesses of Man's activities in the past) are *realities*. Terms such as 'Pleistocene' are man-made designations destined to serve our ends and not to impose upon us ways of thinking. Again, from almost every point of view except that of convenience, the terms 'Pleistocene' and 'Holocene' or 'Recent' are arbitrary. Or rather their use as designating Periods is arbitrary. Both Pleistocene and Holocene should be included in the Tertiary just in the same way as are 'Eocene' or 'Miocene.' We are still living in Tertiary times.

A GEOLOGICAL AND PALAEONTOLOGICAL TABLE OF THE QUATERNARY PERIOD (EUROPE)

Geological Division		Geological Formations, etc.	Palaeontological characteristics	Cultures
	Holocene or Recent	Peat formations Recent alluviums Climate comparable with that now prevailing	*Homo sapiens* and existing varieties of other mammals	NEOLITHIC BRONZE IRON, etc.
PLEISTOCENE	Upper Pleistocene	Postglacial phase and retreat of Würmian glacier. Marine transgression. Surface deposits in grottoes Upper loess Climate cold and dry, at first tundra-like and then steppe-like conditions in northern Europe	*Homo sapiens* in three main varieties: (*a*) Cro-Magnon (*b*) Grimaldi (*c*) Chancelade Other mammals—steppe and tundra fauna with reindeer	UPPER PALAEOLITHIC
	Mid Pleistocene	Last Glacial epoch (Würm) maximum marine regression, heavy deposits in caves, base level alluviums. Climate cold and damp. Riss-Würm Interglacial. Marine transgression, alluviums of middle and low terraces, old alluviums in caves, calcareous tufas. Mild climate	Neanderthaloid Man 'classical' (later) and 'generalized' (earlier) forms, e.g., Neanderthal of former and Ehringsdorf and Steinheim of latter. Other mammals: mammoth, *elephas primigenius*, *rhinoceros tichorhinus*. In Riss-Würm Interglacial *elephas antiquus*, *hippopotamus amphibius*, *rhinoceros merki*	MID PALAEOLITHIC
	Lower Pleistocene	All phases from Günz glaciation to Riss glaciation	Heidelberg Man Swanscombe? Pithecanthropoids and Solo Man in Asia Other mammals, *elephas meridionalis*, *rhinoceros etruscus*, *equus stenonis*	LOWER PALAEOLITHIC

Just as the material we have at present available does not permit of our establishing, save in a very patchy way, the geological and the palaeontological correlations for any other region than (strictly, Western) Europe, so a table of even tentative synchronization between the succession of the glacial phenomena and the man-made industries or tools can hardly be satisfactory for any region of the globe except Europe, although much has been done in recent years towards the fixing of a comparable synchronization for some other areas, e.g., South Africa.

The accompanying table is adapted from that given by the eminent French prehistorian, the Abbé Breuil, in the publication containing his opening lecture on assuming the chair of Prehistory at the Collège de France.

TENTATIVE SYNCHRONIZATION OF GLACIAL PHENOMENA AND HUMAN INDUSTRIES IN EUROPE

Glaciations and Interglacials.	*Rough Flake Industries.*	*Biface Industries.*	*Industries with large, very oblique striking platforms.*	*Industries with striking platforms prepared on the cores — little rechipping.*	*Industries with striking platforms prepared on the core — smaller flakes and much rechipping.*	*Upper Palaeolithic.*
Günz and Pre-Günz.	Flakes from below the Ipswich Red Crag and of its upper levels.					
Günz-Mindel.	(*a*) Cromer beach (possibly old Abbevillian).	(*b*) All subdivisions of Abbevillian.	(*c*) Base of Clactonian.			
Mindel	All preceding industries crushed and altered by the Mindel glaciation phenomena.					
Mindel-Riss.		(*b*) Lower and Mid Acheulian.	(*a*) Mid Clactonian of Clacton, and Evolved Clactonian of High Lodge, probably foundation of Micoquian (Lower Tayacian)	(*c*) Levalloisian I and II and III		
Riss	Preceding industries are crushed in the Riss glaciation deposits.	Upper Acheulian.				

TENTATIVE SYNCHRONIZATION OF GLACIAL PHENOMENA AND HUMAN INDUSTRIES IN EUROPE (*Continued*)

Glaciations and Interglacials.	*Rough Flake Industries.*	*Biface Industries.*	*Industries with large, very oblique striking platforms.*	*Industries with striking platforms prepared on the cores — little rechipping.*	*Industries with striking platforms prepared on the core — smaller flakes and much rechipping.*	*Upper Palaeolithic.*
Riss-Würm		Latest Acheulian (Micoquian)	Mid Tayacian and Upper Tayacian of La Micoque evolving towards Mousterian.	Levalloisian IIIB and IV.	Weimar-type Mousterian: lower Grimaldi. Ancient levels of Mousterian in grottoes.	
Würm I.		Bifaces of Acheulian tradition are found at many more recent levels: Levalloisian V and VI and lower and latest Mousterian, e.g., Combe-Capelle, Upper La Quina.	In later deposits of Acheulian and Mousterian these techniques are still used. E.g., La Quina.	Levalloisian V to VII.	Mousterian of the Grottoes.	
Interstadial.					End of Mousterian.	Aurignacian.
Würm II.						Solutrean. Old Magdalenian.
Post-Würm						Upper Magdalenian. Azilian. Maglemosian Saureterrian. Tardenoisian.

These industries mingle with the Acheulian, Levalloisian and Clactonian.

These industries are interstratified and mixed with those of Acheulian and Mousterian tradition.

CHAPTER TWO

AUSTRALASIA AND INDONESIA

Australia

AND now let us switch over to Australia, still the home of one of the most curious and, in many ways, one of the most 'primitive' of human groups.

Characteristics of Aborigines

The Australian aborigines represent undoubtedly an archaic type of humanity. Many of what we are inclined to regard as 'backward-looking' tendencies show themselves assembled in the black-fellow. The Australian natives form, physically, despite local varieties, a fairly homogeneous group. They are men of chocolate-brown-coloured skin, they are rather tall, they are hairy—though not more hairy than many Europeans—the hair of their head may be curly, wavy or even straight, but not kinky as is a Negro's, they are long-skulled and their skulls are thick and their brains relatively small, their brows are projecting and their foreheads retreating, the vault of their skull is relatively low or depressed. Their jaws are prognathous and the chin (i.e., the bony protuberance from the lower jaw and not the mandible itself) is poorly developed. Their noses are broad and depressed at the base and the nasal bones look 'primitive.' The palates and teeth of the Australians are noticeably large (compared with those of other types of 'modern' men) and the facial skeleton has the upper part set back. The pelves of the women are narrower than is common among other human groups.

On the other hand, the canine fossa—a distinctively 'modern' feature—is particularly deep. The occiput, though protuberant, is not exaggeratedly so, and the *foramen magnum* is so placed that the carriage of the head can be entirely upright.

Earlier anthropologists who were often looking out for 'living fossils' and 'missing links' were inclined to regard the Australian aborigines not only as the most 'primitive' of extant men but also as, in some measure, akin to the Neanderthaloids.

Australians are 'Modern' Men

But the Australian is, in no essential feature, different from other types of 'modern' men now living. It may be, indeed, stressed that the Australoids (that is, roughly, the Australians and the Veddoid groups) and the Neanderthaloids are dissimilar in skeletal

characteristics. The brows of the Australian—prominent as they are—form no *torus* or continuous ridge but they bunch out on either side of the glabella or depression above the nose. The so-called 'barn-shaped' cranial vault of the black-fellow is distinct from that of the Neanderthaloids in having a high crown, a marked mid-line elevation and parietal bosses. Moreover, the areas between the 'keel' of the skull and the parietal bosses are flat and not sunken as in the Neanderthaloids. This flattening in the Australian does, it is true, in some measure, indicate small brain-size, but also a different brain-shape from that of the Neanderthaloids.

The Australian's skeleton is delicate and even graceful in comparison with the more robust bones of the Neanderthaloid.

The Australian is, in fact, a real 'modern' Man and no 'living fossil.'

Australian Culture

We cannot deduce very much from the types of tools employed by the Australian aborigines. When their land was discovered, the native inhabitants were using all sorts of Stone Age tools—'Chellean' ('Abbevillian'), 'Mousterian,' 'Aurignacian' and 'Magdalenian' —together with microliths not unlike those recorded for the European Mesolithic.

The black-fellows, indeed, afforded a sort of retrospective exhibition of human cultures. They used propulsive weapons comparable with those of the European Magdalenian people, their painted caves showed stencilled outlines of hands (some with mutilated fingers) recalling the hands on the walls of French Upper Palaeolithic caves (e.g., at Gargas), and the Australian 'churingas,' or painted stones, look for all the world like those of the Azilian culture-period of western Europe (e.g., Mas d'Azil in southern France).

The native Australian culture is, indeed, unique but it is its complicated pattern which is unique rather than the features composing it, many of which are, moreover, not 'primitive' in any sense in which we can justifiably use that word in ethnology.[1]

The Migration of the Australians

Assuming that the Australian aborigines reached their island-continent from the north, it would seem that they must have preceded on their journey through the islands the Negritos, the Papuans and the Melanesians, judging, at least, from the evidence

[1] In north-western Australia are found not only rock-paintings still 'used' and revered (and presenting typological resemblances to those of western New Guinea) but also naturalistic (and apparently older) paintings of human figures full of movement and curiously reminiscent of the Capsian style of eastern and southern Spain.

afforded by New Guinea, where the Negritos in the mountain fastnesses are surrounded by Papuans, who in their turn give way before Melanesian pressure on the northern, eastern and south-eastern coasts.

There is reason to think that some of the tools and weapons of the Australians reached them from without after their settlement in the land. The polished stone axe, the spear-thrower and (more recently) the harpoon appear to have been imported unless we adopt the most improbable hypothesis of an independent invention *sur place*.

It is *possible* that the Australians reached the island-continent in Pleistocene times (see *infra* sv. Keilor) but in any case they appear to have been preceded by the Tasmanians. Once they were in Australia, the aborigines seem to have mixed with (and largely absorbed) a minor 'Tasmanoid' element together with a Negrito or negritoid element coming, perhaps, from New Guinea.

The Tasmanians

The extinct Tasmanians—who died out only in the seventies of the last century, leaving some descendants of mixed 'blood' in the Bass Strait's islands—seem to have been of a more homogeneous type than the Australians. But fewer numbers and isolation on a comparatively small island may have been contributory factors towards this state of things, though the culture of the Tasmanians did suggest antiquity and/or long isolation. This people lacked bows and arrows and any sort of pottery. No agriculture was practised. Old Stone Age tools, wooden clubs and wooden spears, of which the tips were charred and hardened by fire, were the only instruments. Such cultural poverty would suggest a departure from south-eastern Asia before other techniques had reached the dispersal area.

On the other hand, the Tasmanians have been described as 'daring seamen' and, in fact, more skilled navigators than the Australian aborigines living nearest to them in what is now the State of Victoria, for the 'Victorians' when discovered were using only tree-bark canoes on rivers. Still, Flinders Island (in the Bass Strait) that was uninhabited when discovered by Europeans has yielded evidence of material culture (e.g., mill-stones for crushing grain similar to those utilized on the Australian continent) which is not Tasmanian. It is curious to note that Kangaroo Island, only seven miles off the coast of South Australia, was also uninhabited when discovered by Flinders in 1802, yet here has been unearthed material proof that the island was inhabited for long periods. Evidently, then, there has been some change in the seafaring habits of the dwellers around the Bass Strait area.

The Dingo

On the whole, the evidence from cultural sources would lead us to think that the Australian immigration cannot have taken place so very long ago. There is, for instance, the question of the dingo.

The *warrigal* or dingo is not much different from the pariah dog of India and as it is the only placental mammal 'indigenous' to Australia the circumstantial evidence is strong for its introduction by man. Fossilized dog's teeth (apparently those of the dingo) have been recovered from the cave-breccias of New South Wales and Victoria, but although such fossils may point to an antiquity of thousands of years, the bones do not allow us to determine (from their mineralization or stratification) any definite dating. The Australian dingo, apparently, rendered to his masters few services. He caught no game. He did not assist in hunting. The black-fellows, however, liked to see him about, to sleep alongside him and use his warmth.

There is generally a variety of reasons for other men's acts and the most cogent of these reasons may seem to us the most unreasonable. In any case, we shall often wander far and fare badly if we insist on applying our standards to other peoples or even, worse still, if we insist on finding 'practical' reasons for all men's doings and habits.

For instance, pigs were domesticated in prehistoric Egypt, yet they do not seem to have been eaten or 'used' in any way until a good deal later. Were the pigs 'lucky'? Did they act as scavengers? Did people just 'like to see them' as they do domestic cats?

The fact that the remains of dingo have been found in Australia associated with those of extinct animals might tell us much if we knew (*a*) that the dingo was brought along by the first waves of 'Australian' immigrants, and (*b*) when the Australian 'Pleistocene' fauna (e.g., that whose remains have been found with those of the dingo) became extinct. But we know neither of these things.

But there is every reason to think that the advent of man into regions where he has been hitherto unknown may be accompanied by the relatively rapid extinction of many beasts (see p. 135 for the American evidence on this point). Moreover, much of Australia is inhospitable for both man and beast in a 'primitive' state—the fauna of the island-continent (including Man) must always have been rather scanty.

Migration Route

Now, on their way down from the north, the ancestral Australians must either have come on something that would float or they must have come at a time when the sea-level was lower than

it is now. None of the Australian tribes has retained migration-myths, although groups in the centre of the continent tell of a time when their ancestors arose after the salt waters had withdrawn from the face of the land. However, although the native Australians when discovered by 'white' men were living in a Stone-cultural Age, they possessed canoes and dug-outs comparable in form and shape to those used by some of the New Guinea peoples.

The waters of the Torres Strait dividing New Guinea from the northern coasts of Australia are very shallow—nowhere, indeed, over seventy feet in depth—while those of the Bass Strait separating the island of Tasmania from the coasts of Victoria vary in depth from 220 to 270 feet. The Torres Strait, moreover, is dotted with islets like stepping-stones and even the wider Bass Strait is broken by islands for much of its breadth.

There can hardly be any doubt, therefore, that at various times during the procession and the regression of the ice-sheets with the consequent lowering of the sea-level, these straits were dry land. But if, as seems proved, both Australians and Tasmanians possessed and used sea-going craft we have no absolute reason for supposing that their migrations must have taken place at low sea-levels—that is to say, before the last regression of the ice-sheet. After all, the sea reached its present level, in all probability, not less than 10,000 years ago, and that is an immense time in the cultural history of Man.

New Guinea

As a matter of fact, the real problem of Australia's peopling is not so much one of how the immigrants got from New Guinea into Australia or from Australia into Tasmania but one of how they got to New Guinea.

New Guinea shares with Australia (and Tasmania) a very poor fauna. In Australia, as we have seen, there was only one placental mammal—the dingo—New Guinea was also the home of the dingo and, in addition, had a pig, mice, squirrels and bats—all these latter can quite well have been brought in by man and comparatively recently. On the other hand, if there had been in Pleistocene times a land-bridge joining New Guinea with the lands and islands to the west, why is it that there was no immigration of more 'modern' animals? We can only conclude that (*a*) New Guinea and Australia were isolated from the rest of the world for long ages before the appearance of Man, and (*b*) that Man must have made his way into the New Guinea–Australian area from the west over the sea. Although the islands from New Guinea westwards string out at no great distance from each other, there

would be no continuous land-bridge even if the sea-level were lowered by six hundred feet, which is more than we have reason to think it ever was lowered even at the peak of the most extensive glaciation.

Until we get further evidence we should do well to suppose that when we find a definite break in faunal distribution there has been in these regions no recent land-bridge and that Man made his way across these areas by boat—and, therefore, comparatively late.

This Australasian region is of prime importance in our story, firstly, because nearby in Java we have the most 'primitive' type of hominid—the *Pithecanthropus*—yet discovered, and secondly, because recent finds in Australia itself—those of the Keilor remains—have led some authorities to attribute to Man a very ancient settlement in Australia.

Talgai Skull

In 1914, on the eve of the first World War, the British Association for the Advancement of Science held its annual meeting in Sydney. At this gathering of scientific workers Professors J. T. Wilson and T. W. Edgeworth exhibited the fossilized skull of a boy —aged, apparently, about fifteen years—and this cranium, known as the 'Talgai Skull,' had been picked up on the Darling Downs in Queensland in 1884. Although the specimen was heavily mineralized, there was no evidence as to the geological stratum in which it had lain. The skull had been badly crushed but when repaired was almost complete. Although the Talgai cranium has been referred to as 'proto-Australoid,' it conforms essentially with the skulls of some types of living Australians. The only marked differences to be noted are (*a*) the exceptional size of the palate and teeth—and these, in any case, are large in extant Australians—and (*b*) the big jutting canine teeth. But, if it is noted that the cranium is that of a youth, it is possible that these features might have become accentuated with age had the subject lived longer.

The skull has been held to be 'late Pleistocene,' but, given the circumstances in which the cranium was recovered, it is impossible to date it even if we succeed in working out a tenable comparative chronology for Australian prehistory. It was said that 'indications of dingo' were noted in association with the Talgai specimen, but this does not tell us much. The attribution of 'Pleistocene' antiquity has been pretty freely bandied about in connection with Australian human remains and artefacts. A find of stone implements from Shea's Creek near Sydney has been supposed to be 'Pleistocene' but the classification is more than doubtful.

Cohuna Skull

In the State of Victoria and at a short distance south of the Murray River an adult male skull was recovered in 1925. Later, parts of several skeletons were unearthed nearby. The bones lay near the surface of ancient silt deposits and there were no artefacts or other animals' bones visible in the vicinity. The bones were mineralized but may have belonged to subjects intentionally buried. In size of palate and canines and in prognathism the skull —the so-called 'Cohuna' cranium—surpasses that of nearly all known specimens of *homo sapiens*, but the 'Cohuna' specimen does not differ *essentially* from the Talgai specimen, especially if it is remembered that the latter is of a youth while the former is of an adult. But it is true that the 'primitive' features noticeable in living Australians are accentuated in the Cohuna cranium. The enormous palate is remarkable. This cranium has been by some compared with the Solo skulls from Java (see p. 78) but the Cohuna is undoubtedly *sapiens*. And even among 'recent' Australian crania there are some more 'primitive' than others.

The Tartanga skeletons from South Australia are also thought to be of 'some antiquity' but there is no means of dating them even approximately.[1]

Keilor Skull

In 1942, however, a really important find was reported from Keilor, a township on the outskirts of northern Melbourne.

Keilor lies at the junction of Dry Creek and the Maribyrnong River and the site of the discovery was a still exploited sand-pit. The pit is less than an acre in area and the sand-contractor who found the skull seems to have had in his possession (and found in the same site) another human skull and some further bones together with the fragments (five pieces) of a third cranium unearthed about six feet from the first and on the same level—these have been lost. The cranium is said to have been recovered from undisturbed strata eighteen feet beneath the surface of the 'Keilor Terrace' of the Maribyrnong River. But it may be noted that no specialist was present at the discovery.[2]

[1] A useful summary of our present knowledge relating to fossil remains of Man found in Australia has recently been published by Mahony. Tindale (1928) is of the opinion that the Tartanga specimens may date from the phase of aggradation leading up to the lowest beach-terrace in southern Australia and this beach-terrace has, by some, been equated with the Mediterranean European 'Late Monastirian'.

[2] In the Keilor region there is evidence of three distinct river terraces. That from which the skull was excavated was the highest of the series and forty-five feet above the adjacent river-bed. The other terraces are, respectively, at thirty-six feet and twenty-seven feet levels.

Date of Keilor Skull

Mahony, the Australian anthropologist, concludes that the Maribyrnong River terraces 'represent the eustatic rise of sea-level during the Riss-Würm Interglacial phase' and that the 'skull and the terraces are evidently contemporaneous.' This correlation between phenomena in southern Australia and in Europe was made on the grounds that 'most glaciologists consider that glacial and interglacial phases were contemporaneous in both hemispheres.'

Zeuner[1] holds that the Keilor Terrace's aggradation came to an end when the mean sea-level of the region was in the neighbourhood of sixty feet (higher than now), which is 'almost exactly the level of the Main Monastirian Phase in other parts of the world (eighteen metres), so that Mahony's suggestion that the skull dates from the Last Interglacial receives strong confirmation.'[2]

The skull is mineralized and, therefore, presumably 'old' in the sense that it is not the relic of an Australian who died, let us say, a few hundred years ago. On the other hand, the dating, even the comparative dating, of objects found in sand-pits presents formidable difficulties. No successful effort has been made to preserve the site or even thoroughly to explore it. And, moreover, the evidence for the supposed great age of the Keilor specimen (i.e., Riss-Würm Interglacial) is based solely on altimetric considerations.

The Keilor skull is in quite good a state of preservation (but lacks the lower jaw) and is now in the safe keeping of the Australian National Museum.

Owing to the conditions prevailing in war-time, this interesting relic has not been examined by other than Australian scientists—whose professional competence is, of course, unquestioned. In these matters, however, it is illuminating to get the opinion of scientists from outside the country of discovery. Few anthropologists can be personally familiar with all the comparable material and there is nothing like 'handling the bones' to give the expert assurance.

Again, there is, quite naturally perhaps, an undoubted tendency among any given national group of scientific workers—and especially of anthropologists—to exaggerate the significance of finds made

[1] *Vide* Zeuner, *Dating the Past*, 1946.

[2] The possible sources of error when we are dealing with river deposits are great. A more ancient deposit may slither into a more recent one and it is not generally possible to establish a relative chronology for objects found in the same gravel terrace, for rivers swirl and powerfully churn at their banks. Practised geologists will always date a deposit by its most recent type of fossil, for the more ancient may come from older deposits and may have been washed in. Any isolated pieces of apparently startling 'horizon' should be regarded with suspicion. Moreover objects found near the surface of a river terrace may always have been washed in and objects embedded in the mass of the gravels should be taken as more satisfactory. Sometimes there is extensive penetration into the layers by crevassing and then secondary refilling of the crevasses. And the displacements due to 'solifluxion' are often far-reaching.

in their own soil. If we reflect upon the extravagant claims made by some of our own fellow-countrymen for such objects as the reconstructed skull of *eoanthropus* ('Piltdown Man') and other specimens recovered from the earth of Britain, we shall be only too ready to comprehend the perhaps unprovable claims of scientific workers in other lands.

Now, for the claims made in Australia—and elsewhere.[1]

Edwards (*Proceed. Royal Soc. Victoria*, 53, 233; 1941) correlates the stratum of the Keilor skull with those of the Riss-Würm European Interglacial (or, accepting some calculations, of a date at least 150,000 years ago).

If, therefore, 'Keilor Man' lived in southern Australia many tens of millennia ago, he must have become differentiated (in Asia?) long before the time of his appearance in Australia. So we must set the date of his differentiation early in the last or possibly in the next but last (i.e., Mindel-Riss) Interglacial.

And, we may remember, we are not dealing here with the remains of anything but 'modern' man and, indeed, of a 'modern' man resembling (though not identical with) some modern Australian natives.

If we were to accept such remote dating, the implications would be, indeed, far-reaching. If men recognizably akin to living Australians have been settled in the island-continent for, say, one thousand five hundred centuries, then the present-day Australian aborigine must represent something very like the members of the ancestral stock whence all *homines sapientes* are derived.

Again, if we accept the proposed dating for the Keilor skull, we must extend that dating to the artefacts found in association with it. These are of *Upper Palaeolithic* type. Are we, therefore, to conclude that Upper Palaeolithic culture (i.e., that associated with 'modern' Man) is much older in Australia (and *a fortiori* in south-eastern Asia whence the Australoid type is apparently derived) than in Europe?

Furthermore, if the Keilor skull is to be dated to the Riss-Würm Interglacial, we would have evidence for the existence of 'modern' Man in Australia at a time when (so far as we know) Neanderthaloid Man was alone of human beings in Europe.

[1] Professor Wood-Jones wrote: 'We may therefore claim that the Keilor skull is the first Australian human fragment the geological antiquity of which is definitely guaranteed by the circumstances of its finding and that in the opinion of competent Australian geologists it dates from the Riss-Würm interglacial phase of the Pleistocene.' Professor F. Weidenreich (in his article referred to below) expresses surprise at Wood-Jones's attribution of antiquity. But it will be seen that he puts the onus of the dating on the 'competent Australian geologists.' Moreover in an article entitled 'The Antiquity of Man in Australia' (*Nature*, February 19th, 1944) Wood-Jones stated that he regarded as 'unproved' the antiquity both of the human remains and the artefacts from Keilor.

Keilor and Wadjak

However, as Weidenreich has pointed out,[1] a most important correlation has been overlooked. The Keilor skull is very like one of the Wadjak skulls (found by Eugen Dubois in 1889 near the sea-coast of southern Java, and not described until 1922)[2] and, indeed, the Wadjak specimen might well be that of a male of the same variety of Australoid as that represented by the (possibly) female Keilor skull.

The Wadjak specimen shows a greater degree of prognathism, possesses a supraglabellar torus (lacking in Keilor), has a rather more sloping forehead and is altogether heavier and thicker. In fact, Wadjak looks rather more 'primitive' than Keilor and, as we know from varied evidence, a considerable degree of variation between the males and the females is characteristic of 'primitive' human types (as it is also of the extant great apes).

So we have a 'Wadjak' type in southern Australia and that type is apparently an immigrant from Indonesia. Hence the great interest and importance of the Keilor specimen.[3]

And, moreover, we have some ground upon which to tread in an appreciation of Keilor's age, for it cannot be very much greater than that of Wadjak.

What is the age of Wadjak? It may be Pleistocene and H. de Terra considers it not older than the last Glacial. v. Königswald, on the other hand, thinks that it may be contemporary with the post-Pleistocene fauna from the Sampoeng cave in central Java whence were removed skeletal remains of Australoid (or 'Australoid-Melanesian') type which have been described by Mijsberg. Thus, whatever view we follow, we have evidence that 'Wadjak Man' did not emigrate to Australia *before* the Würm glaciation. We may say that, for the present at least, we can set the Keilor skull in some late Pleistocene or, indeed, post-Pleistocene date. It may therefore be 'Recent'—but Recent in the geological sense that means any time within the last twelve thousand years or so.

Professor A. L. Kroeber well summed up the Keilor question when he wrote:

'the net effect on the reviewer by the evidence produced in the four

[1] *Vide* F. Weidenreich in the American *Journal of Physical Anthropology*, March 1945.

[2] Dubois' Wadjak material consists of one skull (minus the lower jaw) and some skull fragments and a portion of another jaw from a second subject. Wadjak I seems to be that of a female, Wadjak II that of a male.

[3] The Talgai skull (*vide ante*) was badly crushed but the resemblance between it and Keilor is striking, although Talgai (as the cranium of a youth) is smaller than Keilor. Weidenreich remarks that the only feature in which the Talgai skull disagrees with those of Keilor and Wadjak is in possessing the deep infraglabellar notch characteristic of the modern Australian aborigines but not present in either the Wadjak or Keilor specimens.

important papers' (i.e., those on the Keilor remains by Australian scientists) 'is one of scepticism whether Australia has yet yielded anything really ancient either in time or in type of human development.'

But if we have from Keilor no proof that the Australoids were the first 'modern' men and that they made Upper Palaeolithic instruments long before anyone else, we have an indication that the Australoids are related to the Wadjak type and that the Australoids of Australia came from Indonesia.

So, although the Australian 'black-fellow' is no 'living fossil' or belated Neanderthaloid, he does represent an early sort of 'modern' man preserved in the isolation of the island-continent, where, however, he most probably underwent a considerable degree of evolution for these Talgai, Cohuna and Keilor skulls (although not *essentially* different from those of present-day Australian aborigines) are distinctly more 'primitive.'

A Note on Oceania

If the oldest human remains have been found in Java, Polynesia was the most recently colonized of all the major land-areas. Doubtless many peoples had moved out of south-eastern Asia and along and through the East Indies to New Guinea and beyond before the settlement of the scattered islands of the South Pacific was made possible by men with seaworthy boats. There are no traces—and there are no traditions—of predecessors to the Polynesians in their islands.[1]

The mirage of the colonizing of the Americas by a transpacific route is as illusory as that of Cambodian origins for Maya culture, since in the former as in the latter case, apart from all other considerations, the chronology is dead against the hypotheses. By the time the Oceanians *began* to occupy their archipelagoes and islands beyond the Fijis—about 1,500 years ago, it would seem—the characteristic American cultures seem to have been already in possession of their main features. The so-called 'resemblances' between American and Oceanian artefacts and culture-objects amount to just zero as serious evidence for direct Oceanian influence in the Americas.[2]

The existing peoples of the islands to the south-east of Asia fall into seven fairly well defined groups :

(*a*) *Australoid* and *Veddoid*, that is the native population of Australia, the Senoi and Sakai in the Malay Peninsula. The 'Veddoid' type (generally showing 'Old' Malay admixture) is also met with among the Toala and the Tokea and other groups in the south and the south-east of the Celebes and on the Engano and Mentawei islands off the west coast of Sumatra.

[1] The colonization of the nearest islands to Australia and New Guinea would not go back, by the dead-reckoning of the native genealogies (for what they are worth) to earlier than about A.D. 400.

[2] See *The Antiquity of Man in the Pacific and the Question of Transpacific Migration*, by D. S. Davidson, Assistant Professor of Anthropology in the University of Pennsylvania.

(*b*) *Negritos:* in the highlands of New Guinea, the Andaman islands and among the 'negrillos' of the Philippines and the Semang of Malacca.

(*c*) *Papuans:* New Guinea and the neighbouring islands. They are not a homogeneous group and in the north-east of New Guinea have been much mixed with Melanesians, while all round the coasts Malay admixture is apparent and in the south Australoid or Veddoid types are not uncommon whereas inland there are traces of negrito admixture. The Malay and Papuan types meet most in the Moluccas and Lesser Sunda islands.

(*d*) *Melanesians* inhabit the islands to the east of New Guinea and Australia, that is to say, an area from the Solomons in the north to New Caledonia in the south and to the Fijis eastwards.

(*e*) *Polynesians* are found from New Zealand in the south to Easter Island in the east and Hawaii in the north.

(*f*) *Micronesians* inhabit the islands to the north of the Melanesian area and to the west of that inhabited by Polynesians.

(*g*) *Indonesians.* The area of Indonesian settlement is vast, stretching from Madagascar through most of Indo-China (geographical) with the Naga group to the north, and including part of Formosa, the Philippines and all the islands of the Dutch East Indies with the exception of New Guinea and the immediately contiguous islands. The Indonesians of the islands are divisible into two groups: (1) the 'Proto-Malays' (to which group must also be assigned the Indonesians of the Asiatic mainland) and the (2) 'Deutero-Malays.' Of the island-dwelling Malays, the Niasans, the Bataks, the Torajas and most of the Dayaks are 'Proto-Malays.' The rest of the insular Malays can be classed as 'Deutero-Malays.' Both groups of Malays seem to have arrived in the islands at some time (probably) between 2,000 and 1,500 B.C. and they are essentially of the same human variety as the basic population of (geographical) Indo-China and south China. The 'Deutero-Malays' probably owe their special features and characteristics to admixture with non-Malay or non-Indonesian elements, since the 'Deutero-Malay' type is, generally speaking, confined to the Indonesian Islands and is not found on the Asiatic mainland.

The Australoid-Veddoid types and the Negritos are fairly certainly the oldest inhabitants of the islands since they alone are represented in Australia (where Negrito and Papuan influence, such as it is, may be taken to be of comparatively recent importation) and both Australoid and Negrito types are represented among the human remains recovered from the soil of (geographical) Indo-China.

The Papuans may be closely allied to the Melanesians and the 'Melanesoid' type seems to have been ancient on the continent of Asia, being recorded for one of the skulls from the Upper Cave at Choukoutien (see p. 115).

The Micronesians may be a sub-type evolved and stabilized from a Polynesian stock with considerable non-Polynesian admixture.

The Polynesians are, as we have seen, in their islands, at any rate, comparatively new-comers. Their languages are obviously of the same family as those of the Malay group but, physically, the Polynesians of the 'pure' type may represent an ancient element in the make-up of the south-eastern Asiatic populations.

The Indonesians (both of the mainland and 'Proto- and Deutero-Malays') are by far the most numerous group both in the islands and on the mainland of (geographical) Indo-China and they are, probably, the latest comers. One would be inclined to look for the dispersal centre of this type somewhere in southern China, for the mass of the southern Chinese are (often rather superficially) 'Mongolized' Indonesians. The non-sinized tribes of south-western China, indeed, show an obvious physical affinity to the populations south of the mountain-barrier.

If, therefore, we regard the (now) preponderating Indonesian type as having been of comparatively late arrival in (geographical) Indo-China and the adjacent islands, we shall be inclined (if we adopt the theory that geographical Indo-China was an important differentiation-centre of human types) to think that the oldest type was the Veddoid-Australoid, followed by the Negrito and the Melanesoid. The Veddoid-Australoid looks the most 'primitive' of the three and it is clear that this type enjoyed formerly a greater extension than it does to-day. Not only are there Veddoids in Ceylon (and much Veddoid admixture among the populations of southern India) but there is a quite apparent Veddoid substratum as far west as southern Arabia—the Hadhramaut is the area where the Veddoid and Mediterranean types meet and mingle. If we accept, tentatively, the filiation of types *Pithecanthropus*—Solo—Wadjak—Australoid, it is obvious that this type of Australoid-Veddoid must be one of the most antique forms of *sapiens* and possibly a generalized sort of Australoid may have been ancestral to *sapiens* Man south of the Asiatic mountain-barrier.

'Cradle of Man'

Most varied theories have been put forth as to the differentiation area or 'cradle' of Man. Some have even maintained that our birthplace is to be sought at the South or even the North Pole! Some, again, hold that there was no one 'cradle' and that Man appeared in several different areas independently. Then, there is the small company of 'hologenists' who would have it that Man arose simultaneously in many different regions.

But the more the evidence piles up the more it looks as though Man did turn into Man in some one, possibly fairly restricted, area. Man is a naked animal and even if he were as hairy as the great apes (and they are less hairy than they seem) it is probable that, his physical constitution being so like that of the anthropoids, he could only have had his origin in a tropical or sub-tropical climate. Moreover, Man is derived from a common stock with the great apes, and therefore it is reasonable to look for his cradle somewhere where great apes were common in Tertiary times, that

is, somewhere in a T-shaped area running from Spain to China and from Egypt to the Transvaal.

There is, it is true, not, as yet, anything from Africa comparable with the pithecanthropoid material from Java and from China, but, in view of the most recent discoveries, many anthropologists are veering round to the view that Africa may well prove to have been as important an area as eastern Asia for the story of Man's evolution. Indeed, some are of the opinion that it is rather in Africa than in Asia that we should seek for traces of pre- and proto-hominids.

Of the purely human (as distinguished from the most suggestive anthropoid) material the *Africanthropus* (see p. 202) exists in too fragmentary a state for any definite pronouncement to be made as to its affinities, though it may be more 'evolved' than the pithecanthropoids and rather comparable with the African 'Neanderthaloids' such as Rhodesian Man and the Florisbad type from South Africa.

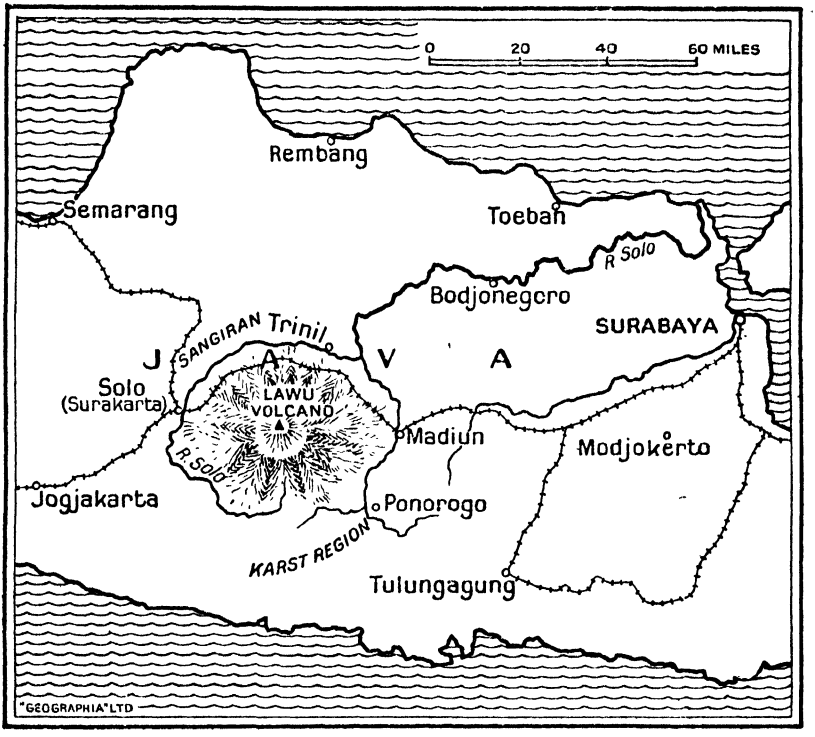
However, we shall consider the African evidence later. Let us now see what is the evidence from south-eastern Asia and then consider the relation of such evidence to that from India, the north-western part of which was, during the Tertiary Period, a great breeding-ground of apes.

Wadjak Man

Hermann Klaatsch (who visited Australia as long ago as 1904) seems to have been the first anthropologist to suggest that the Australian aborigines were in some way related to or descended from the antique forms of men whose remains had been discovered in Java. The guess showed considerable insight if we remember that, for nearly a generation after his discoveries in Java, Eugen Dubois, who recovered the first *Pithecanthropus* skull-fragment, allowed it to be tacitly understood that no hominid remains had been found by him—with the exception of those he published to the world.

In 1918, however, stimulated probably by the announcement that a skull of 'proto-Australian' type had been unearthed in Java, Dubois revealed that in 1889 he had found fossil remains of members of the 'same race' at Wadjak near the southern coast of the island. In 1921 he published descriptions and illustrations of the two Wadjak crania unearthed by him before he came upon the famous calotte of *Pithecanthropus Erectus*. The two incomplete crania were strongly dolichocephalic and presented the essential features of the Australoid type—marked supraorbital ridges, low orbits and large palates, massive skulls and heavy jaws (comparable with that of Mauer, see p. 206), with some prognathism and but slight development of the chin-prominence. But Wadjak Man is definitely

'modern'—he is *homo sapiens*. With the new evidence from Keilor (*vide supra*) we can now say that Wadjak is 'proto' if not 'pre-Australoid' and that the Wadjak type *represents* an ancestral form from which the modern Australian aborigines are probably derived.



Relevant part of Java.

Solo Man

The Solo River in eastern Java takes its source on the southern slopes of the great volcanic mass of Lawu-Kukusan, whose still active crater rises some ten thousand feet above the sea-level. This volcano, like all those of Java, is set upon a substratum of Tertiary rocks of marine origin.

In our consideration of the evidence as to Man's origin that may be forthcoming from Java we must bear in mind that the island is of comparatively recent and volcanic formation, that Java did not wholly rise above the waters until the end of the Tertiary Period, and that its fauna bears strong resemblances to those of Malaya and South China, so much so that it seems undoubted that the Sino-Malayan fauna moved down to the newly-emerged

lands from the north-west while those lands were still part of the mainland of south-eastern Asia.

If, as seems probable, Man—or, if we will, the pre-hominids of the pithecanthropoid type—moved into Java with the Sino-Malayan type of fauna, then it would not be surprising that archaic forms of human beings should have been isolated and preserved in a remote island when they had died out elsewhere. It is just this 'museum' aspect of Java and its contents that we should do well not to lose sight of when weighing the evidence from the island.

The Solo River, starting from the southern slopes of the Lawu-Kukusan volcano, divides them from the plain until, towards the west, the Solo moves away a few miles from them but still curves round, following the contour of the mountain's mass, until in the north-east, at Ngawi, the Solo receives the waters of the Madiun (which rises higher up the slopes of the mountain than the Solo but with the Solo forms an almost uninterrupted girdle of stream around the whole volcanic mass) and the two rivers flow together to the sea on the north of the island.

To the west of Lawu-Kukusan the Solo River cuts through an anticline[1] of the Kandang Hills whose northern flanks display a series of at least three terraces—'the river-terraces of Ngandoeng.' The terraces (of 12, 20 and 40 metres respectively) lie directly upon Miocene strata.

In 1931–32, officials of the Java Geological Survey found embedded in the middle (or 20 metre) terrace portions of five skulls. In 1932, W. F. F. Oppenoorth described and figured a nearly complete cranium and two fragments of other crania.

These fossiliferous Ngandoeng beds do not seem to be as old as the Trinil beds (where the *Pithecanthropus* remains were found). Oppenoorth (as well as H. de Terra) would date the Ngandoeng beds to the time of the Riss-Würm Interglacial. If this dating is correct, then Solo Man would be more or less contemporary with the earlier European Neanderthaloids. But Solo Man is morphologically of a more primitive type than the Neanderthaloids.[2]

In the same year, 1932, the aged Dubois produced from his collection four more or less fragmentary thigh-bones and later (in 1935) a fifth thigh-bone. All of these remains can be assigned to Ngandoeng or Solo Man.

By 1936 further discoveries by Dr. R. v. Königswald had brought up the number of Solo skulls to eleven. Most of these could be fairly satisfactorily reconstituted. There are also a few

[1] An anticline is an upward folding of strata into a roof-like form.

[2] Out of 58 characteristics of the skull 55 or 56 are common to the Solo crania and those of *Pithecanthropus* and *Sinanthropus*—the only striking differences between the skulls of Solo Man and those of the pithecanthropoids lie in the larger dimensions of the former and in their greater cranial capacity.

fragments of other skulls and one rather damaged tibia and the fragment of another tibia.

The bones are heavily mineralized. The skulls are remarkably uniform in type. The basal parts are missing and there are no facial bones, jaws or teeth.

The general appearance of the crania is Neanderthaloid, but as far as can be judged from the incomplete condition of the material, Solo men represent a stage of evolution more 'primitive' than that of the Neanderthaloids. The occipitals show a ridge where two surfaces meet almost at right angles, an arrangement rather like an exaggeration of that seen in the Rhodesian skull (*vide* p. 194) and normal in the great apes. Skull No. 1 has enough of the base preserved to show that the *foramen magnum* was set farther back than in 'modern' Man and this position would indicate a forward carriage of the head.

However, the mastoid region is more or less of a 'modern' Man type and the maximum breadth of the skulls is not between the mastoid processes (as in *Pithecanthropus* and *Sinanthropus*) or, again, between parietal bones (as in 'modern' Man) but between an intermediate region not far from that of the parietals.

The crania are of fair size with heavy supraorbital ridges and low and retreating foreheads. The Solo skulls may represent a general 'Neanderthaloid' form through which all human types may have passed.[1]

It is evident that the Solo skulls were hacked open by men. In fact, these crania look like primitive skull-bowls. They may, of course, just be relics of a cannibal feast, or they may have been manipulated in some other intent. Analogous skull-bowls are recorded for the Upper Pleistocene of both France and Spain. Such utensils are, doubtless, a very ancient form of table-gear—possibly the most ancient—and those from which our soup-tureens, platters and salad-bowls are eventually derived.[2]

The cranium known as 'Ngandoeng V' shows (at the base of the skull) a bone fracture which, if it were inflicted (as seems probable) before death, was sufficient to kill.

[1] The Solo bones were found in close association with those of cattle and nearby, it is said, were unearthed worked deer-horns and a bone harpoon. It is, however, by no means certain that the bone industry of Ngandoeng and the now famous 'harpoon' came from the same level as the skulls. Bone artefacts, unlike those of stone, are generally recognized only in the laboratory. These bone implements (the only artefacts save some balls of andesite) certainly look rather 'modern' but bone implements were also found associated with Peking Man's remains.

For the Solo literature, see: W. F. F. Oppenoorth, *Ein neuer diluvialer Urmensch von Java—Natur und Museum*, Vol. 62, 1932, pp. 269–279, and the same author's 'The Place of Homo Soloensis among Fossil Man' (in *Early Man*—Philadelphia 1937, pp. 349–360). Professor F. Weidenreich has also studied the material which was also examined by Professor A. W. Mijsberg in Batavia and by W. C. B. Koolhoven in Bandoeng.

[2] Cf. Monte Circeo (p. 35) and Ehringsdorf (p. 219) and Krapina (p. 216).

According to Oppenoorth, the cranial capacity of Ngandoeng or 'Solo' man was about 1,175 c.c.—but any estimate of cranial capacity for skulls so damaged cannot be other than approximate. It does, however, seem that the average cranial capacity of Ngandoeng man was inferior to that of the Neanderthaloids of the 'classical' type although the figure of 1,175 c.c. is greater than that given by one of the estimates of the cranial capacity of the Saccopastore (I) skull.

Ariens Kappers,[1] the eminent Dutch anatomist, was of the opinion that the Ngandoeng or Solo endocranial casts show that the brain was a 'primitive' one and he compared it with that of the *Pithecanthropus*. Weidenreich, the *Sinanthropus* specialist, has calculated that the average cranial capacity of the six best preserved of the Solo skulls was 1,100 c.c. as against 850 c.c. for the *Pithecanthropus* and 1,040 c.c. for the *Sinanthropus*—all average figures.

Solo Man 'an Enlarged Edition of Pithecanthropus'

In a general way, however, it may be stated that the Solo skulls so closely follow the pattern of those of the *Pithecanthropus* that the former appear to be enlarged editions of the latter.

Weidenreich considers that a case is made out for the descent of the Australian aborigines from a *Pithecanthropus* form through the Solo and the Wadjak phases. Australian skulls of the 'Cohuna' (see p. 69) type, he holds, do so resemble those of Solo Man in essential features that 'such skulls can be interpreted as a further evolutionary stage of *homo soloensis*.'[2]

It is, however, undeniable that the gap between the 'Solo' and 'Wadjak' forms is considerable. But, until we get more evidence we may take it as a *working hypothesis* that one form of 'modern' Man at least, i.e., the Australoid, is a southern form of hominid

[1] *Vide* C. U. Ariens Kappers, 'The Endocranial Casts of the Ehringsdorf and *Homo Soloensis* Skulls' (*Journal of Anatomy*, Vol. lxxi, Pt. 1, October 1936). In this connection a note by Professor W. E. Le Gros Clark, F.R.S., in *Nature* (3rd August, 1946) commenting on a book entitled *Anthropoid and Human Endocranial Casts* by Pierre Hirschler (Amsterdam, 1942) is interesting. 'The author is particularly (and, we think, rightly) outspoken about those anatomists who appear to assume that every unevenness of the surface of an endocranial cast must be a fissural imprint; who claim that the relative size of a localized eminence can be taken to signify the possession of such mental faculties as the power of speech; or who ignore the influence of membranes, subarachnoid cisterns and blood vessels in the determination of irregularities on the cast surface. . . . In casts made from human skulls fissural markings can be identified on the orbital surface of the frontal lobe, near the anterior border of the frontal lobe, and on the temporal lobe. Elsewhere they are not usually present in any recognizable form.' These weighty words may be recalled when we are asked to believe that the endocranial cast of the Rhodesian skull shows that the subject was possessed of a high degree of articulate speech—to mention only one instance.

[2] See *Nature* 138–194 (1936). Weidenreich's further evidence is marshalled in his most important monograph on the *Sinanthropus* skull (*vide infra*).

evolved in south-eastern Asia. But it is worth while stressing again the point that a morphological series is not, of necessity, an evolutionary series. Less 'evolved' and (apparently) more 'primitive' forms *may* be directly ancestral to more 'evolved' and (apparently) less 'primitive' forms, but the former may also be contemporary collaterals of the latter.

In the pithecanthropoids (*Pithecanthropus* of Java and *Sinanthropus* of China) we have a form that is morphologically undoubtedly intermediate between the anthropoids and 'modern' Man, but our Australoid type of 'modern' Man has left traces from Java to Tongking (and elsewhere) and it is more than probable that we must look for his cradle somewhere on the mainland of south-eastern Asia and not in a comparatively small island isolated for long ages from the rest of the world.

Java's Past

Java is a region that plays such an important part in our story that it is worth while to glance for a moment at the geological history of that part of the island where the remains of very ancient men have been found. We may remember that for most of the Tertiary epoch Java was submerged.

There are two (main) series of Pleistocene strata: (*a*) the 'Solo', and (*b*) the 'Karst'.[1]

It is in the 'Solo' layers that human remains have been discovered. The 'Karst' has yielded specimens of men's tools and also of animal bones but not of men's bones.

The Solo layers are:

(*a*) The 'Djetis' due to lake sedimentation and to volcanic action.
(*b*) The 'Trinil' formed by river and volcanic action.
(*c*) The 'Ngandoeng' due to river action.

(*a*) is the oldest. In this first 'Djetis' layer among the typical mammals are stegodont (i.e., with 'roof-shaped' ridges on the teeth), elephant—an antique form, hippopotamus, sabre-toothed tiger (a Tertiary form that survived into the Pleistocene).

The 'Trinil' layer still has a fauna resembling that of the 'Djetis' and so does the latest of 'Ngandoeng,' but with the fading of some forms although the three types mentioned survive.

It was in the Solo basin that v. Königswald recovered chalcedony artefacts and rolled (i.e., water-worn) chalcedony flakes probably belonging to the youngest (Ngandoeng) layers where were discovered the remains of Solo Man.

[1] The term 'Karst' is applied in geology to a region of high and dry limestone ridges such as occur in the original 'Karst' country to the east of the Adriatic's northern shores.

In the 'Karst' country to the south of the Solo region an abundant harvest of artefacts (fashioned of rhyolithic tufas and silicified wood) was gathered, these seem to have a general 'Abbevillian' appearance (and may therefore be very ancient, see p. 46) but the specimens have been somewhat blurred by river action.

The 'Karst' tools look like Lower Palaeolithic, whereas the Solo tools seem to be Mid-Palaeolithic—judging from type.

The 'Karst' country is centred around the Patjitan area, that is an upland of Miocene limestone shelving towards the south.

Here there are three (main) layers. They are:

(*a*) A thick mantle of volcanic cinders in which no fossils have been found.

(*b*) Deposits in fissures and old grottoes (that may antedate or postdate the cinders) with remains of beasts very like those found in South China deposits, i.e., bear, tapir, orang-utan and stegodont elephants.

(*c*) Terraces formed in the valleys when they were re-cut through the volcanic cinders. Here in 1935 v. Königswald found an abundant 'Chellean-Acheulian' industry (of a type very like that found in Madras). These tools were made by utilizing the beautiful Miocene flint of the region.

Whatever type of man was the author of these tools, they are of the same general sort as the chopping-instruments and coarse scrapers found associated with *Sinanthropus* remains at Choukoutien in China.[1] But at Patjitan were also discovered some pointed bifacial choppers. These are comparable with and closely similar to true European hand-axes and bifaces (that is, flint tools worked on both sides). Movius is of the opinion that these 'pseudo' hand-axes may be either (*a*) imitations of, or (*b*) convergences upon, types of artefacts associated with different sorts of men in varied areas of western Asia, Africa and Europe.

One last word on this Javan geology and industry. Teilhard de Chardin holds that central Java was a region where met—or whence parted—possibly at different epochs, two ancient currents of Palaeolithic industries:

(*a*) One, a northern current, derived, possibly from India, with Abbevillian industry and hippopotamus remains.[2]

(*b*) Another, a north-eastern current, coming from or going up to China and bearing along the pithecanthropoid type of Man together with orang-utans and buffaloes.

[1] And, indeed, are hardly distinguishable from these Chinese tools.

[2] Hippopotamus remains are the 'classical' accompaniment of Abbevillian artefacts.

Java's fossil mammals show, indeed, analogies to those of both India and southern China.

So, it will be seen that this eccentrically placed and relatively small land of Java is a place of prime importance for our story—and we have not yet told the tale of *Pithecanthropus*.[1]

We may add here that in Java Neolithic artefacts are abundant, whereas in Sumatra (always, despite its position, a provincial area) nearly everything is Neolithic (or what the late Professor Lebzelter of Vienna used to call 'a-typical Palaeolithic'), but as all the objects found have been recovered from the surface and as we know little or nothing of Sumatra's Pleistocene stratigraphy and as there are few authentic fossil animal remains from the island, we must not give up hopes of finding there material of importance.

'*The Erect Ape-Man of Java*'

In the same year (1935) that Eugen Dubois produced from his collection the fifth thigh-bone of 'Solo Man' he also published a portion of a lower jaw unearthed, it would seem, in 1890 at a site called Kedung Brebus, twenty-four miles from Trinil. The mandible fragment was found in the same geological formation as the famous *Pithecanthropus* skull-fragment. With this relic was recovered a portion of a right lower human canine, perhaps that of a *Pithecanthropus*.

Thus, Dubois had thought fit to *faire durer le plaisir*, as the French say, for forty-five years before revealing what all anthropologists wanted to know, namely, that he had found another portion of a *Pithecanthropus* skull other than the calotte or brain-pan. Had the jaw-fragment been published at the same time as the calotte a good deal of fruitless speculation would have been avoided.

But, better late than never.

Now, to come to Dubois' famous discovery. During his season's explorations in 1891–92 Eugen Dubois recovered from the terraces of the Solo River[2] near the village of Trinil in eastern Java the upper portion of a skull of what is now universally recognized as a very 'primitive' sort of Man. The relic was unearthed from a layer of volcanic *lapillae* overlying a conglomerate stratum of

[1] v. Königswald has shown that the Trinil fauna of the *Pithecanthropus* horizon consists of sixteen mammalian 'genera' (cf. Pilgrim's list for the Narbadda—southern India—fauna) and that half the genera are common to southern India and to Java. Of the twenty-eight genera so far known for the apparently early and middle Pleistocene beds of Java (i.e., 'Tji Djolang,' 'Kali Glagah' and 'Djetis') sixteen occur also in Indian formations of 'Upper Siwâlik' age. Therefore in late Pliocene and early Pleistocene times, the fauna of Java was composed both of 'indigenous' and of (presumably imported) Siwâlik elements, and of especial interest is the occurrence of *elephas namadicus* among the Trinil fauna, since it is a form commonly found in the Indian Middle Pleistocene and has also been reported from Choukoutien, near Peking.

[2] Or Bengawan river, the *Pithecanthropus* site is under the shadow of the Lawu volcano.

marine origin. Nearby, and in the same deposits, were recovered bones of hippopotamus, rhinoceros, deer, stegodont elephant and some tailed monkeys. No artefacts were found.

Besides the fragment of a mandible from Kedung Brebus, Dubois had also recovered in 1890 a left thigh-bone and two upper molar teeth which are probably of an orang-utan.

The famous calotte was not discovered in what can be called quite satisfactory stratigraphical conditions. The relic may have been, as Teilhard de Chardin has phrased it, *remanié dans une basse terrasse de la Solo*, i.e., that this relic of *Pithecanthropus erectus*[1] may have been subjected to fluvial action so that the original stratum in which the specimen was embedded may not be known.

Controversy raged about this first relic of 'Trinil Man.' Huxley was still alive when the discovery was made and he guessed that the bones were those of an early type of Man, but the late Marcellin Boule was maintaining as late as 1921 that *Pithecanthropus* was an ape, while in 1937—only a few months before his death—Dubois himself, while admitting the possible Wadjak-Australian filiation, was sturdily declaring that Trinil Man was not human.

In his very last published paper Dubois admitted that Solo (and, curiously enough, Modjokerto) remains were human and of 'proto-Australian' type (and even indeed 'identical' with *Sinanthropus*), but he affirmed that neither Solo nor Modjokerto had 'anything to do' with *Pithecanthropus*. Rhodesian Man (see p. 194), even, Dubois conceded, resembled Solo Man, but his 'Erect Ape-Man of Java' was a 'gigantic gibbon as the calvaria indicate.'[2]

But even Dubois, had he lived a little longer, could hardly have withstood the impact of the conclusive new evidence collected by Dr. v. Königswald.

We may remember that the original Trinil calotte did not certainly come from the strata later known as 'Trinil.' On the other hand, the fragments of femora attributed to 'Trinil Man' and found in 1890 did undoubtedly come from 'Trinil' strata and from a site about twenty yards from where the calotte was discovered. But, again, these fragments are not *undoubtedly* of *Pithecanthropus*.

Date of Pithecanthropus

If the original *Pithecanthropus* was found where it has been

[1] As Dubois clumsily (and indeed tendentiously) named his discovery. The 'erect ape-man' appellation was borrowed from that of an imaginary creature postulated by Haeckel (the German biologist) in 1868. It would be preferable if the awkward term of *Pithecanthropus* could be dropped and 'Trinil Man' substituted for it. The adjective 'pithecanthropoid' might be retained to define members of the *Pithecanthropus-Sinanthropus* group and allied or comparable forms.

[2] *Early Man in Java and Pithecanthropus Erectus*, by Eugen Dubois, Curator of Palaeontology and Mineralogy of the Teyler Museum, Haarlem, Holland, 1937

assumed that it was (that is say, in the Upper Trinil Beds), then it *may* be of as late a date as Mid-Pleistocene (e.g., Riss-Würm Interglacial). The Solo Man remains from the upper layers of the Ngandoeng beds are apparently of later date.

But the reading of Java's stratification is not clear and in any case it is possible that both Solo and Trinil Man may have existed side by side and have been two types derived from a common ancestor at differing speeds of evolution. Since for other mammals we have the spectacle of nearly allied forms—showing some more 'advanced' features than others—living side by side, there is no reason to think that Man must have always constituted an exception to a fairly generally observed state of things.

Indeed, as the evidence accumulates, it does look as though the reduction of Man to one type (*sapiens*) is a comparatively recent phenomenon.

The human record as we begin to see it is jumbled and complex.

Later Finds

In the years after the first *Pithecanthropus* finds a certain amount of prospecting and of digging had been done in the Trinil area. Frau Selenka led a German expedition in 1907–08 and unearthed an abundant collection of non-human mammalian remains (axis deer, hippopotamus, elephant, stegodon, etc.) but no traces of *Pithecanthropus* were found.

Modjokerto Man

Hope had been almost abandoned of recovering more *Pithecanthropus* material when in February 1936 a collector of the Geological Survey excavated at Modjokerto, a village to the west of the town of Soerabaja and some considerable distance away from the Trinil area, a skull that v. Königswald considers to be that of an infantile *Pithecanthropus*. The cranium was discovered, undisturbed, in what is probably a Lower Pleistocene stratum.

Provisionally, the 'Baby Pithecanthropus' has been referred to a special group of *homo modjokertensis* and the 'Djetis' layers in which it was found do seem to be more ancient than the 'Trinil' layers in which all the *Pithecanthropus* remains have been discovered.[1]

The thin-boned skull is incomplete, lacking part of the base and almost all the facial bones. The sutures are closed (indicating in a 'modern' child an age of about two years), the cranium is, how-

[1] The sequence of geological strata has been thus worked out for eastern Java (but there is not, of course, as yet at least, any certainty in a correlation of these formations with those of western Europe). (*a*) Recent; (*b*) Sampoeng-Neolithic with some extinct mammals; (*c*) Ngandoeng-Solo Man; (*d*) Trinil-Pithecanthropus; (*e*) Djetis; (*f*) Kali Glageh; (*g*) Tji Djoelang-'Siwâlik' fauna; (*h*) Tji Sande—mammals can first be traced in the newly emerged land.

ever, smaller than that of a 'modern' child of twelve months; the skull is brachycephalic and its cranial capacity can be estimated at about 700 cc. (that would give a capacity of about 900 cc. for an adult of the same type). The forehead is more retreating than that recorded for any child of two years. There is a slight occipital torus and the superciliary ridges are beginning to bunch out at the sides. The post-orbital region is narrow and the parts behind the parietal region particularly depressed. The glenoid fossa is deep and the mastoid process strongly developed. The part of the parietal bones in the shaping of the cranial vault is greater than that of the frontal bones and the occipital is rather rounded. So there are several features recalling the skulls of 'modern' Man. But it seems most probable that the relic is an allied form to that of the *Pithecanthropus*, whose infantile form may well have seemed more 'modern' and less 'pre-hominid' than the adult. 'Modern' Man, indeed, compared with earlier forms or with the anthropoids, is a 'foetalized' sort of primate.

Sangiran Pithecanthropi

During the same year 1936 at Sangiran in the Solo River area was recovered one side of a pithecanthropoid jaw (together with four teeth in place and in good condition); the mandible was much mineralized (as were the other non-human fossils found in the same locality) and was embedded in concretions. The teeth are of great size and increase in size from front to back, the third molar (or 'wisdom tooth') is particularly large or 'unreduced.' These are peculiarities of a 'primitive' character and strikingly unlike those of 'modern' men's dentition. With the mandible was found a number of small flake-artefacts—scrapers, multitubular flakes, etc.

In 1937 one of Dr. v. Königswald's native collectors sent him from a site in Central Java, not so very far from Trinil, a fragment of a fossilized human skull. As its fractures were fresh, v. Königswald went immediately to the spot and there collected about twenty-nine further fragments belonging to the same skull. The cranium had apparently been washed out from the lowest part of the Trinil beds and then broken up by the natives.[1]

The base of the occipital bone has not been preserved, nor the bones of the face with the upper jaw. The right side of the frontal bone is missing but the important temporal region was preserved on both sides.[2]

[1] They had broken the precious relics into as many fragments as possible in order to obtain a tip for each bit 'found.'

[2] The mandible has a dental arch as in 'modern' Man and although the teeth are, by our reckoning, enormous, the premolars and the canine are less strongly developed than in the anthropoid apes. The fourth premolar is very large and ape-like but it is of the same pattern as that of *Sinanthropus*. The jaw, heavy and chinless, recalls in shape that of Heidelberg, whereas the teeth are more like those of Peking Man.

This 1937 calotte is smaller and less robust than the original of Dubois, and the 1937 specimen is probably that of a female (with a cranial capacity of about 750 c.c. as compared with that of some 900–950 c.c. for the 'original' *Pithecanthropus*). The cranial capacity of the 1937 *Pithecanthropus* specimen would, therefore, be about only one-half of that of an average modern European and only 150 cc. greater than that of the largest recorded (full-grown male) gorilla.

The supraorbital ridges are very marked. The skull is strikingly narrow in the post-orbital region. The roof of the cranium is flat and there are distinct margins for the attachment of the temporal muscles. There is no mastoid tubercle (behind the ear almost always present in 'modern' Man) but the position of the ear-opening (completely different from that postulated in all 'restorations' of the original *Pithecanthropus* skull) and the articulation of the mandible are exactly as in modern Man.[1]

It is possible that the fragment of a mandible found in the same Sangiran region earlier (see above) may have belonged to an individual of the type of the second *Pithecanthropus* skull.

In 1939 v. Königswald recovered, also at Sangiran, the posterior two-thirds of a cranium showing a deep cleft in the bone. The direction of the cleft and the straight lines of cleavage and the smooth margins of the split bones suggest that the skull had been injured by an instrument and that the injury had probably been inflicted while the subject was alive.

In the same year (1939) v. Königswald recovered an almost complete upper jaw together with part of the occipital bones of another *Pithecanthropus* skull.

So, up to the present time, we have the remains of four or five 'Trinil' men (not counting the Modjokerto specimen). It is a relatively rich material, although inferior in quantity to that available for the Peking Man, still we have now a clear idea of the main features of the pithecanthropoid type.

'*Pithecanthropus Robustus*'

In 1939 v. Königswald announced, however, that the cranial fragment with the upper mandible displayed simian characteristics more marked than those hitherto observed in any fossil hominid.[2] There was, for instance, a diastema (or gap) between the lateral incisor and the canine teeth—a typically anthropoid feature—

[1] The cranium is very rugged, despite its smaller size, and there is a median crest on the top of the skull. The broad cheek-bones project more than in any other human type known and the lower jaw's width (whether it is that of this skull or not) is almost as great as that of the cheek-bones. Both the 1936 mandible and the fine skull of 1937 came from the basis of the Trinil layers.

[2] This third Sangiran skull is considered by Weidenreich to belong to another variety which he would name *Pithecanthropus Robustus*.

although in other respects and in size the fragment might well have belonged to a *Pithecanthropus* skull. In the same year, the same anthropologist reported still another mandible fragment but it was in such bad condition that practically no detailed account of it could be given.

Meganthropus

And now comes the most extraordinary find of all. It was made in 1941, thus on the eve of the occupation of Java by the Japanese.

The discovery was that of a lower mandible's fragment with three teeth in position. Both the jaw-fragment and the teeth are of great size, far exceeding that of the Heidelberg jaw (see p. 206), which although very robust, bears teeth relatively small. v. Königswald named the new type of hominid *Meganthropus Palaeojavanicus*, and judging from the teeth this *Meganthropus* must have had a head the size of that of a full-grown male gorilla.[1]

Gigantopithecus and Giganthropus

Now, v. Königswald at different periods and for some years before 1939 had recovered from druggists' stores in South China a considerable number of orang-utan teeth (together with the teeth or other bones of stegodon and of tapir). Between 1934 and 1939 he found at Hong Kong stores three very voluminous molars that he attributed to a giant anthropoid ape. In fact, he dubbed the animal from which these teeth came *Gigantopithecus*. The teeth were, indeed, double the size of the corresponding molar teeth of a full-grown gorilla and six times those of 'modern' Man. In so far as their very worn state allows of comparison, they may be equated with the teeth of *sivapithecus* from the Siwālik deposits and this *sivapithecus* is known in a giant form (see p. 92).

Weidenreich thinks that v. Königswald's *Gigantopithecus* was no anthropoid but a prehominid since the pattern of these teeth is more human than simian, and Weidenreich would name the variety that bore them *Giganthropus*.

Weidenreich suggests that *Gigantopithecus* or *Giganthropus* may have been the ancestor of *Sinanthropus*, while the *Meganthropus* of Java may have been the ancestor (perhaps through a type represented by the cranium fragment found in 1939, that is, of a larger size than the earlier *Pithecanthropus* relics) of the *Pithecanthropus*.

If *Meganthropus* had a head the size of that of a full-grown gorilla, then *Gigantopithecus* (or *Giganthropus*) must have had a much larger and heavier head.

[1] 'Bobby', the gorilla of the Berlin Zoo, weighed at his death over 250 kilograms (or well over 500 lb.—say 36 stone) and was the largest specimen of gorilla to have been kept in captivity.

It is true that, so far, we have only three worn teeth of *Gigantopithecus* and a jaw-fragment of *Meganthropus* to go upon, but we may infer from even this slender evidence that the pre-hominids of the Lower Pleistocene consisted of a number of distinct forms.

The dominating question is, of course, the following:

Are these different and distinct forms to be compared with distinct forms of anthropoid apes in Pliocene (and even in Miocene) times or were they all derived from one anthropoid form?

If they were all derived from one anthropoid form it would seem that we must seek for that form a good deal farther back than has been thought necessary up to now.

If Weidenreich's ideas prove to be valid and some such 'giant' form as *Gigantopithecus* and *Meganthropus* were ancestral to the hominids, *Sinanthropus* and *Pithecanthropus*, then we shall have to accept what looks to-day to be a revolutionary idea, namely, that instead of being derived from pre-hominid forms of small stature, Man has been derived from large forms with a very massive skull. Such an idea is not only revolutionary as regards our theories about Man's evolution but the idea also supposes an evolution contrary to that observed almost universally in the development of mammalian forms.

Interpretation of Pithecanthropus Evidence

Although it would be rash to generalize from the relatively few *Pithecanthropus* remains, it does seem that in Trinil Man we are confronted with a group remarkably homogeneous. Peking Man (for whom our material is more abundant) shows much more individual variation. As E. A. Hooton says, *Pithecanthropus* I (the original calotte) is as like *Pithecanthropus* II (the 1937 specimen) as 'one egg to another.'

The huge frontal ridges and the thickness of the skull give it a large appearance, but the frontal sinuses are very voluminous and the cranium held a brain a good deal smaller than would appear at first sight, but if we take a cranial capacity of about 940 c.c. to be an average for the *Pithecanthropus*, the figure is not so very much smaller than that for smallest human brains of Veddas and Australians. There is a greater gap between the *Pithecanthropus* brain-size and that (of 655 c.c.) recorded as a maximum for a gorilla.

On the face of it, it seems not improbable that the 'Trinil men' of whom we have remains may have been the lingering representatives of an ancient stock, having come to the end of its evolutionary development, and isolated in a comparatively excentric area. Whereas the Peking men (who may be later in date than the

Trinil) show such a diversity of forms that one is inclined to think that they indicate evolutionary activity and transformation.[1]

In any case, the Trinil Man remains are of a shape and form which make us almost certain that we must look for the *Pithecanthropus* ancestor in some Tertiary type of 'man' (or probably rather 'pre-hominid'), and this Tertiary 'man' (whether eventually derived from a *Dryopithecus*—see p. 93—type of ape or not), or this, let us say, precursor of *Pithecanthropus* in *type* must have been a creature a rather long way removed from any fossil ape yet discovered—even in South Africa (see pp. 188–194).

If the limb bones which have been recovered from Trinil Man sites and have been attributed to *Pithecanthropus* really belong to him (and not, e.g., to Solo Man) then these long bones show that Trinil Man had a carriage comparable with that of 'modern' Man.[2] *If* such a human characteristic as upright carriage had been acquired as long ago as, say, the Lower Pleistocene, then the point of divergence of Man and his immediate pre-hominid ancestors must be set very far back.

More and more, however, the conviction is being forced upon us that at the end of the Tertiary and at the beginning of the Pleistocene there was in south-eastern Asia, and perhaps elsewhere, an extraordinary development of apes. Several types, we know, appeared showing an evolution into what looks like a human or hominid direction.

Possibly several forms changed into pre-hominids while only one—that we may provisionally call the pithecanthropoid—merged into Man, the others dying out.[3]

The question of Man's origin is more complex than we used to think it.

And now before we move into China, the land of *Gigantopithecus* and of Peking Man (*Sinanthropus*) let us glance for a moment at India, a sub-continent where in Tertiary times there was such a curious flourishing of apes.

[1] That is to say, of course, the *Sinanthropi* of which we have remains may be younger in date than the *Pithecanthropi* for which we have remains. This statement does not prejudice judgment as to the relative antiquity of the Trinil and Peking men's *stocks*.

[2] These bones were found in the same strata and at the same level as the *Pithecanthropus* skull, but at about fifty feet from it. These long bones would indicate a stature of about five feet six inches.

[3] v. Königswald was in Java when the Japanese arrived and was by them interned. Before his imprisonment, however, he packed his pithecanthropoid and other specimens and hid them with Swiss and Swedish nationals. He and his wife spent thirty months in prison camps but both survived. In September, 1946, v. Königswald arrived with all his specimens in New York and they are now deposited in the American Museum of Natural History where they will be studied. The material now in New York includes the *Pithecanthropus* remains, Solo Man specimens, the fragment of *Meganthropus* jaw and the teeth of *Giganthropus*. All this priceless material from Java has been saved but unfortunately the same cannot be said of the *Sinanthropus* relics (see p. 106).

CHAPTER THREE

EASTERN ASIA

India

THE range of the Himalayas sweeps in a great arc from Kashmir in the north to Bhutan in the east, and the vast cliffs, for they are the buttresses of the Tibetan highlands, rise from the alluvial plains of the Ganges and of the Brahmaputra in what, from a distance and from the air, seems an abrupt upheaval. But these recent mountains—recent in a geological sense, for they were formed during the earth-shaking movements of the Miocene—have foothills, not very high foothills, but still high enough to break the transition from the plains to the chaos of summits we call the Himalayas.

Siwāliks

In the north-west of the United Provinces—a region of which the Dehra Valley or the *Dehra Dun* may be considered the centre—and in the south-east of the Punjab—with Simla as a median point—the foothills are known as the Siwāliks. They are a range varying in height from 2,000 to 3,000 feet and running from Hardwar on the Ganges banks to the line of the Beas River—a length of some two hundred miles, and the mean width of the Siwāliks does not exceed ten miles. The hills are composed of sandstone and conglomerate, making low, rounded eminences very unlike the bold, jagged and majestuous mountains against which they are set. The Siwāliks, however, belong to the same Miocene formations as the Himalayas themselves and the hills have doubtless owed their origin to the solidification and then to the upheaval of the detritus brought down from the Himalayan chain.

The classical site of what are known as the 'Siwālik formations' is on the north-west of the range and faces the plains. These formations have yielded a rich fossil fauna. The Siwālik region was undoubtedly a great breeding-place of anthropoid apes.

Siwālik Apes

The first discoveries of fossils in the Siwāliks were made as long ago as 1834 by a Scottish physician named Hugh Falconer.[1] In the years before the Four Years' War the late G. E. Pilgrim devoted

[1] See p. 17.

several seasons' work to a re-examination of the Siwālik sites and he brought back to England an extensive collection described by him in the *Records of the Geological Survey of India* (Vol. xlv, 1915) under the title of 'New Siwālik Primates'.

Since Falconer and Cautley unearthed in 1836 the first fossil ape's remains in the region—and suggested a role the uplift of the Himalayas might have played in primate evolution—eight 'genera' and twenty-two 'species' had, up to 1937, been recorded from the Siwāliks.[1]

The hypothesis that the evolution of the apes, and, indeed, their evolution towards pre-hominid forms, may have been influenced by the upheaval of the Himalayas has, of recent years, been extensively canvassed.[2]

But the uplift of the Himalayas and the evolution of the Siwālik primates do not appear to coincide in time. The greatest abundance of ape-forms seems to be recorded for a period after the mid-Tertiary (Miocene) mountain-building movements and before the later Pleistocene uplifts.

Climate is, indeed, perhaps the first cause we should invoke to explain changes in faunal forms, and the whole climate of the world was profoundly modified by the emergence in Miocene times of the earth's great mountain-barrier stretching from Morocco to Malaya, and climate played, no doubt, a great part in the *extinction* of the Siwālik primates.

From the evidence of geology and palaeontology we may surmise that there was, coinciding with the extinction of the Siwālik apes, a retreat of the tropical belt (from what is now a temperate zone) and we may suppose that the Siwālik fauna needed the tropical conditions which, in the time of its flourishing, extended right up to the Himalayan foothills.[3]

Helmut de Terra holds that the evidence from the Siwāliks indicates that the late Tertiary mammals of north-western India migrated to south-eastern Asia, guided thereto by a shifting tropical zone.[4]

G. E. Pilgrim considered that a Siwālik primate he baptized *sivapithecus* may have been ancestral to Man and this *sivapithecus* is known to have existed in a giant form. But perhaps the most

[1] So classed by the palaeontologists who are always inclined, because of the paucity of their material, to multiply genera and species.

[2] *Vide, i.a.*, the works of Mathew, Barrell and Black; also Gruban, 'Tibet and the Origin of Man,' *Geograph. Annaler.*—Stockholm 1935.

[3] 'Tropical' conditions are not only those of heat—at certain seasons of the year the Siwālik region is very hot—but of more or less unvarying heat and of damp. The 'tropics' are not really very hot—the highest temperatures have been recorded for 'temperate' zones—but unchanging and humid. By the Middle Pleistocene, it would seem, the climate of India had reached its present condition.

[4] *Vide* H. de Terra, *The Siwāliks of India and Early Man.*

'generalized' type among the Siwālik anthropoids is *Dryopithecus*. Of all the fossil anthropoids, *Dryopithecus* had, as far as we can see, the widest distribution. Its remains occur in Europe and in North Africa as well as in northern India, but the *Dryopithecus* material consists almost entirely of teeth.

And the *Dryopithecus* pattern of the lower molars' crowns seems to be that from which the four-cusped or cruciate type of Man's lower molars may have been derived. Of all the types of fossil men whose molars are known to us, the *Sinanthropus* and the Neanderthaloids (especially the Ehringsdorf child, see p. 219) show the *Dryopithecus* pattern with least modification.[1]

Weidenreich, however, is now of the opinion that *Dryopithecus* and the *Australopithecus* forms from South Africa should be referred to anthropoid and not to human ancestry.

A Drive to the South-East

In support of H. de Terra's theory that the late Tertiary mammals[2] of north-western India took a migration route to the south-east, it may be noted that, according to our present knowledge, almost one-half of the so-called 'Irrawaddy Series' of Pleistocene fossil fauna from Burma is composed of forms known to have been living in the Siwālik region. And a number—but not so many as in Burma—of these forms is also found in South China.[3]

So, if, say, the Siwālik mammals followed southwards the displacement of the tropical belt, they must have lingered some time in south-eastern Asia where an exchange with animal types of Malaya seems to have taken place.[4]

The major migration track was probably along the shore of Burma's coastal ranges and towards the lowlands of Indo-China and towards southern China. The farthest easterly limit of the

[1] The five-cusped pattern often occurs in 'modern' Man. In *Dryopithecus* there are local variations of the five cusps' arrangement and of the several grooves at their bases. Of all these variations those exhibited by the first lower molar of the South African *australopithecus* come closest to what seems to be the human modification of the basic *Dryopithecus* pattern, so that it may well be that pre-hominids branched off from the common dryopithecoid stem before the date of our *Dryopithecus* material. (*Vide*, Weidenreich, Wood-Jones and Aston.) See also Milo S. Hellman and W. K. Gregory, 'Dentition and Evidence for the Origin of Man in the Light of new Anthropoid Material from Siwalik obtained by H. de Terra and G. E. Lewis.'

[2] The determination of the exact age of late Tertiary fossil mammals is no easy task. Falconer, Lydekker, Pilgrim and Matthew did not agree as to the dating of the Siwālik fauna, but since the three American expeditions to North-West India (1921, 1932 and 1935) it is fairly clear that most of the Siwālik anthropoids can be assigned to the Pliocene, or at the earliest to the late Miocene.

[3] *Vide* H. de Terra, 'Cenozoic Cycles in Asia and their Bearing on Human Prehistory,' *Proc. Amer. Phil. Soc.*, Vol. lxxvii, No. 31, 1937.

[4] It is the stay-at-home types that change slowly and it is the emigrants that tend to evolve more quickly in new conditions.

Siwālik fauna's dispersal was Java and at the close of Pliocene times when that island had fully emerged from the sea but was still part of the south-eastern Asiatic mainland.

On such a route, as Noetling says, 'the climatically specialized animals would have encountered genial habitats, and, at the same time, the varying nature of the countries they crossed would have stimulated their evolution.'

The Siwālik primates, indeed, appear to have been in a state of progressive evolution when the climatic changes apparently forced them to move off southwards. So, it may well have been rather the shifting of the climatic zones than the changes of climate due to the Himalayas' upthrust that furnished some of the stimulus to mutation and to evolution.[1]

If we bear in mind this evidence from India and from south-eastern Asia—and add to it evidence from elsewhere—we shall be inclined to conclude that the ultimate emergence of *certain* ape-forms (anthropoid forms, of course, and not those of extant apes) into human or pre-human types may have taken place somewhere in tropical south-eastern Asia. That is to say, geographical Indo-China may prove to have been *a* centre of human differentiation.

What the Tools Tell

For late Pliocene and early Pleistocene times there is a gap in the Siwālik record.[2]

India has been inhabited for long ages and here is a possible site for 'Tertiary Man.' There are Lower Palaeolithic style tools everywhere and near the surface. The south-east is particularly rich in 'Chellean,' Acheulian, Mousterian, Aurignacian and even Solutrean, especially the Madras region that may have been a centre of diffusion.

At the end of Siwālik geological history there is, moreover, evidence of human settlement. In the 'Boulder Conglomerate' formation there have been found definite artefacts together with many pieces of (intrusive) quartzite and metamorphic rock of no very definite shape but comparable, nevertheless, with the tools of the early Clactonian industry in Europe (see p. 47).[3]

[1] In peninsular India (that is roughly to the south of the Ganges valley) both Upper Pliocene and Early Pleistocene fossiliferous formations are unknown, but in central India there is a richly fossiliferous Middle Pleistocene and in both India and Burma Plio-Pleistocene faunas are known. For instance, out of the three proboscideans from the Narbadda Middle Pleistocene of central India, two were evidently derived from Siwālik forms, so also were the Narbadda hippopotamus, the *equus namadicus*, *bubalus palaeoindicus* and other forms.

[2] It is doubtful whether the *simia* tooth and the *ramapithecus* ape remains are really from the upper strata of the deposits.

[3] The 'Boulder Conglomerate' is a glacial formation but it cannot be concluded that there was in this Siwālik area any such widespread glaciation as in north-western Europe. In the north-western region of India it would appear that the mountains only

Man in North-West India

It is quite clear that some form of Man entered this Siwālik country at the close of the second glaciation since flakes are found mixed with boulder fans or coarse gravel outwash of late 'Siwālik' age. Thus, as an American archaeologist has put it, an early stock of Man entered a region 'made doubly dynamic by the addition of glaciation cycles upon a moving and indeed steadily rising, group of foothills sheltered from the north by the great wall of the Himalayas.'

Until the time of the Yale North India Expedition of 1935, little was known of the Indian Lower Palaeolithic.[1] Now the tools indicate an expansion of Palaeolithic populations from *southern* India to the Siwālik Hills regions during the Mid Pleistocene—that is to say shortly (in the geological sense) after the Himalayan glaciers had retreated from their second major advance.

Soan Industry

Terra also found in northern India a pebble and flake flint-tool industry that he has termed 'Soan'.[2] The main tool is, essentially, that same chopping instrument as has been found at Patjitan in Java and associated with Peking Man's remains in north-eastern China. Do these tools indicate the existence in north-western India of a pithecanthropoid type of Man? The Soan flakes are first made with a Clactonian-like technique and later with a Mousterian-Levalloisian-like technique. As we have said the Soan industry lasted until the Würm glaciation and the tools spread over much of India but, up to now, they have been found in contact with hand-axe core tools in one area only.

For Terra found true Abbevillian-Acheulian hand-axes in north-western India and especially in the valley of the Soan or Sohan River, where they seem to have been washed out from old gravel terraces.[3]

were ice-bound. As far as we can see the second major glaciation in the Himalayan area occurred in the early Mid Pleistocene. The third (and fourth) glacial advances—at least in the Kasmir region—are progressively weaker than the second advance. See H. de Terra and Teilhard de Chardin, 'Observations on the Upper Siwālik Formation and the late Pleistocene Deposits in India,' *Proc. Amer. Phil. Soc.*, Vol. lxxvi, No. 6, 1936.

[1] Except for such evidence as was afforded by the well-known 'post-laterite' quartzites of Madras and the Godaveri alluvial formations of southern India. See *L'Anthropologie*, xliii, p. 353. 'Laterite' is a reddish-brown clay consisting of hydrated aluminium oxides mixed with oxides of iron and manganese. It is extensively formed from most igneous rocks and is a product of weathering and leaching occurring in *tropical* climates.

[2] It was discovered, curiously enough, associated with the bones of a sort of fossil 'generalized' ape.

[3] The principal members of the Yale North India Expedition were Helmut de Terra, Teilhard de Chardin, T. T. Paterson. The Soan or Sohan River is an affluent of the Indus and falls into it on the left bank some miles above the town of Kalabagh (on the right bank)—the Soan traverses the province of Patwar.

But, except here, Abbevillian-Acheulian hand-axes are not found until a date that seems to be after the end of the third or Riss glaciation and, indeed, the later Soan tools show what appears to be the influence of certain flint-chipping techniques of a general Abbevillian-Acheulian character.

Terra concludes that it would seem that men with a chopping-tool industry (and possibly of general pithecanthropoid type) were living just south of the Himalayas at 'the beginning of the Mindel-Riss Interglacial' and that during the long stretch of this Interglacial the Soan (i.e., chopping-tool) makers were subjected to the influence of types of men making true hand-axes.

Of course, the question is for India as for Europe—what sort of men made and used the Abbevillian-Acheulian hand-axes?

South India Industries

Farther south, in the Narbadda Valley, Terra discovered typical Abbevillian-Acheulian hand-axes associated with a few choppers of coarse Soan type. Finally, in southern India and particularly in the Madras province, there occurs a great abundance of classical forms of hand-axe. Thus, the hand-axe people seem to have spread northwards to influence the 'Soan' people.

While we cannot say what sort of men made the Abbevillian-Acheulian hand-axes they were probably men of a different type from the makers and users of Soan tools, and if we conclude (from the similarity of the artefacts) that the 'Soan' men were of general pithecanthropoid type, then the Abbevillian-Acheulian makers were possibly of more 'advanced' type—so we have some indirect evidence for the existence side by side of two types of men in the India perhaps of the Mindel-Riss Interglacial.

There remains also the problem of how the hand-axe makers reached southern India. Or was that region one of evolution both of human types and of artefacts?

Terra considered that geographical Indo-China would be the most likely area to search for evidence of the early men whose artefacts he recovered on Indian soil. He opted for Burma as a field of operations and in 1937 led thereto an expedition with H. Movius, Jr., as second in command.[1]

Burma

Here they discovered a lower Palaeolithic industry for the most part of chopping-tools and coarse scrapers, nearly identical with

[1] The expedition was recommended at the festival meeting of the American Philosophical Society and the expenses were met by Harvard University. In addition to Dr. Helmut de Terra and H. Movius, Jr., of Harvard, Father Teilhard de Chardin also accompanied the party. The report on the expedition's results was embodied in a special number of the American Philosophical Society's *Transactions* and Teilhard de Chardin furnished a full résumé of the expedition's activities to *L'Anthropologie* (Vol. xlv, 1935, s.v. Les Recents Progrès de la Prêhistoire en Chine).

those from Choukoutien (*Sinanthropus*) and Patijan. No human skeletal remains were, however, recovered. Movius named this culture 'Anyathian' and it also included some strange chopping-tools of petrified wood the like of which have been recovered from the Perak Valley of Malaya.[1] This Anyathian may be, more or less, contemporary with the Soan industry of India.

River Terraces

It was established that five river terraces could be traced along the Irrawaddy's banks and it would seem that these terraces correspond with those recognized by H. de Terra and T. Patterson in northern India and attributed by them to the influence of Himalayan glaciations. These terraces of the Irrawaddy are, moreover, the equivalent of the southern China typical 'lateritized' gravels extending from the Yangtse valley to Kwanghsi. Moreover, these gravels are probably post-Villafranchian, that is to say of early Pleistocene date, and thus fit in with the Pleistocene stratigraphy both of southern and of northern China.

In the Irrawaddy Valley terraces the choppers and rudimentary hand-axes of the upper terraces differ from those of India (Narbadda, Madras and Sohan) by the absence of true 'bifaces', but this Burma industry, as we have said, does resemble some of the Javan and it may be said that the 'Irrawaddian' is like that of the deep-down layers of the *Sinanthropus* deposits and 'reduced to its most voluminous forms or elements.'

On the Shan plateau, where the thick vegetation and the covering of laterites made research arduous, no human remains were recovered for the Upper Palaeolithic or indeed for the Mesolithic or the Neolithic. But most of the caves are now shrines and have been thoroughly cleaned out. The transformation of caves and caverns into pagodas and holy places is, indeed, one of the most disagreeable surprises awaiting the archaeologist and anthropologist in these Buddhist lands of south-eastern Asia. There can be little doubt that valuable evidence has been destroyed within the last few centuries. However, in the hilly regions (e.g., of Upper Tongking) there are still untouched caverns, and from many points of view French Indo-China might have offered the American expedition an even more promising field than Burma.

But, all the same, on the Shan plateau, the same succession of terraces as in the Irrawaddy valley is observable along the courses of the main streams, where the old terraces are profoundly covered with laterite and where, moreover, the 'karstic' (see p. 81) fissures (filled up at the times of the oldest terraces) contain fossil fauna of

[1] Nothing was known of the Malayan Palaeolithic until Collings of the Raffles Museum found in 1936 choppers comparable with those of Java and the Irrawaddy.

the stegodont elephant type that is so characteristic of parts of French Indo-China (e.g., the Langson region) as well as of southern China and of Java.

Pithecanthropoid Industries?

Thus, to sum up, it seems probable that the 'Soan' type of artefact is intrusive in India, whence it perhaps arrived from Burma (Anyathian), this Soan-Anyathian shows close similarities to certain industries from Java and from Choukoutien and at the time when this Soan-Anyathian type of artefact was in use from north-western India to Java and up to Peking, it would seem that in Europe and in Africa quite different cultures were in being.

It is therefore possible that at one time men of the general pithecanthropoid type spread over this whole area from India, through Indo-China to Java and up to northern China. And, until proof to the contrary, we may assume that this type of coarse chopping-tool was the characteristic artefact of pithecanthropoid men.

Proto-historical India

Until quite recently, few or no antique remains of Man had been recovered from Indian soil. Towards the end of the nineteenth century R. B. Foote found an abundant microlithic industry in the sandy wastes near Langhanaj in northern Gujerat. The small flakes were chipped from carnelian, agate, quartz, jasper and bloodstone and there are no deposits of these rocks within a hundred miles of the site.

During a season's work at Langhanaj in 1946–7 H. D. Sankalia recovered eight human skeletons and thousands of microliths together with bones of buffalo, ox, sheep, goat, pig, horse, deer and dog.

Two of the human skeletons were almost complete. One is of a young woman (aged between 18 and 20) over five feet in height and of slender build, whereas the other was of a male aged about 25 and over six foot tall. The skeletons lay in a flexed posture and had evidently been intentionally buried. The girl's skull showed a round hole possibly made before death (primitive trepanning?).

The human remains are of Mesolithic date which in India may possibly be set at about 5000 B.C. As the only intact skeletons recovered other than those of Man were of dog we may take it that this beast was the only domesticated animal of the Langhanaj men. No metals or pottery were noted.

An Indian anthropologist, Dr. Iravati Karve, thinks that the Langhanaj men show a resemblance to pre-dynastic Egyptians and the former seem to be of general Mediterranean type.

Relatively ancient crania that have been unearthed in the

Tinnevelly region in the extreme south of the sub-continent are hyperdolichocephalic, platyrrhine and of Veddoid type resembling that of the extant Veddahs of Ceylon—evidently, at one time, the Australo-Veddoid type spread much farther than it does to-day. The rock-engravings at Ghatsila have a markedly 'Australian' character and the red paintings on the rocks near Singanpur (district of Raigahr) represent hunting scenes, dances with masked figures recalling those of Cogul in eastern Spain and there is one painting showing what are apparently *kangooroos*.

The Indian lands have played so important a role in the civilization of mankind—and, indeed, probably, in its physical development—that we may indicate briefly some lines of approach to the problem of Indian civilization's origin.

Towards the close of the Ice Age it would seem that still another group of stone-tool-manufacturing peoples invaded the lower Indus Valley and settled in the area where, later, we find the remains of the so-called 'Indus Valley' culture.

Indus Valley Cultures

The remains of early 'modern' Man in India are regrettably few. From Indus Valley sites there are a few skeletons remaining and, to judge from them, the types were mixed. They have been described as 'proto-australoid'(!) and 'dolichocephalic with small heads' showing affinities to the earliest Sumerians of Mesopotamia.[1]

Along the banks of the Indus in a country that is now for much of the year a burning desert have been found at the sites of Harappa, Mohendojaro and Chanhujaro, evidence of an evolved urban civilization whose beginnings may be dated at about 2,500 B.C. Four superimposed and interconnecting cultural phases have been noted. The first ('Amri') is, compared with its successor, fairly primitive though showing certain parallels with the El-'Ubaid culture-phase in Mesopotamia (see p. 170). The next—and by far the longest—phase is that called 'Harappa' and it would seem from the evidence that the bearers of the 'Harappa' culture subdued and assimilated the 'Amri' men. The 'Harappa' was the most advanced of the four Indus civilizations, and, what is of prime importance, it is the only one offering specimens of writing.[2] Moreover, the Harappa seals,

[1] *Vide* E. Mackay, *The Indus Civilization*. Some skeletons have dolichocephalic skulls with high faults and narrow faces. In some levels at Harappa there are skeletons of a brachycephalic 'Armenoid' type, probably intrusive.

[2] The supposed parallels between Harappa writing and that from the wooden tablets found on Easter Island (*vide* Hevesy, etc.) are now quite discredited. Professor v. Heine-Geldern of Vienna (now of New York) has been working out parallels between Harappa writing and that of the Shang-Yin 'oracle bones' from northern China (see pp. 120). The Harappa writing is an isolated script and bears, of course, no resemblance whatever to that of Sumeria. But if it was the *idea* of writing rather than its forms that the world owes to the Sumerians (see pp. 168) then there is no more reason to seek for cuneiform letters in the Indus Valley than in that of the Nile.

together with what look like imported forms, are symbols and figures appearing specifically 'Indian' (i.e., phalli, dancing girls, Indian animals and trees, etc.) and surviving in some form through the ages to this day.

The Harappa phase is followed by the 'Jhukar,' that although displaying some fusion with Harappa elements is less advanced in architectural technique (though equal in metal-work), and for 'Jhukar' there are no traces of writing. The 'Jhangar' culture that is only known from the site of Chanhudaro, is obviously the latest but, if one judged only from its poor technique, it might be set as the most 'primitive' and earliest. The Jhangar culture seems to have tailed away into sterility.

Of these four cultures the Harappa looks as though it were due to the intermingling of three culture-streams, (*a*) one from north-eastern Persia, (*b*) some from central, and lower, Mesopotamia, and (*c*) those from India itself.

Indian history from the decline of the Indus civilizations to that of the 'Aryan' invasions is obscure. But it is evident that while the Indus civilizations were flourishing, southern India was still in a palaeolithic stage.

From H. de Terra's investigations of the megaliths (large-stone monuments) of Bursahom, Kashmir, something has been learned of the immigration route followed by the invaders from the Tarim basin of central Asia who poured into India after the wane of the Indus civilizations.[1]

Aryans

A word that seems undoubtedly to be a form of Aryan occurs in Mesopotamian inscriptions as early as 1,450 B.C. and a little later Hittite political treaties are sworn to not only by the deities of the contracting nations but by Mithra, Varuna and Indra and other gods whose names long survived in India.

The centre from which the 'Aryas' emigrated[2] may perhaps be set on the steppes and plains lying between the rivers Oxus and Iaxartes to the south-west of Lake Aral. And, on archaeological evidence, it would seem that three main groups of 'Aryas' emigrated to the south and south-east. The first immigration into India through eastern Persia and the south of what is now Afghanistan and by the Bolan passes into north-eastern Baluchistan, may be, perhaps, set as early as 1,500–1,400 B.C. in full Bronze Age times.

Although the 'history' of India even after the 'Aryan' invasions is shot through with myth, still, we have now some general glimmer-

[1] See *Proc. Amer. Phil. Soc.* 85, No. 5, September 1942.

[2] Bringing with them the cattle and dairy culture that was to become so characteristic of later India.

ing as to what was the course of north-west India's story from the apes of the Siwāliks down to our day.

South China

Not only historically are North and South China separate units but geologically they are distinct regions.

China is, it may be worth while noting, a very mountainous land. We are so accustomed to seeing pictures of and reading about the over-populated plains of the north-east that even a visitor to the classical sites of the North might well come away with the impression that the country is made up mostly of levels and low hills.

On the contrary, however, most of the Chinese surface is corrugated, and in the south, the south-west and the west it is peaked up into lofty chains and summits. Until the great exodus of flight before the Japanese invader, the Chinese of the east knew little at first-hand about two-thirds or three-quarters of their immense country.[1] It is, therefore, hardly surprising that the archaeological exploration of southern China has hardly begun.

South Chinese Industries

The whole of southern China region, as far as we can see at present, lacks traces of Chellean-Abbevillian core-industry (and indeed remains of its 'satellite,' the hippopotamus).

South China is, geologically, a region of Devonian[2] formation with limestones of Carboniferous age. It is an ancient land-area.

These limestone formations—often taking on the most picturesque and fantastic shapes—are riddled with caves some of which are rich in Mesolithic and Neolithic artefacts, but do not, as a rule, contain Pleistocene fossiliferous strata. However, what bones have been found in the grotto ends have been of characteristic 'cold' Pleistocene mammals.[3]

These caves have yielded neither pottery nor polished stone artefacts; however, early in 1935 a party of geologists including Teilhard de Chardin and W. C. Pei established that a typical Mesolithic culture-stage could be identified in these pottery-less and imperfectly-polished artefact cultural deposits. And this culture shows affinities with the 'Bacsonian' (*vide infra*) of Tongking.

'Porcupine Caves'

The limestone caves are especially common in the province of

[1] There are still vast areas inhabited by men not of Chinese stock—areas that, at least in the country-side, are almost untouched by Chinese culture.

[2] That is of rocks laid down above the Silurian and below the Carboniferous during the Primary Era.

[3] E.g., the so-called 'stegodon' fauna with *elephas namadicus, rhinoceros indicus, bibos, bubalus, hyaena crocuta,* together with orang-utan and other more or less 'modern' forms.

Kwanghsi and among the fossil bones recovered from one such grotto (of the so-called 'hystrix' or porcupine caves) v. Königswald thought that he could identify several human teeth from among the mass of orang-utan teeth, but the identification is doubtful.

The enormous teeth (*vide* p. 88) of v. Königswald's *Gigantopithecus blacki* (that Weidenreich would identify as a hominid) were reputed to have come 'from the South' so that they may *possibly* have been found in these same 'hystrix' layers.

Orang-utan remains have not, at least as yet, been recovered from the otherwise richly fossiliferous 'fissures' in the province of Szechuan—possibly because these 'fissures' are natural chimneys (that would serve as ready-made traps)—and not caves in the ordinary sense of the word. However, worked flakes of Palaeolithic appearance have lately been found in various places of this vast north-western province of China.

It was reported in 1946 that an American expedition was preparing to explore Yünnan and Kwanghsi—where, no doubt, a rich archaeological and palaeontological harvest awaits investigators. We may be sure that south-western China and the northern Indo-Chinese area will, sooner or later, reveal evidence of importance for our story of Man's origins.

Cultures in Tongking

The Institute of Human Palaeontology in Paris had, also, formed plans for the despatch of a prospecting party to undertake a systematic examination of the caves and other deposits in the hill-country of Tongking, but the present unsettled state of French Indo-China will probably render any French expedition into Tongking improbable for the present. The Americans might be able to include a survey of Upper Tongking in their south-western Chinese programme.

The hill-country of Upper Tongking presents, indeed, over much of its area, a face comparable to that of some southern Chinese regions. No Chellean-Abbevillian industry has been recovered from Tongking sites, and it is curious to note that the somewhat similar 'karst' area of eastern Java has proved rich in artefacts of this primitive type. However, South China, Tongking and the Upper Laos (to the western side of the Annam Range watershed) are all regions whose numerous 'fissures' and grottoes contain, in the lowest strata, an 'orang' fauna of, apparently, Pleistocene age.

Almost all the explored caves of Tongking have yielded only Neolithic artefacts, though in the ancient 'fissures' (resembling those of South China) have been recovered remains of *Megatapirus* (a large and long extinct form of tapir) together with *elephas namadicus* and other antique forms. Caves where have been found imperfectly

polished or ground 'celts' (comparable with those of the Kwanghsi Mesolithic) are known in northern Tongking. The industry has been named 'Bacsonian' (another slightly different type is known as 'Hoabinhian'). These Bacsonian artefacts include both grinding-stones and stones perforated by pitting. In neighbouring Siam there is a comparable industry.

It is evident that we are a long way from having unveiled the past of Indo-China that so many 'pointers' seem to indicate as a region where important and perhaps capital phases of Man's history occurred.

Human Types in Indo-China

With the exceptions mentioned below, all the human bones recovered from the soil of Indo-China are of 'modern' Man or *sapiens* type, but the skulls are of different and fairly noticeably different sorts. There are 'Indonesian' (comparable with those of the mass of the modern population—both 'settled' and 'civilized' and 'savage'—despite the superficial 'Mongolization' of many of the e.g. Annamese), there are 'Melanesian,' there are 'Negrito' and there are 'Australoid' skulls and there are intermediate types that look as though they were the product of hybridization. We shall not go far wrong, in the light of our present knowledge, if we regard the succession of *sapiens* or 'modern' Man populations in Indo-China as having been, (*a*) Australoid, (*b*) Negrito, (*c*) Melanesoid, (*d*) Indonesian—and this sequence agrees rather well with what we observe far east in, e.g., New Guinea (see p. 74). Indo-China, indeed, from the indications of the 'modern' populations alone, seems to have played a part as an *officina gentium* or a breeding-ground of men.

'Sinanthropus' Teeth in Indo-China

In gravels underlying the loess of northern Annam M. J. Fromaget discovered, some time before the last war, a 'hystrix' fauna (comparable with that of the porcupine caves in Kwanghsi) and in these *hystrix* deposits he also unearthed a fragment of a human temporal bone and a second lower molar of Man. It would seem, from this scanty evidence, that we have here a trace of the existence in northern Indo-China of a non-sapiens type of Man. The lower molar, indeed, looks more like those of *Sinanthropus* than those of any later or more evolved form of hominid and the phosphate deposit in which the tooth was found may be of about the same age as the *Sinanthropus* deposits of north-east China.

During the war, M. Fromaget pursued his researches and from a site in northern Indo-China (on the western side of the Annam Chain watershed) he recovered a considerable number of teeth.

Some of these are certainly hominid and are comparable with those of *Sinanthropus*. The abundance of the material suggests that we may be hot on the trace of an Indo-Chinese '*Sinanthropus*'—in fact, the evidence, as it is, allows us to state that pithecanthropoids at one time lived in Indo-China.

It is to be hoped that nothing will long prevent further investigations in this most interesting region of Indo-China.

There are Palaeolithic industries in Malaya and from some Malayan gravels a fine Neolithic (or Mesolithic) industry of general 'Bacsonian' (see above) appearance has been recovered. But the prehistory of Malaya is almost unknown. Old 'fissures' and grotto ends do not seem to occur, though there is, here and there, the same calcareous formation that crops up in Java, in northern Indo-China and in South China.

With regard to the human palaeontology of any but 'modern' types and with the exception of the most suggestive material collected by M. Fromaget (of *Sinanthropus*-like teeth), we must admit that we know little, as yet, for the immense area stretching from Singapore northwards to the Tsinling Mountains which divide much of North China from the South.

North China

To the south-west of Peking the alluvial plain is broken by a range of limestone known as the Western Hills and among them at a site near the hamlet of Choukoutien were unearthed from 1922 until the eve of the Japanese occupation finds of such capital importance for our story that the best way to present them may well be to set out the tale in chronological order.

'Peking Man'

In 1916, Dr. Gunnar Andersson, a Swedish geologist, was called in for consultation by Yuan-shi-kai, then the ruler (and for a few short weeks the titular Emperor) of China. Andersson soon got to work surveying the Tertiary deposits of North China and in 1921 while he was prospecting at Choukoutien (that is only some thirty-seven miles from Peking) he came across lumps of quartz and as this is a mineral not occurring within two miles of the locality, he suspected that ancient man had once dwelt nearby and he predicted that the site might yield interesting fossils.

Between the years 1922 and 1926 Andersson handed over to Zdansky a number of fossils (and Zdansky himself excavated others) including two human teeth (unearthed in 1926) one of which, a molar, was strikingly like a tooth purchased at a Peking druggist's store years before and described in 1903 by Max Schlosser of Munich. If this tooth, as now seems probable, came from the

Choukoutien site, the first remains of 'Peking Man' were discovered at the very beginning of this century.[1]

In October 1927, Dr. Birger Bohlin, a young Swedish scientist, began excavating at Choukoutien. He laboured with no encouraging result all through the summer and to the onset of winter. Late one afternoon, however, he unearthed a tooth and, greatly excited, at once set off in a rickshaw for Peking. At this time, however, one of the not infrequent little civil wars was troubling the neighbourhood and before reaching the city's gates he was stopped by the 'rebels,' searched and stripped of most of his belongings. He managed, however, to save the tooth and when he was released he rushed in to see the late Davidson Black of the Peiping Union Medical College.

The tooth was evidently that of a young subject and was almost perfect and very little worn. Black extricated the relic from its matrix and then, greatly daring, prophetically attributed the molar to a hitherto unknown variety of man whom he named *Sinanthropus Pekinensis*.

Obviously a systematic and expert prospection of the Choukoutien site was imperative. Financial support was given by the Rockefeller Foundation and excavation was begun (under the direction of Dr. Wong Wen Hao) with the support of the Geological Survey of China in collaboration with the Department of Anatomy of the Peiping Union Medical College. Fr. Teilhard de Chardin, S.J.,[2] who was geological counsellor to the Chinese Geological Survey from 1929, played an important role in the stratigraphical study of the site and consequently in the discovery of Peking Man's remains.

Towards the end of 1928 there were unearthed the fragments of two human skulls, two jaws and five loose teeth. One of the lower jaws was that of a child with receding chin-region and showing a general likeness to anthropoid forms. The marks for muscle-attachments were, indeed, rather more ape-like than those present on the Mauer mandible (see p. 206). The other Choukoutien mandible showed a striking resemblance to that postulated for the *Pithecanthropus* skull. There was, of course, at this time only the original *Pithecanthropus* calotte available and no jaw-fragment of the Java 'ape-man' had been found.

[1] Chinese druggists' stores (as we have noted in connection with *Gigantopithecus*—or *Giganthropus*) have ever been the homes of queer relics. 'Oracle Bones' from Anyang (that are our main material for information about the culture of the first historical Chinese dynasty) were first found among a Chinese chemist's stock-in-trade. As the Choukoutien peasants have long quarried the cliffs for lime, they may have not seldom come across 'dragon's bones' and other treasures sought after by the Chinese pharmacist.

[2] Teilhard de Chardin, whose part in the Choukoutien discoveries is often overlooked, was also the discoverer of a Piltdown tooth (see p. 209) and is to-day among the most eminent of living geologists.

The Discovery of the Sinanthropus

On December 2, 1929, Dr. W. C. Pei discovered the uncrushed cranium of a *Sinanthropus* embedded in a matrix of travertine. The skull, on examination, proved to be slightly more voluminous than that of the *Pithecanthropus* although of the same general form—low vault, narrow retreating forehead, heavy supraorbital ridges—still, the forehead was somewhat fuller than that of the *Pithecanthropus* and, indeed, the cranium was more suggestive of that of some of the Neanderthaloids, or, perhaps, it would be better to say that it looked with its compression of the upper parietal bones as compared with the lower temporal ones like a 'proto-Neanderthaloid' type.

In July 1930, the broken fragments of a second skull were extracted from material gathered in 1928. The fragments consisted of a large part of the brain-case with a portion of the nasal bones. These remains have been attributed to a female *Sinanthropus*.[1]

By the end of 1936 the skulls (or fragments of the skulls) of no fewer than twenty-four individuals had been discovered, including five more or less complete crania, twelve mandibles and nearly one hundred teeth. From 1936 to 1939 seven femora and one humerus were recovered. These bones, if they belong to *Sinanthropus* as is most probable, indicate that he had a fully upright posture.

The material, therefore, for studying the *Sinanthropus* and for comparing his remains with those of the *Pithecanthropus* was abundant and Dr. Franz Weidenreich—who succeeded Davidson Black and must be considered the first authority on Peking Man—has embodied the results of his studies in a series of publications of which 'The Skull of *Sinanthropus Pekinensis*, a Comparative Study of a Primitive Hominid Skull' is particularly illuminating.[2]

Of the thirty-eight *Sinanthropi* known in 1939 (of which fifteen are juvenile subjects) seven provide skulls sufficiently well preserved to permit of useful comparisons with other types.[3] Three of these skulls belonged to men who *if they had been of 'modern' type* would have been less than thirty years of age at death. By the same reckoning, three skulls may be those of subjects ranging in age from thirty to forty years and only one cranium (apparently that

[1] The *Sinanthropus* relics were packed and were removed from Peking at the beginning of the war. Various versions have been published as to their fate, but it seems clear that they were captured by the Japanese. And, up to the end of 1946 at least, all efforts to trace these precious remains had been in vain.

[2] *Vide Palaeon. Sinica*, New Series, D. No. 10, New York, 1943. Weidenreich left North China on the outbreak of war to continue his work in the United States.

[3] '*Sinanthropus* Locality No. 1' where most of the Peking Man's remains have been found is an ancient cavern filled with some 150 feet of red clay (in places hardened to a stone-like consistency) containing a rich fauna of what, in Europe, would be classed as Lower Pleistocene. The roof of the cavern had in remote times caved in and portions of the roof are embedded in the clay.

of a female) may have belonged to a really old individual—that is to say of over fifty and perhaps even over sixty years of age.[1] Except for the suborbitary region and for the zygomatic arches we have now, in one specimen or another, all the parts of the skull.

The *Sinanthropus* skulls all seem to show signs and traces of injuries inflicted before death and sufficient to cause death, although, it will be remembered, it is often difficult if not impossible to distinguish between post-mortem fractures and those inflicted during the lifetime of the victim immediately before death.

Peking Man Killed and Eaten?

Although there is now a useful collection of long and other bones, the *Sinanthropus* material remains essentially one of skulls and the apparently legitimate deduction to be made from the evidence is that *Sinanthropus* was killed and eaten. We may be inclined to think (or even to hope) that Peking Man was killed and eaten by another type of Man (a 'higher' type of Man, of course) but there are no traces at Choukoutien in the *Sinanthropus* strata of any other sort of human being.[2] But organized cannibalism would be one of the most distinctively human traits about the *Sinanthropus* and would alone be enough to set him apart from and indeed 'above' the anthropoids who, as far as we know, do not eat their own kind. Cannibalism, at least in historical times, is something more than a practice to satisfy hunger—save in cases of absolute urge under the goad of starvation, and there are examples enough to show that even 'modern' and 'civilized' men can eat their own kind in certain circumstances—cannibalism has a ritual and ceremonial, even a magical significance and cause, though it would be unjustified to furnish any explanation for the *Sinanthropus*' apparent anthropophagy.

Sinanthropus Skulls

Perhaps the most striking thing that a first examination of the *Sinanthropus* material reveals is a degree of variation as between the remains of individual to individual.

For instance, the smallest *Sinanthropus* skull has a cranial capacity of not much more than 915 c.c., whereas the capacity of the largest

[1] Within the *Pithecanthropus* group, two skulls exhibit complete fusion of the skull-cap's sutures (a state indicating in *homo sapiens* an age of more than fifty years) while the third skull discovered in 1939 is that of a juvenile subject. The interesting problem is, of course, to determine whether the skull's sutures in these earlier types of men closed up at approximately the same times as in 'modern' men. In any case, the evidence, such as it is, goes to show that those remains of *Sinanthropus that we possess* are those of individuals who met with violent deaths.

[2] But see p. 111.

(presumably male) cranium is about 1,225 c.c.[1] Again (both in general shape and in what may be learned from endocranial casts) some *Sinanthropus* skulls are almost as 'primitive' as those of *Pithecanthropus*, whereas others suggest what might be called a 'proto-Neanderthaloid' type,[2] though the *Sinanthropus* skulls have a lower vault than that of any Neanderthaloid skull.

Comparison of Sinanthropus and Pithecanthropus

The *Sinanthropus* forehead is very retreating but the cranium is more or less vaulted. In *Sinanthropus* the brow-ridges project far forwards and are separated from the forehead by a distinct broad furrow while the ridges are united by a protrusion above the nose. As in the *Pithecanthropus*, the skull is constricted behind the orbital region and the greatest width of the cranium occurs between the bones above the ear-opening. The summit of the skull shows a blunt crest that behind the vertex merges into a flat depression. The occiput shows a thick transverse ridge while the nuchal (i.e., nape) part bends forward forming an acute angle.

The jaws are robust with no chin and they are deeper in the (supposed) males than in the (supposed) females. The dental arcade is a long and narrow arch—a very anthropoid feature and unlike the dental arch in 'modern' men. Again, in the jaws and teeth, as in the general size of the brain-case there seems to be a marked difference in *Sinanthropus* as between males and females, a difference much more marked than in 'modern' Man, and, indeed, so great as to recall that of the great apes among which the full-grown males are larger and heavier than the full-grown females. Judging from the skulls and teeth one would be inclined to conclude that there were 'greater differences in bodily build as between men and women sinanthropes than exist in any groups of modern man.'

The *Sinanthropus* dentition, indeed (and we know that teeth form one of the surest indications of physical type), is a rather strange mixture of 'primitive' and fairly 'advanced' features. For instance, we find in one and the same jaw premolars showing more ape-like features than those present in the mandibles of other hominids, together with incisors differing but little from those of 'modern' Man. Again, some features of the *Sinanthropus* teeth are almost Neanderthaloid. *Judging from the teeth alone*, one is inclined

[1] The five skulls for which the cranial capacity can be estimated with some degree of accuracy would give the following figures: (*a*) 915 c.c. for adolescents, (*b*) 1,030 to 1,225 c.c. for three males, (*c*) 1,015 c.c. for a female, (*d*) 1,030 c.c. for a specimen of doubtful sex. These figures are higher than those formerly presumed and they are a good deal higher than the figures for the cranial capacity of the *Pithecanthropus* skulls.

[2] The fissuration of the frontal lobes is of more 'modern' appearance in the Neanderthaloids than in the *Pithecanthropus*, but the former differ from 'modern' Man by certain features, e.g., the strong deviation of the median frontal fissure.

to think that the *Sinanthropus* represents a hominid type in a state of evolution—possibly in a general Neanderthaloid direction.[1]

As far as the *Sinanthropus* jaws are themselves concerned, the small fragments of a *Pithecanthropus* lower jaw found long ago by Dubois at Kedung Brebus seem to give a mandible similar to that of the *Sinanthropus* female, while the larger portion of a *Pithecanthropus* lower jaw found at Sangiran by v. Königswald compares closely enough with the *Sinanthropus* male mandible. But the new *Pithecanthropus* upper jaw from Sangiran (if it *is* that of a *Pithecanthropus*, for it will be remembered that it is of very primitive characteristics and shows a simian 'diastema' or gap between the incisor and the canine; it is, however, the only *Pithecanthropus* upper jaw—if it be such—that we possess) has no counterpart among the *Sinanthropus* material, since what fragments we have of that region are much smaller than the Sangiran specimen and probably belong to female *Sinanthropi*. Moreover both the Sangiran *Pithecanthropus* upper and lower jaws appear to be too large for either of the calottes —which may therefore *possibly* both be of females (the occipital fragment of a *Pithecanthropus* skull, however, is heavy and may be that of a male).

The molars of Trinil Man or *Pithecanthropus* are, on the whole, larger than those of Peking Man, but the incisors and the canines are, apparently, smaller in the former than in the latter.[2]

If the long bones *attributed* to the *Pithecanthropus* be compared with those recovered from the *Sinanthropus* deposit the latter show features that can be described as 'primitive,' whereas the former are almost exactly like those of 'modern' Man.[3]

Although the *Sinanthropus* long bones indicate a 'biped' posture, they are different from those of any 'modern' Man and, indeed, from those of the apes or the Neanderthaloids.

These 'primitive' features, however, do not indicate that *Sinanthropus* did not stand upright.

[1] Weidenreich would see in *Sinanthropus* a direct, though, of course, most remote ancestor of the Mongoloid human type. He cites, in support of his hypothesis, (*a*) the *torus mandibularis* or ridge on the inner surface of the lower jaw—that is undoubtedly a common feature in Mongoloid skulls; (*b*) the so-called 'shovel-shaped' upper incisors; (*c*) the 'Inca bone'—a special part of the occipital bone separated from the rest by a proper suture—a feature noted for many Mongoloid skulls and especially for those of Amerindians (hence the name 'Inca').

[2] The canines of the Sangiran upper mandible (presumably *Pithecanthropus*) protrude, however, considerably below the pre-molars and are, indeed, rather tusk-like. Perhaps, the male *Sinanthropus* showed a similar feature. The diastema or gap in the Sangiran upper mandible is of the same width (6.2 mm.) as in the male orang-utan and this gap (allowing the lower canine teeth to fit into the upper interspace) is found in no other sort of hominid. These premaxillary diastemata are what is known as 'discontinuous variations' and are of high generic value for determining the relationship of types to others.

[3] It has been estimated, though the figures must be received with caution, that the average height of the *Sinanthropus* (male?) was about 1 metre 56 centimetres.

In cranial capacity, *Pithecanthropus* is inferior to the *average* of *Sinanthropus*.

It may be remarked that the Steinheim (*vide* p. 220) (probably) female skull has a cranial capacity of under 1,100 c.c., which is less than the estimated capacity of the largest *Sinanthropus* skull (1,225 c.c.).

The brains of both Peking Man and *Pithecanthropus* are considerably more voluminous than those of the extant gorilla. Moreover in these hominids' brains can be traced two new eminences (the parietal and the temporal) and if, as seems probable, these eminences marked on the endocranial cast correspond to eminences on the brain itself, we have some evidence for the existence in both *Sinanthropus* and *Pithecanthropus* of regions that in 'modern' human brains are associated with the speech-function.

In Neanderthaloid Man, the frontal lobe has lost the characteristically anthropoid lines (still observable in *Sinanthropus* and in *Pithecanthropus*). The essentially human brain-development of Man is, of course, that of his frontal lobes, and, above all, of their prefrontal area.

Identity of Type Between Sinanthropus and Pithecanthropus

The late Marcellin Boule[1] was the first to maintain the substantial identity between the two types, and in this view he was at the time alone, for Davidson Black (until his death) and Weidenreich (for some time) considered that *Sinanthropus* and *Pithecanthropus* fell into two distinct classes. With us, Zuckerman, in 1931, suggested that the two hominids were but local variations of one type. In 1939 Le Gros Clark reaffirmed their identity. In 1940 Weidenreich and v. Königswald admitted it. The view is now classical.

The Date of Sinanthropus

If we hold that *Sinanthropus* is a pre- or proto-Neanderthaloid form his dating becomes a matter of considerable importance. Of course, we need not think that the birth of every new form is accompanied by the death of the parent form. All the evidence shows that archaic forms live and linger or even prosper long after they have thrown off new types. *Sinanthropus may* have been the contemporary of Neanderthaloids—somewhere, even if not in north-eastern China—but there is no evidence for it as yet.

Again, it has been, though not very cogently, urged that because Trinil Man's remains are somewhat more 'primitive' than those of Peking Man, *Pithecanthropus—our* Pithecanthropus—was, of necessity, of earlier date than *our* Sinanthropus. Yet, the general trend of the

[1] Of course, until ten years ago, there was very little *Pithecanthropus* material to go upon. Still, the perspicacity of Boule was all the more remarkable.

evidence (both direct and analogous derived from other animal species) would indicate that in early times several sorts of men lived upon the earth at the same time.

Because we may assume that the first Peking Men came northwards into China from the tropical south-east of Asia we do not exclude the possibilities (*a*) that *Sinanthropus* may have undergone evolution on his way to his new home near Peking and (*b*) that he may represent a line more 'progressive' than *Pithecanthropus*, who may have lingered on later in the comparative isolation of Java, and (*c*) even if *Sinanthropus* derives directly from a *Pithecanthropus* type (from which he differs only in minor features) *our* Sinanthropus may be older in date than *our* Pithecanthropus.

Until comparatively recently it had been more or less generally assumed that *Sinanthropus* was of remote Lower Pleistocene date.

But such a dating offers objections. The *Sinanthropus* fauna does not look very 'antique' (i.e., presenting many Pliocene survivals) and it seems to bear to the North China loess deposits much the same stratigraphic relation as do the European 'hot' fauna layers to the later 'cold' ones.[1]

Breuil inclines to the belief that the *Sinanthropus* strata are sandwiched in between a 'Sanmenian' (which it is by no means clear can be equated with any Western series) of Tertiary affinities and the Chinese loess, and he would set the *Sinanthropus* layers at not older than our Würm glaciation. But the *Sinanthropus* strata are fifty feet thick and must represent a long passage of time.

Thus the *Sinanthropus* may have flourished for an immense age and have been replaced by the makers of the Moustero-Aurignacian industry of the Ordos at a period when the great loess deposits were being laid down.

Recent correlations[2] of the Indian, Javanese and Chinese Pleistocene deposits seem to indicate that the *Sinanthropus* strata of Choukoutien may be the equivalents of the Trinil layers in Java and thus of early Middle Pleistocene date.

Choukoutien Industries

There has been found at Choukoutien (Locality 13) a chert

[1] And, again, there is no valid correlation yet possible of the European glaciation and interglacials with the Chinese climatic phases. In eastern Asia, with the exception of Transbaikalia, the glaciations are not developed, and this whole region seems to have suffered much less than those of northern Europe and North America from alternating types of climate. Even in the geological past China seems to have been a land of long-lasting things. Stable conditions appear to have been established at the dawn of the Quaternary Period.

[2] i.e., those undertaken by Teilhard de Chardin, H. de Terra and v. Königswald. The first of these stated at the Philadelphia 'symposium' that he had revised his earlier computations and now accepted a Mid Pleistocene dating for *Sinanthropus*. Some would still have it that the *Sinanthropus* strata are of Lower Pleistocene date. *Vide* Zeuner, *Dating the Past*, pp. 271–272, who sets the date of *Sinanthropus* 'in the neighbourhood of 500,000 years ago'.

artefact of undoubtedly human workmanship. Each side of the tool has been flaked alternately and it is comparable with the Abbevillian core-tools of Europe so that it *may* be of Lower Pleistocene age.

The now 'classical' *Sinanthropus* industry (found only at Locality 1 at Choukoutien) is a flake industry showing affinities with (but in no case strictly identical with) the industries of Europe (i.e., Clactonian, Tayacian, Mousterian and even some pieces, curiously enough, of pseudo-'Solutrean'—that is, Upper Palaeolithic techniques). Many thousands of flakes have been found at Choukoutien and a type of 'side-scraper' that is the most common artefact may be paralleled at almost any European layer from remote Clactonian up to advanced Magdalenian.

If, therefore, the solitary chert core-instrument of Locality 13 is a legacy from a core-making people distinct from the flake-producing *Sinanthropus*, then, while Abbevillian biface-core manufacturers and Clactonian flake-producers were living (presumably) contemporaneously, if not side-by-side, in Europe, then, in north-eastern China, there may also have been two peoples, one using a chert biface core-tool and the other—presumably the *Sinanthropus*—making and using flake-tools.

One solitary tool is indeed slender evidence upon which to base a theory of a people's existence, but one can hardly avoid speculating as to whether we have not here some evidence for the presence at Choukoutien of two peoples. Still, no other human remains but those of Peking Man have been, so far, found at Choukoutien—until we come to the much later 'Upper Palaeolithic' 'modern' men from the Upper Cave.

During the long period evidenced by the deposits of flake artefacts at Choukoutien there is little sign of any improvement in technique, though utilized animal jaws and pieces of antler are found and charred layers and charred bones show that fire was used.

There is, however, another series of human artefacts from Choukoutien. Many hundreds of chert and quartz implements were found in 1934 and 1935 at Locality 15. The layers from which these tools were recovered seem to be definitely later in date than those in which were unearthed the bones of *Sinanthropus*. These Locality 15 tools have a general look of the *Sinanthropus* artefacts but the former are, on the whole, better worked and retouched. There are some new types—side-scrapers, chisels, points and so forth. The materials used comprise besides the quartz of the *Sinanthropus* layers, flint, chert and hard sandstone.[1] Were these the tools of another sort of hominid?

[1] The ten main divisions and the thirty-seven sub-divisions of European Palaeolithic industries with characteristic types of tools are quite unrepresented in China where no comparable classification is possible.

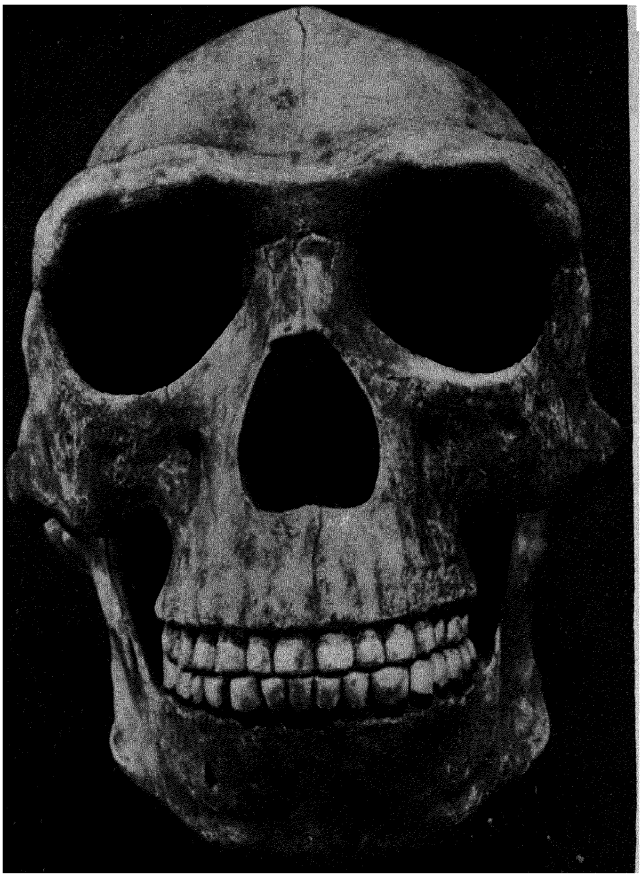
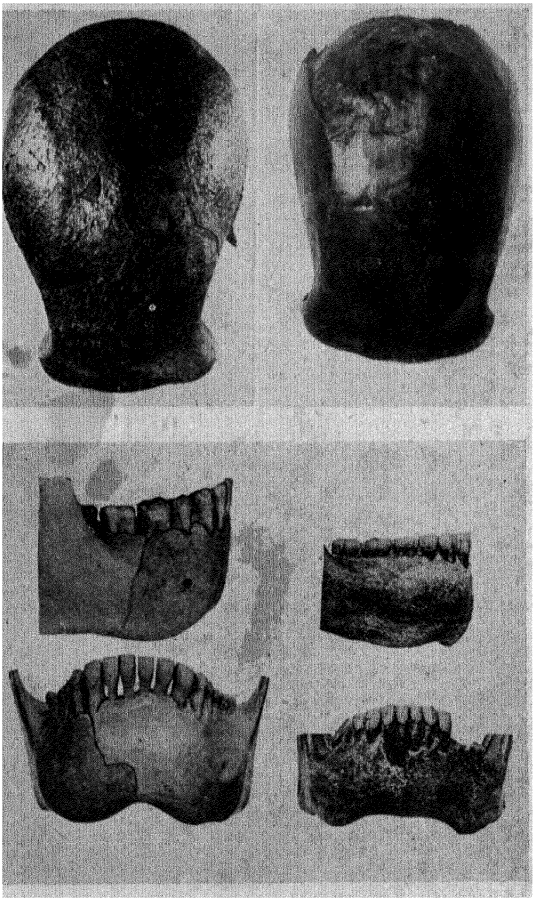


Photo. Museum of Man, Paris

FIG. 11—Reconstituted skull of a female *Sinanthropus* as prepared by Professor Franz Weidenreich
(*See Frontispiece*)



Photos. (a) Dr. R. v. Königswald (b) Royal Indian Institute, Amsterdam

FIG. 12—(a) *Norma verticalis* view of the *Pithecanthropus* II skull compared with the same view (b) of Solo Man (Ngandoeng IV) showing the essential similarity of the forms. Note: (b) is on a slightly smaller scale than (a)

Photo. Dr. van Bork Feltkamp

FIG. 13—Comparison of the *meganthropus palaeojavanicus* (v. Königswald) mandible (left) with that of the Mauer jaw of Heidelberg Man (right); the reconstructed portions of the *meganthropus* mandible are shown in lighter colour. Both specimens are shown on the same scale

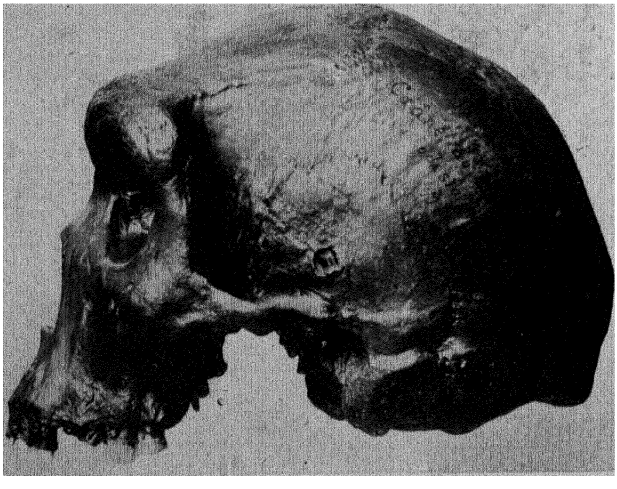


Photo. Museum of Man, Paris

FIG. 14—The Rhodesian or 'Broken Hill' skull

Summary of the Evidence

As the *Pithecanthropus* and *Sinanthropus* material forms the very foundation of our present knowledge concerning the evolution of Man, and as the *Sinanthropus* discoveries revolutionized the whole science of human palaeontology, we must try and resume what has gone before and appraise the evidence for the better understanding of what comes later.

First of all, there can be now no doubt as to the substantial identity of the *Pithecanthropus* and *Sinanthropus* types of hominid. Of sixty-nine features in the skulls of both types, fifty-seven are identical in both *Pithecanthropus* and *Sinanthropus*. Eight features are doubtful. And four show differences. These four are, for the *Pithecanthropus* (*a*) an average cranial capacity of only 870 c.c. as against 1,075 for Peking Man, (*b*) a more elongated cranial contour, (*c*) the presence of a frontal sinus, (*d*) the absence of a superglabellar groove or depression.

From this evidence, one would be inclined to think that the *Pithecanthropus* is the more 'primitive' of the two. And, indeed, this is the opinion of most anthropologists; it is, however, only fair to add that Weidenreich, the greatest expert on the *Sinanthropus* material, considers that this type is more 'primitive' than that of the Java 'Ape-Man.'

It is clear (from the long bones) that *Sinanthropus* stood upright, and it is at least probable that *Pithecanthropus* also had an erect posture. The upright posture was evidently acquired early, and possibly this posture was acquired *before* those profound transformations of the head and cranium that distinguish Man from the anthropoid apes. The freeing of the fore-limbs must, indeed, have marked a decisive phase in the evolution of our ancestors.

On the evidence we have to-day, we can say that Man's ancestors passed through a general pithecanthropoid stage of evolution and that all the varieties of hominids from these pithecanthropoids to 'modern' Man fall into one general 'species' in the widest sense of that term.

When we come to consider the rather conflicting evidence as to the dating of the *Pithecanthropus* and the *Sinanthropus* we are led to question whether either of these forms, *as represented by the bones we possess*, could be the direct forefathers of 'modern' Man. The *Pithecanthropus* of Java, certainly, looks like a 'residual' or archaic type preserved in the isolation of an island. It is, indeed, probable that other types of hominids existed in Java at the same time as the *Pithecanthropus*. With regard to the *Sinanthropus*' possible contemporaries (of other types of hominid), we know nothing directly. The question does, however, still remain open as to whether he was not hunted by some other sort of Man.

The evidence, in fact, such as it is, suggests that in remote times, several sorts of hominids existed contemporaneously. Two sorts, as far as we know, survived only eventually, the Neanderthaloid and the *sapiens*. It is possible, even probable, that in different sorts of men the physical features did not evolve at the same rate in the different branches.

However, what has gone before in no way invalidates the hypothesis of an evolution of the pithecanthropoid *form* through the Solo Man *form* to that of Wadjak and eventually to the Australoids. Indeed, we have there a plausible line of descent for, at least, one type of 'modern' Man.

Weidenreich (who shares with many anthropologists the conviction that 'modern' men's ancestors passed through a 'general' Neanderthaloid stage) is almost alone in maintaining that there is a line of descent from *Sinanthropus* (through a Neanderthaloid phase) to the existing 'modern' men of the Mongoloid group. At the best, we must say that the evidence for such a line of descent is much more tenuous than that for the pithecanthropoid-Australoid ancestry.

Still, as the indirect evidence for the existence of Neanderthaloids in northern and north-eastern Asia accumulates, we must, at least, consider the hypothesis of a *Sinanthropus*-type ancestor for the Neanderthaloids who may, possibly, have been a northern sort of men contrasting with the *sapiens* type of the south. But when we come to later Pleistocene and Upper Palaeolithic times, the cross-currents of migrations were evidently so complicated that it is certainly premature to see in the existing Mongoloids the direct descendants of *Sinanthropus* through a Neanderthaloid form.

The Ordos

Artefacts discovered by American investigators in the Mongolian Gobi are not dateable. Fathers Licent and Teilhard de Chardin,[1] however, made important finds in the Ordos desert region in 1923–1924 and discovered a Chinese Palaeolithic. The Ordos, lying between the great north bend of the Yellow River and the Great Wall (which separates the area from the province of Shensi), is a steppe (partly bordered by low hills), some three thousand to three thousand five hundred feet above sea-level. The Ordos is, thus, a transition region between the mountains of northern China proper and the lower-lying sands of the Gobi. The artefacts are scattered over a huge area and North China was, perhaps, at one

[1]No doubt, the Mongolian soil may yield most interesting relics and it is curious to remember that years ago Andersson reported the remains of a fossil gibbon from Ertemte in Inner Mongolia.

time a great workshop whence spread industrial techniques far and wide.

The soil is for the most part sand or loess, laid down presumably in the cold dry periods preceding and immediately following a glacial epoch. Or rather, the loess formations of Europe may be so dated but we do not yet see clearly how to equate the eras of, e.g., Ordos loess formation with those of the European loess. The Ordos loess is, in places, quite 150 metres (or, say, 460–70 feet) thick. Below the loess is a red clay. At Choei-tung-kiau an archaeological level with artefacts was recognized 15 metres below the surface.

The Sjara-osso-gol is an affluent of the Yellow River and some twenty years ago a human upper incisor, apparently of late Pleistocene age, was recovered from a site in the canyon, but the tooth is in too poor a state of preservation for useful conclusions to be drawn from it. The fauna of the Sjara-osso-gol loess corresponds, apparently, with that found in Europe associated with Neanderthaloid Man. A flake industry of points, scrapers, gravers and borers of general Mousterian character and (from the upper layers) microlithic flints have been recovered from the Ordos loess, so that we may take it as certain that Neanderthaloids at one time inhabited this area. North-westwards across the Mongolian steppes and along the course of the Upper Yenissei numerous Mousterian sites have been located (e.g., Aftonova, Ladeiki, Kogoeva, etc.), but mingled with the Mousterian artefacts are objects of Aurignacian (Upper Palaeolithic) type made, as far as we know, by 'modern' men, and the few skeletal remains recovered from such sites of 'mixed culture' have been of general 'Cro-Magnon' type (see p. 231). Cultures and perhaps human stocks were evidently intermingled during the northern phase of transition from Mid-Palaeolithic to Upper Palaeolithic tools.[1]

Upper Palaeolithic Man in China

But no remains of Neanderthaloid men have been as yet recovered from the soil of China or, indeed, from that of any region of Asia east of the Hissar Mountains in Uzbekistan (see p. 153).

At Choukoutien we pass at a bound from *Sinanthropus* to the 'modern' men of the so-called 'Upper Cave.' This 'Upper Cave' or Base at Choukoutien was discovered in 1930 but it was only on the eve of the late war, in 1939, that the human remains there

[1] In this connection it is interesting to recall the theories of those who would see in the Cro-Magnon type a result of *sapiens*-Neanderthaloid hybridism.

Of two human crania (of apparently Mesolithic or possibly early Neolithic culture-period) found in ancient lake-formations near Jalai-nor, one is markedly brachycephalic (as are the Chinese populations of to-day) and the other is interesting as showing what has been held to be intentionally produced depression and deformation.

unearthed were described in detail. The Upper Cave lies quite close to the cleft in the hills where the remains of Peking Man have been discovered.

The Upper Cave

This Upper Cave revealed an extraordinary wealth of animal bones. There were the remains of thousands of hare, the complete lower jaws of Sika deer, hundreds of roe-deer skeletons and at least forty complete remains of leopard, tiger, bear, hyaena and ostrich. Many of these bones are of species (e.g., Sika deer, ostrich and hyaena) long extinct in northern China and, indeed, incapable of enduring the present-day climate of so northern a region. The presence of these bones suggests, therefore, that the weather conditions in north-eastern Asia were, for part at least of the Upper Palaeolithic culture-period, different from those obtaining at the present time.

The skulls (and some of the other bones) of seven human beings were recovered from among the other animal remains.[1]

The human crania (all of which have been held—on somewhat disputable evidence—to indicate that their owners suffered mortal injury) are those of an old man (probably over sixty), two fairly young women, a youth, a child of about five years of age and a newly-born infant. All the skulls have been crushed in the earth but the facial portions of the man's skull and those of the two women have been fairly well preserved.

They are of individuals of quite 'modern' type.

Skulls of Varied Types

The old man's skull has been compared with that of the present-day Ainu, but it reminds us even more of some Upper Palaeolithic types of western Europe and especially of the 'Old Man' of Cro-Magnon. From certain features, moreover, this skull (while it might recall an enlarged edition of some of the 'generalized' Neanderthaloid crania) has a certain air of 'family resemblance' to the prehistoric 'Chinese' skulls from Kansu.

One of the women's skulls is comparable with a present-day Melanesian cranium from Oceania, while the other woman's (that has been described by Weidenreich as 'Eskimoid') is, in its general lines, uncommonly like the famous Chancelade skull from south-western France (see p. 231), which, indeed, it resembles more than it does any recent Eskimo skull except that the alveolar prognathism in the Upper Cave specimen is more marked than

[1] Few other bones were found but those of crania, but the incomplete vertebrae of two individuals, seven fragments of femora, two pelves, a pair of tibiae as well as some smaller fragments were recovered.

in any Eskimo skull (the Chancelade skull shows no traces of such prognathism). In fact, this Upper Base specimen and the Chancelade cranium are not unlike the earlier Eskimo skulls (e.g., Naujan and the 'Old Igloo' type). The existing Eskimo are a highly specialized group whose physical characteristics seem to differ rather considerably from their relatively recent ancestors who may well have been of the same general physical type as some of the 'Magdalenian' men (see p. 245) of western Europe. In Upper Palaeolithic times there doubtless were vast migratory movements reaching all over the Eurasiatic continent and, for the Upper Cave, at least we have evidence that such Upper Palaeolithic populations were of very mixed types.[1]

Staining the Bones Red

From the fact that a considerable quantity of haematite powder was found scattered over and around the bones, it seems probable that the Upper Cave was not a charnel-house but some sort of 'family-vault,' although the remains had been much disturbed by burrowing animals.

Now, the nearest deposit of haematite to Choukoutien lies at Lungkuan—over a hundred miles away over mountain ranges, so that it would seem that the Upper Base men were wanderers or traders or both. This haematite powder is indeed the first trace that we find in China of those exotic substances (used for ritual and magic) whose need was one of the earliest, apparently, to be felt by the historic Chinese.

This staining of bones red or sprinkling them with red powder is one of the most widespread of Upper Palaeolithic practices.

One of the earliest of human fossils to be recovered in England was the famous 'Red Lady' of Paviland. Placed behind the head of one of the Grimaldi skeletons (from the 'Red Caves' near Mentone) was a plaque of red sandstone further reddened with peroxide of iron. The Barma Grande skeleton had a thick coating of red ochre on the skull-cap. Red stain was found on or near the remains of Cavaillon Man, of the Baoussé de Torre specimen, of Cro-Magnon men, of the Chancelade and Obercassel men. The practice continued into Azilo-Tardenoisian times (e.g., at Ofnet in Bavaria).

[1] The 'mandibular torus' (such a feature in *Sinanthropus*) is faintly marked in the Upper Cave old man and his teeth exhibit 'taurodontism' (i.e., large pulp-cavities) in the lower molars. The mandibular torus is also faintly indicated in the 'Melanesoid' woman. The 'Melanesoid' type (now confined to Oceania) is of continental origin and can be traced in the Upper Palaeolithic of, e.g., Tongking. None of the 'Upper Cave' skulls has the Inca bone and the upper incisors are so worn that it cannot be determined whether they were 'shovel-shaped' or not. On the whole, it cannot be held that the Upper Cave population displays marked Mongoloid characteristics. But there is no reason, at present, to think that the Mongoloid type is not of northern Asiatic origin, for all the evidence points to its influence having descended from north to south.

And in comparatively modern times the human remains from Tres Zapotes in Mexico were daubed with red pigment. The instances could be multiplied and they range from the bones found in the South Russian kurgans to the coffins of the Emperors of China who were, until the last, buried in scarlet.

What did it all mean?

Artefacts of Upper Cave Man

With the human remains in the Upper Cave were found stone implements, bone artefacts (and notably a bone needle very like those used by the existing Eskimo, so that the Upper Cave men were probably 'tailored') and ornamental objects including beads of calcareous stone (painted red with haematite and placed near one of the women's skulls), pendants carved from the bones of large birds of the ostrich family, perforated *marine* shells and fish bones. The bone needle and the perforated teeth and bones show a technique inferior to that of the western European Aurignacians, but the ground and polished beads are not inferior in make to those of the European Magdalenians.

Finally, the skulls of the two women show a shallow depression running round from the forehead—probably the marks left by headstraps by which were suspendeds bag or baskets for carrying babies, as practised by the Ainu to this day.

The Upper Cave men seem very human.

Later China

It would seem as though in Palaeolithic times the Yellow River valley was inhabited by settled communities, although no skeletal remains have, as yet, turned up that would allow us to compare these Yellow Valley men with those of the Upper Cave at Choukoutien.

Neolithic Chinese

From the North China Neolithic, however, we have an abundance of skeletal material and 'from every major site in which human skeletal remains were recovered, one or more of the graves contain bones which were coloured with bright red pigment.' So we have for the northern Chinese Neolithic evidence of a practice that is not only widespread over different parts of the world but is also noted to the Upper Cave Palaeolithic peoples of Choukoutien.

These Neolithic northern 'Chinese' seem to have been, physically, essentially the same people as those living in northern Honan at Anyang in the times of the Shang-Yin or first historical Chinese dynasty. And these Shang-Yin Chinese are indistinguishable from

the modern Chinese of Honan. There has not been, therefore, any radical physical change in the make-up of the northern Chinese for at least four thousand years.

'Shang' Chinese

There is plenty of material at hand for the study of 'Shang' Chinese. Some years ago many hundreds of 'Shang' skeletons were removed from a cemetery just north of the Han River and north-east of the town of Hou-Chia-Chuang. Among them were four headless skeletons and, altogether, more than a thousand skeletons of these sacrificial victims of 'Shang' times have been examined.[1] All the incisor-teeth were 'shovel-shaped' (a tell-tale characteristic of the Mongoloid type) and in skull-form and facial bones these 'Shang' Chinese closely resemble their Neolithic predecessors and to the extent that we are justified in assuming that the two groups form, physically, one people.

Chinese Neolithic

The Chinese Neolithic stage was first demonstrated by Andersson in 1921 when he revealed the now famous 'Yangshao' culture-objects with a pottery painted in bold, and 'primitive' style. Similar objects to these Honan province 'Yangshao' culture were later found in Kansu and elsewhere. Early, Middle, Late and Transitional phases are now recognized. The connection of this early Chinese ware with the pottery of Anau, with that of Tripolye in South Russia and with that of the Baltic 'passage graves' seems fairly clear. This western material may be, perhaps, dated to about 2200 to 1800 B.C.[2] These Chinese Neolithic men enjoyed a fairly high culture, with domesticated animals, and probably also with features recalling those of the 'circumpolar' peoples of to-day, e.g., shaman-complex, totemism and mask-complex. Traces of early and barbarous things, but half-hidden, can be perceived, streaking down far into historical times of North China. And, although we cannot, of course, assert that these Neolithic dwellers along the banks of the Wei and the Yellow Rivers contributed much or little to the Chinese 'Shang' civilization, we can assert that the Chinese Neolithics were in touch with, and doubtless influenced by, cultures much farther west in the Eurasiatic continent.

Later than this painted Yangshao Neolithic pottery comes a

[1] Human sacrifice lingered in China far into historical times. Such offerings were still in the third century B.C. made in the old-fashioned and conservative State of T'sin (in the north-west) whence came the First Emperor.

[2] *Vide Chronological Tables of Prehistory*, by Burkitt and Childs. Andersson suggested as early as 2,500 B.C. for 'middle' Yangshao but Menghin would have it later than 2,000 B.C.

'Black Pottery' phase in northern China. The Black Pottery was first found (in 1928) at Lungshan, near Tsinan, in the province of Shantung, and recently new Black Pottery sites have been discovered near Hangchow, in the province of Chekiang, and at Chin Shan Lake. It is rather surprising to find this Black Pottery so far south—a good four hundred and fifty miles from Tsinan. The Chinese South, undoubtedly, still reserves surprises for us. The Black Pottery people apparently practised ancestor-worship and textile impressions suggest weaving.[1]

The Black Pottery people apparently laid the foundations of Shang culture, or some of its foundations, since at Anyang (the classical Shang site) there is a Neolithic substratum—we may indeed suppose that for long, perhaps indeed for the whole length of the Shang period, the common people lived still in what was essentially a Neolithic culture-complex. The painted pottery at this lowest level of Anyang shows little relationship to the white modelled pottery found at the level of the first bronzes, but a layer of plain Black Pottery separates the two and at one of the sites where Black Pottery has been recovered there is evidence of a transition leading up to the white ware which was contemporaneous with and bore the designs of the Anyang bronze age.

Anyang Bronze Age

As far as we can see, the bronze age at Anyang may be dated to about 1,500 B.C.—the conventional dates for the commencement of the Shang-Yin dynasty are too early—and as far as we can see this bronze age civilization, already in its main lines comparable with certain permanent features of historical Chinese culture, was of the nature of a rapid nationalistic evolution probably induced by a clash of cultures one of which, we may be sure, came from the West while another, perhaps, came up from the South. Both impinged upon the old Neolithic culture of the Han, Wei and Yellow Rivers. Judging by analogy such blossomings of civilization may be in terms of generations quite rapid. The development of Chinese civilization in northern China may be compared with the quick flowering of the sophisticated Mayan art from the naïve products of North American agriculturalists of the archaic level.

In China we pass suddenly from a Neolithic culture to Shang civilization. It is arguable to state that at the present time, as far as we can see, the Shang high culture or 'pre-civilization' resulted, like most high cultures, from a clash and we may suppose that the anvil was constituted by the Eneolithic culture of north-east China.

Although the Shang shared with their predecessors, the 'Black

[1] See 'Black Pottery Culture in Chekiang,' by Stirling S. Beath, in *Asia*, January, 1941.

Pottery. people,' such culture-traits as pounded earthern walls and foundations, white pottery made (already!) from porcelain clay, and (perhaps) the use of bones for divinatory purposes and domesticated oxen and horses, there are 'new' elements. Bronze casting, the potter's wheel and horse-drawn chariots seem definitely to have been imported from the West in what is called an 'integrated complex.' During the Bronze Age the Far East was demonstrably in touch with Europe. Polychrome pottery with spirals of one type is found from Rumania to China. Axe-hammers with sockets (some in bronze and others in stone—the latter copied from bronze models by men who could not get metal) and of a peculiar form sometimes covered with a stylized animal decoration are found spread from northern and central Europe across Siberia (at Krasnoiarsk and Minussinsk).

On the other hand, the reflex bow, probably the divinatory bones and the so-called *'li'* tripod seem to belong to the North China area. The reflex bow, it is true, suggests a circum-polar culture as do the rectangular or semi-lunar knives, 'tailored' clothes (i.e., with sleeves), but these may well have spread northwards.

Note on the Mongoloids:

We are inclined to think of the Chinese as a typically Mongoloid people. However, they might be more accurately described as 'Mongolized' than Mongoloid. The 'Mongolization' becomes increasingly less noticeable as one proceeds south, and in south-western China there are many regions where the population is no more Mongoloid than among the Annamese of Indo-China where the 'Indonesian' substratum is never entirely hidden.

There is a good deal of difference between most types of even northern Chinese and the real Mongols. The centre of Mongoloid dispersion may probably be sought for in north-eastern Asia. We may not be going far wrong if we think of the ancestors of most of the northern Chinese as having been Mongolized through contact with peoples perhaps now represented (in the physical sense) by such tribes as the Gilyaks, Chukchis and Golds.

Japan

There are no traces of Palaeolithic—although there is a supposed Palaeolithic site in southern Honshu with remains of *elephas namadicus*—in Japan and the pre-Japanese Neolithic (with pit-dwellings, pottery and human figurines) appears to be Ainu.[1]

[1] Japan seems to have been finally severed from the Asiatic continent at the end of the Pliocene or at the beginning of the Pleistocene (at the time when the whole of the eastern Asiatic plateau moved upward to form the existing masses of Mongolia, of

The 'Neolithic' skeletons unearthed by Matsumoto fall into, perhaps, three types, but they are all more or less Ainu and are comparable with the remains of some of the men of the western European Upper Palaeolithic.

But it is at least possible that the Ainu settlements in Honshu (the main Japanese island) may not be very ancient. The 'Japanese' Neolithic may have lasted only a short time and have ended with the importation of Chinese civilization. In any case the ancestors of the present-day Japanese do not seem to have been settled in their island for more than a few centuries before our era.[1]

Moreover, if the objects classed as 'Palaeolithic' have all turned out to be misclassed, there is no Mesolithic at all. There are, however, over 10,000 Neolithic sites and very numerous Eneolithic and Iron Ages ones.

The Eneolithic (i.e., mixture of Bronze and New Stone Age culture) seems to indicate an invasion from Korea and this Eneolithic merges into an Iron Age beginning about 200 B.C.

Schnell showed that a line drawn through the Lake Biwa region of Honshu would leave 90 per cent of the Neolithic sites to the north or old Ainu side,[2] thus suggesting not only Ainu penetration from the north but a comparatively late invasion—so perhaps only the 'Japanese' Eneolithic is really Japanese.

Southern Affiliations

The occurrence in Japan of dolmens somewhat like those of India and Oceania—and unlike those of neighbouring Korea—the now extinct but formerly widespread practice of tattooing, the flimsy houses in a cold climate and in a country where there is an abundance of good building stone, seem to point to southern affinities for at least one group of Japanese ancestors. On the other hand, the Neolithic pottery of Japan and the 'bored knives'—'*couteaux à trous d'attache*'—recall the cultures of the Aleutians and of the Arctic generally.

But recent investigations by Japanese workers in the Kuriles brought to light nothing suggesting that this chaplet of islets was

Shansi and of the Tsinling range). This view of the date of Japan's severance is also suggested by an analysis of its fauna, though some authorities (e.g., Spinden) maintain that Japan was still connected with the mainland during much of the Pleistocene Period. The Ainu culture (as at present existing) bears obvious affinities with those of more northern peoples (e.g., Eskimo, Aleuts, Chukchi and Koryak), sharing with them such culture-traits as the tattooing of the face and the use of bone harpoons. The diffusion-centre of this culture-complex probably lay inland fairly far to the south.

[1] Some Japanese archaeologists would count three prehistoric cultures in their country: (*a*) 'Jomon' (Ainu); (*b*) 'Yayoi' (Japanese); (*c*) 'Iwaibe' (Japanese).

[2] There are to-day (1946) some 17,000 'pure-blooded' Ainu living and many of them show resemblances in type to certain remains of western European Upper Palaeolithic men. (*Vide* G. Montandon, *Au Pays des Aïnous*, Paris, 1927.)

ever used as a bridge connecting north-eastern Asia (i.e., Kamchatka) with the Japanese archipelago. The only Neolithic on the Kuriles and in Kamchatka is a most decidedly 'recent' (i.e., not later than the beginning of our era) Neolithic and neither Jockelson nor Bergman, who spent a considerable time in the islands, could find any Palaeolithic or Mesolithic remains.

A Note on Bear-Cults

It is well-known that the central religious ceremony of the Ainu is (or rather was since of late years it has been forbidden by the Japanese) a complicated bear-cult. A young bear captured in the woods was carried back to the village, suckled by an Ainu woman, then carefully pampered and well-fed until, placed in a cage of wooden stakes, it was shot to death by arrows. Then the people communicated in its blood and flesh.

The rite is comparable with many practised at one time or another in many parts of the circum-Pacific area (a similar ceremony is observed by the Gilyaks on the mainland of eastern Asia), but our interest in the cult, for the purposes of our story, lies in the fact that some sort of what we may call a 'bear-cult' is observable in very remote times.

The evidence accumulates that some of the Neanderthaloids, at least, practised some sort of magic. After all, the Neanderthaloids were, as far as we know, the first sort of men to bury their dead with gear and objects that seem to have had some non-material significance, and many of the Neanderthaloid techniques and customs seem to have been shared by early 'modern' men.

For instance, at Petershöhle (near Velden and about thirty miles to the east of Nuremberg), in a cavern giving on a valley on the left bank of the Pegnitz, were found bear-skulls in the niches of the walls as well as in a sort of primitive kist. On a stone platform were ten isolated bear crania and with them other isolated (and mostly long) bear bones. The culture of the cave is Mousterian (or rather what Hörmann called 'pre-Mousterian') and the bear relics were probably put in place by Neanderthaloid men. In Switzerland also has been found a stone chest covered with slabs containing skulls of bears all pointing in one direction. At Drachenhöhle near Mixnitz in Styria (Austria)—also a Mousterian site—fifty-four bears' thigh-bones were discovered all laid out in one direction. And forty-two skulls and several thigh-bones lay in another cave. Abel holds that these remains were those of sacrifices to the bear spirits.[1]

[1] *Vide* O. Abel and W. Koppers on the Bear Cult, but the conclusions of these authors seem to reach beyond what is justified by the evidence. The remarkable interglacial sites in the Swiss and Austrian Alps have been known since 1902. Here are caverns that were occupied by bear-hunters.

During the Magdalenian culture-phase of south-western France there seems to have been bear sorcery (as of that of other beasts) but there is little evidence of bear-masks or bear dances.

Bears, however, and particularly the terrific cave-bear that could tower up twelve feet when on his hind-legs, seem to have been one of the beasts that most impressed early men. And traces of bear-cults may be found in the early days of even high cultures.[1]

Siberia

The cultural and anthropological relationships which may exist between the various northern Siberian populations (e.g., Tungus, Lamuts, Golds, Gilyaks, etc.) have been little worked out. Some indications would tend to show that nearly all the existing peoples are, relatively speaking, late-comers.[2]

No Lower Palaeolithic

Also, we know really very little about the archaeology and the prehistory of Siberia, although somewhere in this vast region lies, no doubt, the key unlocking the mystery of America's peopling. In Siberia no typical Lower Palaeolithic industry has yet been discovered. What human remains have been unearthed are quite unlike those of the peoples now 'indigenous' to the region and are comparable with some of the types of the European Upper Palaeolithic.

Baikal Region

Southern Siberia—that is the region of Lake Baikal—is the area where have been found what are perhaps too definitely called 'ancestral phases of Amerindian culture.' This Baikal country—with the typical site at Mal'ta—shows a definite Neolithic complex analogous to that of northern Eurasia and this complex may, perhaps, be dated approximately, by reference to regions of the Old World (e.g., Mesopotamia, Indus Valley and Egypt) for which we possess an historical chronology.

'*Magdalenian*'

Petri called the earliest finds in the Irkutsk region 'Magdalenian' and indeed the Magdalenian is the longest Upper Palaeolithic

[1] There may be (as some authors, notably Abel and Koppers, have postulated) some bear-symbolism for coitus or sexuality generally, but there is not (as has been often stated) any female figure (together with that of the bear and the man) on the incised mammoth bones from Colombière.

[2] The 'Arctic' culture of the Palaeosiberians—a culture that bears an obvious relationship with those of Hokkaido, Chishima, the Bering Sea area and of the Japanese Neolithic, on the one hand, and those of Korea, Manchuria and the Maritime Province of Eastern Siberia, on the other—may, indeed, be no ancient thing. Again, Chernetsov has, in the last few years, reported an apparently lately-settled but still pre-Samoyedic coastal population, on the inhospitable shores of the Yamal peninsula.

cultural-division since it stretched, it would seem, from the peak of Würm II to about 12,000 B.C. A subglacial tundra-culture of Magdalenian inspiration appears indeed to have spread across Siberia, but no 'Magdalenian' human remains have been there recorded—those we have come all from much farther west.

If we take this 'Magdalenian' complex of Irkutsk together with the rather excentric figurines from Mal'ta we have a mixture of objects occurring together and these must, here as elsewhere and always, be dated from their latest ingredients.

For instance, a Mesolithic bone dagger set with small flints was turned up at a so-called 'Palaeolithic' level.

Now this culture that is 'ancestral to that of the Amerindians' is to be found at quite numerous Neolithic cemeteries set along the Angara River outlet of Lake Baikal and, for instance, at Kitoi and Rasputin among other sites. The artefacts comprise polished 'celts,' chisels, knives, and toggles (mostly of nephrite); these are found in the ancient shallow graves together with harpoon points, fishhooks, needles, awls and spoons of bone, bone saws, daggers edged with flints, tools of chipped flint, objects of carved soapstone, grooved arrow-polishers of sandstone, ochre-stained skeletons and a little plain and basket-marked pottery as well as copper objects and sculptures representing fish.

This, apparently, sudden-appearing Siberian Neolithic is pretty evidently of Western origin, as is indicated by the distribution of comb-marked pottery in northern Europe and by the ochre-stained graves of the south Russian kurgans.

Mousterian type tools, comparable with those found in France, have been discovered on the upper (southern) course of the Yenissei River and also farther east in Siberia, but with these artefacts are also Aurignacian (Upper Palaeolithic) types of bone and ivory points, awls, harpoons and a baton. Analogous mixed cultures are met with in other parts of the steppe to the west of the Yenissei. The few human remains found associated with such mixed cultures are of general western 'Cro-Magnon' type (see below).

Mal'ta

The interesting village at Mal'ta near Irkutsk has the bases of the houses formed of bones and soil. A split-base point of Aurignacian type (conspicuously lacking in European Russia) was found together with some tools showing Mousterian influence. The twenty figurines of women are unlike the adipose statuettes of Russia (and of Vistoniče and Willendorf)—save that the arms are crossed on the breast. Both features and hair are clearly indicated.

It is possible that Mal'ta may have been a cultural frontier as may be indicated by the (later) European-type skulls found in the

Yenissei valley and the Mongoloid skulls to the east of that divide. But the eastern Russian-Siberian sites have been connected with those of European Russia by the recent Palaeolithic discoveries in the Urals.

There is, however, no Palaeolithic known in Asia north of 40° but there are Upper Palaeolithic sites in the Altais, the Upper Yenissei Valley, the Angara Valley and Transbaikalia. And the human skulls found with Upper Palaeolithic artefacts in the Altai region are also of a type comparable with the French Cro-Magnon.

In Southern Siberia, apparently Lower Palaeolithic tools are found a little beyond 50° in the Yenissei valley and at 53° at Mal'ta. But these eastern Siberian Palaeolithic artefacts are not identical with those of the eastern European cultures and doubtless the two complexes were not wholly contemporaneous.

Portal to the New World

But the portal to the New World must lie farther north than the Lake Baikal region, and within the Arctic Circle. Although there would appear to be on the Baikal shores a series of no less than five cultures (ranging in date, perhaps, from about 6,000 to 1,000 B.C.). The stretch of over a thousand miles from Lake Baikal to the Bering Sea's shores was, until quite recently, an archaeological blank, but the recent discoveries in the Lena valley (of which we have not, as yet, a full report) may fill in a part of this blank since the line of the Lena's course leads half of the way to the Bering Sea area.

We have not, however, found—up to now—proof of Man's invasion of the sub-arctic region until the time when the forests were re-clothing the old tundra zone. Then we come across traces of a 'Maglemosian' (i.e., resembling the Maglemosian of northern Europe) phase of small-blade or Microlithic culture. But there is also a Microlithic in the Americas. If the immigrants to the New World came in by the Arctic Circle route (and there seems no other) and bringing with them a fully-developed New Stone Age culture, then their journey can hardly have begun so very long ago.

Nothing has been found in the Americas that is pre-Neolithic.

H. J. Spinden (in his important paper, 'The Peopling of the Americas') thinks that the 'American Complex' region near Lake Baikal was not 'ready' before 2,500–2,000 B.C. and that, therefore, the date for the arrival of the first immigrants into America cannot be set at much before 2,000 B.C.[1]

[1] Spinden's main contention is, of course, that of all competent students. Man came into America from Siberia through Alaska and he came as 'modern' Man with a relatively advanced Neolithic culture—that is with flint knife and stone axe. As we have mentioned, one route from the Baikal area is along the Lena, but there is another possible path along the banks of the Amur.

Many 'American' secrets are locked up in Siberia and until we know more of the glacial geology, of the anthropology and of the archaeology of this area we cannot hope to answer all the questions that pour in upon us when we review our knowledge of America's peopling.[1]

[1] It has been suggested that we may see in the people of the Upper Cave at Choukoutien, specimens of a wave of immigrants towards the Americas. There is nothing inherently impossible in the view that the 'Upper Cave' people may have been ancestors of such immigrants but we cannot, at present, accept this hypothesis even tentatively.

CHAPTER FOUR

AMERICA

THE Bering Sea is, for much of its area, not thirty fathoms deep and from the Asiatic to the American shores a course can be laid out under which water nowhere exceeds twenty fathoms, or one hundred and twenty feet, in depth.

It has been estimated that during the main phases of the last (or Würmian) glaciation the sea-level was rarely less than about seventy metres (or, say, two hundred and forty feet) lower than it is at the present day, while, at times, the sea-level was reduced by as much as one hundred metres.[1]

Land-Bridge Between Asia and America

And there can be no doubt that, for ages at a time, a land-bridge connected Asia and America. The Bering Sea route undoubtedly offered to other animals than Man a corridor of egress and of access. For instance, Upper Tertiary ancestral mammalian forms are shared by America and Eurasia and it is demonstrable that later (and Pleistocene) species migrated back and forth across the Bering Sea area. And, at no time since the Tertiary Period has the Bering gap been much wider than it is to-day. The fifty-six miles of sea separating the two continents are, moreover, broken approximately half-way by the Diomede Islands.

Big Diomede, six miles long, peaks up to 1,759 feet. Thus, the widest stretch of open water from East Cape to Cape Prince of Wales—on the Diomede line—is only twenty-five miles or so. Although the region is notoriously one of fogs and mist, Fairway Rock and the Diomedes can often be seen from Cape Prince of Wales, and, in fine weather, the Asiatic shore from East Cape southwards is visible to the naked eye from the American coast.

Although the waters of the Bering Sea show almost no tidal variations—the mean rise and fall does not exceed one foot—there is, off-shore, a strong current bearing somewhat northwards from Asia so that a crossing upon drift-ice over to America, were such a journey possible, would land the traveller on the Alaskan shore rather to the north of the Strait.

So much for the Bering Strait route. A possible migration way through the Aleutian Islands and the Komandorski Islands would

[1] This shifting of sea-levels ('eustatism') due to the accumulation of ice and also to the depression of land-levels owing to the burden of the ice, is a matter of great importance for our story of Man and for that of his migrations. Unfortunately much still remains to be learned about these land and sea movements.

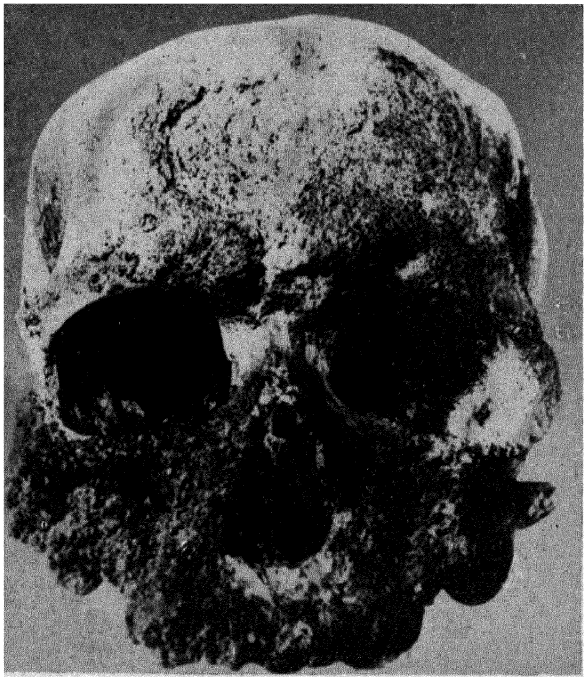


Photo. Museum of ***Man, Paris***

FIG. 15—Front view or *norma facialis* of the ' Old Man of Cro-Magnon '



Photo. Prof. H. V. Vallois

FIG. 16—The La Chapelle-aux-Saints Neanderthaloid skull (Museum of Human Palaeontology, Paris)



Photo. Museum of Man, Paris

FIG. 17—One of the Cro-Magnon-type Upper Palaeolithic skeletons from the Baoussé-Rossé Caves near Mentone, Southern France

be a much more difficult one. The nearest Komandorski Island is distant one hundred and fifteen miles from the Asiatic continent and it is one hundred and seventy-five miles away from Attu, the last of the Aleutian chain.

Way Through the Ice

For long ages, and from the Atlantic to the Pacific coasts, the routes leading through Canada from Alaska were blocked by insurmountable ice-barriers. W. A. Johnson and E. Antevs consider that during the maximum of the Wisconsin glaciation[1] the ice-sheets of the Keewatin and Cordilleran centres were connected but that at an early stage of the ice's retreat the two sheets became separated so that Man arriving from Siberia by the Bering Strait would have been able to make his way through to the open country of the Middle Western plains.[2] If, therefore, some time during the 'Wisconsin' phase a way was open through the glaciers and that Man took that way we cannot well set the time of his migrations at very long ago. Indeed, what evidence we have points to Man's arrival in the Americas during the latter part of the Würm glaciation *at the earliest* and it may well be that the migration started a good deal later.

Dates for Man's Arrival in America

On the geological evidence *alone* we should be inclined to set 20,000 B.C. as the earliest possible date for the arrival of Man in the New World. E. Antevs has thus summed up:[3]

'The first man to arrive in North America was of modern type and perhaps at the Neolithic stage of culture. He came from north-eastern Asia to Alaska and probably spread along the eastern foot of the Rocky Mountains when an ice-free corridor had formed some 20,000 to 15,000 years ago. He seems to have reached the South-West at the age of transition between the pluvial and the postpluvial epoch or, roughly, 12,000 years ago.'

[1] Wisconsin and Würm glaciations were probably coincident in a general way but the ice-sheet extended 10° farther south in North America than in Europe and this advance was not everywhere contemporaneous. Pollen analysis in N. America has not given on the whole satisfactory results—the attempt to collect pollens in the Folsom sites has not been successful. The great climatic changes did not probably have a world-wide extension and the glacial phenomena may have occurred in comparatively small areas.

[2] At times during the Pleistocene, the Alaskan glaciers appear to have been restricted to the coast ranges in the south and to the Brooks Mountains in the north, thus leaving the central part of the country comparatively free from ice. American geologists have calculated that the routes from Alaska to Canada and beyond were blocked from about 65,000 to 20,000 B.C., with a possible break about 40,000 B.C. when a north–south corridor may have been free along the Rockies base and probably along the passage between this great range and the coastal mountains. But 40,000 years ago seem much too far back to set the first waves of human immigration into the Americas.

[3] *Geographical Review*, 1935.

Estimates from other data—or from pure guesswork—vary from this 20,000 year limit to 4,000 or even 2,000 B.C. Spinden, as we have seen, concludes that men did not move into the Americas much before 4,000 years ago.

We shall see what sort of dating we can extract from other evidence, but two points are clear from the start:

(*a*) No remains have been found anywhere in the Americas that can be referred to other human types than 'modern' Man—and, indeed, 'modern' Man of sorts still represented to-day.

(*b*) There is nothing in the geological or the palaeontological record to make it remotely probable that Man arose independently in the Americas.[1]

But, if the evidence indicates a migration date in comparatively recent times, still 22,000 to 17,000 years is a long time in the history of Man's cultures and development, and a time quite sufficient, it would seem, to allow of the peculiar evolution of Amerindian languages, agriculture and cultures.

The American instance is of the highest interest and importance for Man's story since we have, on the American continent, evidence for what Man can achieve in isolation or subject only to influences brought from afar, indirectly and (probably) in successive waves separated by long intervals.[2]

The Peopling of the Americas

The territory of Alaska and of its fringing islands has been fairly well worked over by archaeologists. There are no Pleistocene remains either upon the islands or on the shore-line of the Bering Strait. In fact, no sites have been noted that seem earlier than Holocene or 'Recent' Period.

Eskimo Immigration

The Eskimo wave or waves of immigration may not have been

[1] New World and Old World monkeys seem to have arisen from separate lemuroid (or even tarsioid) forerunners and it may well be that the resemblance between catarrhine (i.e., Old World) and Platyrrhine (i.e., New World) monkeys may be a result of parallel or even convergent evolution.

[2] The 'Diffusionist' school of ethnologists (many of whose dogmas took shape before the relations of Egyptian culture to those of neighbouring lands had been elucidated in part) have found the American evidence troublesome. We still have to read occasionally of alleged 'borrowings from Cambodia' in Mayan architecture and art. However, the earliest Mayan monuments appear to antedate the earliest Khmer (and even 'Funan') by several centuries. As a side-light on human migrations into America it may be noted that the Amerindians possessed at least three main and sixteen lesser varieties of dog. And all these varieties are traceable not to any American wild prototype but to an *Asiatic* type of wolf.

the last ones to reach North America[1] though the series of Eskimo remains from the Bering Sea area tends to indicate that there have been no important movements of immigration for the last two thousand years. It appears established, then, that an Eskimo culture (of obvious unity) came into the Arctic over two thousand years ago and that this Eskimo culture was once more prosperous than it has been in recent centuries.

Although the climate may have been more clement when the Eskimo came through than it is at present, there was certainly no land-bridge for them to cross. But the Eskimo are to-day and were apparently in the past skilled navigators, at least for short distances, and there is every reason to think that they brought with them their *umiak* and *kayak* boat-forms that are paralleled in the north-eastern parts of Asia.[2]

Eskimo and Magdalenian

There seems to be no ground for the oft-repeated story that the Eskimo represent the men of the Asiatic Upper Palaeolithic. The 'eskimoid' skull from the Upper Cave at Choukoutien does not resemble that of (at any rate) any extant Eskimo. There is, it is true, the famous Chancelade cranium from the Dordogne in south-western France. As Vallois has put it:

'The details noted for the form of the face, of the nose and of the orbits show that it is much less different from those of other subjects from the Upper Palaeolithic than is commonly asserted.'[3]

There are, however, rather striking analogies between the material culture of the European Magdalenians and the still extant Arctic cultures. However, the differences are also many, e.g., a polished stone industry with forms unknown to the Magdalenians. Eskimo art, again—many features of which, it is true, appear to be

[1] A later wave than the Eskimo may have been that of the Athapascan peoples bringing the snow-shoe complex with them. But, since it is possible that the Athapascans may have arrived in America as much as 3,000 years ago, it is possible that the Eskimo invasion may be still earlier. *Vide* Kai Birket-Smith, *Eskimo Cultures and their Bearing upon the Prehistoric Cultures of North America and Eurasia.*

[2] The late Franz Boas, while emphasizing the resemblance between the *umiak*, the *kayak*, the harpoon, the domestic utensils, the rituals and the hero-legends as between the Eskimo on the one hand and the Chukchis and Koryaks of north-eastern Asia on the other, rejected the view that Eskimo *culture* had originated in Asia and indeed he considered that several palaeo-Asiatic peoples of north-eastern Asia were immigrants from America. This view may be too extreme but there have undoubtedly been movements in both directions across the Bering Sea area.

[3] See 'Nouvelles recherches sur le squelette de Chancelade,' by H. V. Vallois, *L'Anthropologie*, tome L, pp. 165–200. Moreover, the Chancelade specimen is obviously akin to those of the Mesolithic men of Treviec in Brittany. But it is possible that the *ancestors* of the extant Eskimo were not unlike the European Magdalenians.

comparatively modern—offers no close parallels to that of the later cave-men of Europe as that art has been preserved for us.[1]

The mechanical genius of the Eskimo is, indeed, rather noteworthy.

'Proto-Eskimos'

But, however we may look at the problem of America's peopling, the peopling of the Americas presupposes the peopling of north-eastern Asia. We should search the Arctic shores of Siberia in an attempt to discover where the proto-Eskimo adopted a coastal way of life and learned how to hunt sea-animals. For the Eskimo way of life is a highly original thing and its evolution must have demanded a relatively long lapse of time.[2] There seems, however, a considerable time-lag between the oldest Eskimo cultures and the Siberian New Stone Age cultures which show the closest affinities to them, although these Siberian cultures offer no parallels with those of demonstrable antiquity in other parts of America than those inhabited by the Eskimo. This fact alone would suggest that, for instance, the 'Ipiutak'[3] and 'Old Bering Sea' cultures are considerably later in date than those of Folsom and Sandia (see pp. 134–137). This 'Old Bering Sea' culture is a highly developed and specialized and distinctly Eskimo culture with an elaborate art-style and many ingenious instruments. If the immediate origin of the 'Old Bering Sea' culture is to be found in the extreme north-east of Asia, then the roots of that culture must strike back deep into such regions of Asia where have been found such objects (typical of 'Old Bering Sea'), as the square and wooden earth-covered houses with entrance passage, skin boats, sledges, toboggans, toggle harpoon heads, throwing boards and bird-darts, lamps, pottery vessels, needle-cases and chipped stone and rubbed slate instruments—that is to say, for many of these, right back into the Eurasian plains of Russia. In fact, if the 'Old Bering Sea' culture shows so many features that can be paralleled with Upper Palaeolithic cultures of thousands of miles to the west, we may suppose that the (hypothetical) proto-

[1] In their social behaviour the Eskimo contrast strikingly with their nearest neighbours, the Chukchi of north-eastern Asia. The former are a self-reliant and confident people whereas the latter live in a condition of social and emotional insecurity.

[2] Sociologically and ethnographically, the Eskimo can be divided into two well-defined groups (whose members are, however, physically and linguistically one people): these are (*a*) the 'Sea-Eskimo' and (*b*) the 'Caribou-Eskimo.' The latter are quite divorced from the sea and in the winter practise ice-fishing. These 'Caribou-Eskimo' are, however, sharply marked off from their neighbouring Amerindians of the woodlands, men who use and apparently brought with them from Asia (if they did not invent in America) snow-shoes. Before the adoption of this invention men in the cold American North had to keep in winter to the surfaces of frozen lakes and streams.

[3] The 'Ipiutak' culture recently discovered at Point Hope on the Arctic coast of Alaska has been termed for convenience' sake 'pre-Eskimo.'

Eskimo remains from north-eastern Siberia would show even more marked relationships with Epipalaeolithic cultures of western Asia and Europe.[1]

The Arctic zone of Eurasia has, as yet, yielded up little to satisfy the prehistorian. To-day, however, the whole region shows a remarkably unified material culture extending from the land of the Samoyeds in the west through that of the Asiatic Eskimo—the Namollo or Yuite—and of the Aleutians to the settlements of the American Eskimo.[2] Just as the ancient Lapp polished schist industry is found as far afield as southern Norway, so on the coast of the Chukchi country in north-eastern Asia, there are traces of habitations similar to those of the Asiatic Eskimo, and we may therefore conclude that Eskimo culture once penetrated much farther south than at present. On the other hand, artefacts similar in form and in material to those used by the Greenland Eskimo to-day have been unearthed in the State of New York.

Much of the pottery from the American north-west—that is, of course, Amerindian and not Eskimo—suggests parallels with and possible relationship to the ceramic of the Angara River valley type in the Lake Baikal region. And, as far as we can see in the darkness, this area may well have been the womb whence issued some, at least, of the Amerindians. Indeed, among the tribes living around the Yenissei basin there is an apparently ancient and almost submerged people showing many Amerindian types. Certain of the north-western Indians' culture-traits suggest a migration, on the other hand, from the Amur River region, which might well indicate a remote relationship with peoples still farther south, that is to say, touching on the area of the earliest Chinese or proto-Chinese settlements.

Again, the recently discovered microlithic culture of Fairbanks, Alaska, closely resembles the Mongolian Microlithic. In any case, judging merely from physical evidences, the so-called 'Palaeo-asiatic' peoples such as the Yakaghir, the Chukchis, the Koryak, the Gilyak and the Kamchatkans must be closely akin to some of the types that peopled the Americas.

And if the existing Amerindians (the Eskimo are, as we have seen, a case apart) show considerable divergences of type, the majority of them display 'Mongoloid' characteristics. You can

[1] The fact, alone, that Siberian Stone Age culture objects show resemblances with those of the oldest Eskimo cultures, would suggest that there must be a great time-gap between the arrival in the New World of the earliest Americans and that of the Eskimo.

[2] The Eskimo everywhere from north-eastern Asia to Greenland speak what is essentially the same language and this alone would indicate (*a*) that their dispersal is comparatively recent and that (*b*) the Asiatic Eskimo are most probably returned migrants from America, for if the Namollo were the last remaining representatives of the ancestral Eskimo we should expect to find their language rather definitely differentiated from that of their kinsmen in the New World.

mingle with hardly any Amerindians without encountering types so Mongoloid that they would scarcely appear out of place in a northern Chinese crowd. And once when showing an excellent film of the late Knud Rasmussen's on Eskimo life to a young Annamese lady she whispered to me during a scene of an igloo's interior where the women were stripped to the waist, "Why, the old one is just like my grandmother."

The fact is that the whole picture of the inter-relations between north-eastern Asia and the Americas is far from clear even in its main lines. It would seem certain, however, that America has been a trap and that nothing (except perhaps local influences across the Bering Sea area) has come out of it and, moreover, that the peopling of America occurred too late for there to have been over-crowding and exhaustion of the food supply.[1]

Yuma, Folsom and Sandia

In every discussion on Early Man in the Americas nowadays references occur to Yuma and Folsom 'points.' The problems presented by the existence of these artefacts are complex.

Folsom

The Folsom quarry is dug into the Pleistocene gravels of a stream at a point some fifteen miles west of Folsom township lying between Clovis and Portales in the Guadalupe Mountains of New Mexico. The original 'Folsom' stone spearhead was found embedded in a matrix and between two ribs of a bison larger than any sort extant. Other points were also discovered in contact with buffalo bones, and in association with the remains of elephant, mastodon, horse and camel with some charred bones and traces of hearths.

Now, these Folsom points were produced by pressure-flaking and not by percussion. They have a longitudinal fluting or groove on either side and a secondary chipping or retouching is visible along the edges. These weapons bespeak an advanced technique and no products of 'recent' Amerindians are quite as fine as the 'Folsom.'[2]

No skeletal remains of 'Folsom Man' have come to light and since nothing relating to him—that is to say, his tools or his weapons —has been found in caves or in grottoes, it is possible that he lived in the open. That is to say, that 'Folsom Man,' or whoever made and used the Folsom points, was probably a 'Plains Indian' and,

[1] It would seem that the human population of North America was always, in pre-Colombian days, scanty. It has been estimated, indeed—though, of course, on slight evidence—that the total number of inhabitants of the continent, north of the Rio Grande, did not exceed 900,000 persons at the time of the European discoveries.

[2] See 'Folsom and Yuma Problems,' by Edgar B. Howard in the *Report* of the Annual Meeting of the American Philosophical Society (1942).

as such, his dead would have been exposed on scaffolds, in lodges, in trees and in boxes—or cremated. The skeletons of recent Plains Indians are quite rare and it is not, therefore, surprising that no traces of 'Folsom Man's' bones have yet been found.

A Folsom point, unearthed on the Lindenmeier ranch in northern Colorado, was also embedded in a bison's vertebra and, although this beast was also of an extinct sort, all its bones were discovered lying in anatomical connection (such a position always—either for man or beast—suggesting no very great age) so that the animal can hardly have been killed in very ancient times.

Extinction of Fauna

Now beasts—or some beasts—become very rapidly extinct when they are intensively hunted, especially when they are hunted with new weapons, as we have seen in the case of the still extant American bison. Also, other things being equal, the stupidest beasts get killed off first.

The fresh and excellent condition of some beasts' remains found in the Americas suggests that, in some cases, extinction was achieved almost in modern times or, let us say, since the beginning of our era. The bones of a South American mastodon have been reported in association with human artefacts (in Ecuador) apparently not more than 1,600 to 1,800 years old. Portions of the dried *skin* of the extinct great South American ground sloth have also been recovered in association with traces of men. In 1914 Carlos Ameghino found in the Argentinian pampas a quartzite point in contact with a *Toxodon* femur and two smaller points (arrow-heads?) embedded in the spinal column. And the quartzite point was of 'modern' willow-leaf form.[1]

In North America, also, the mammoth died out only at some period between the times of 'Folsom Man' and that of the 'Basket-Makers' (see p. 143). Mastodon bones have been found associated with man-made objects.[2] And, in addition to the mammoth and the mastodon, it is almost certain that various ground-sloths, the dire-wolf, the Californian lion, the American horse, extinct forms of peccaries, extinct musk-oxen and ancient types of pronghorns and bison as well as the giant beaver were all flourishing when

[1] Many of these queer South American mammals must have lived on to quite recent times, but, of course, men were few in the southern continent. In addition to the large pieces of giant sloth skins referred to above there were also recovered from the same *cueva Eberhard* (in the same year 1899) human bones of quite 'modern' type and some pieces of skin and calcined bones of *onohippidium* (a peculiar large-headed South American extinct horse only very remotely related to the Old World horses). In the *Rio Salado* and *Arroyo Tapalque* regions were also found the very fresh bones of a sort of *glyptodon* (a gigantic armadillo-like beast) and of a large *sinilodon*.

[2] But not, as in Ecuador, with *pottery* that indicates a very late date, but the mastodon and pottery association reported by Uhle from Ecuador is doubtful.

Man appeared. And it is proved that the American camel was still hunted by Man.

The early immigrants appear, indeed, to have encountered an exceptionally rich fauna.

Even in Eurasia, such seemingly archaic beasts as the woolly rhinoceros, the mammoth (which possibly survived in Siberia into very recent times although his accompanying flora—birch, willow and alder—suggest a rather warmer climate than at present obtains) and the great Irish 'elk' were still living only a few thousand years ago. And for the first two, at any rate, we have had preserved for us their flesh, skin and muscle as well as their bones.

It is probable that the rapid extinction of so many types of beast—an extinction which left North America with a relatively poor and undiversified fauna—was, in fact, due to the ecological balance having been violently upset by the sudden irruption of Man and his engines.[1]

But it is also clear that a process of natural elimination was going on among North American fauna before Man's appearance. Nearly all the early Pleistocene forms (e.g., *hipparion*—the three-toed horse that may be in the direct line of ancestry of modern horses—and the sabre-toothed tiger) died out early on, whereas the later Pleistocene forms have either survived to this day or did survive until Man appeared on the North American continent.

The Dating of the American Artefacts

The dating of the Folsom points—especially in the absence of any agreed comparative stratigraphy with that of the Old World—is largely a matter of guesswork. Yet, it is of the highest importance for the solution of the problem of America's peopling that we should be able to 'place' these artefacts.

It would seem, from the general appearance of the deposits where the Folsom instruments have been found and from the condition (and the position) of the beasts' remains recovered with the artefacts, that the Clovis (New Mexico) Folsom points, at any rate, cannot be much more than 10,000 years old at the most.

Yuma

The only other undoubted and ancient prehistoric type of artefact which until quite recent times has been discovered in North America is the so-called 'Yuma point' and it is difficult to place these Yuma points in relation with the Folsom. Are they con-

[1] The moas (flightless and indeed wingless birds formerly existing in a large number of varieties in New Zealand) were hunted to extinction by the Neolithic Maoris within a few hundred years of their arrival in the islands. The moa disappeared from the North Island by about A.D. 1,500 and in the South by some two hundred years later.

temporary or does one antedate the other? The Yuma type certainly appears simpler from the purely typological point of view, and on this evidence alone 'Yuma' might be older than Folsom, or it might represent a survival of an older technique into Folsom times.[1]

Sandia

The latest finds from the south-west of the United States do, however, suggest that we may, sooner or later, be able to establish a cultural sequence leading to Folsom Man's time.

A new type of artefact has been unearthed and has been named from its place of discovery 'Sandia.' The Sandia Cave lies on the eastern side of the Sandia Mountains and some eighteen miles from Albuquerque (New Mexico).

The strata in the cave lay thus :

A superimposed layer of dust and bat-droppings covering a three to six-inch stratum of stalactite (solidified calcium carbonate); below this came a layer, of varying thickness, and consisting of charcoal fragments, flint chips, bones, angular rock fragments and other cave debris intermingled with Folsom points, gravers, scrapers and other implements, all indicative of a 'Folsom' horizon or complex.

Then there was a layer of sterile yellow ochre above another cave-floor containing debris of bones, charcoal and implements of a shape and make different from the 'Folsom' type from above. The lower-layer instruments are presumably more ancient than the Folsom, from which they are distinguished by a side shoulder and much rougher chipping. These are the new 'Sandia' artefacts. Below the 'Sandia' level was another sterile stratum and then bed-rock.[2]

The most interesting of all the animal remains was a bleached fragment of camel's hair (in the Sandia level). Camels all originated in North America (although their remains also occur in the Lower Pleistocene of China) and they survived late enough to be hunted by men in North America.

[1] Some artefacts recovered from Manchuria might pass as Yuma points and some stone instruments from the Lake Baikal region also suggest (see p. 125) a connection with American types, but no fluted point (i.e., of Folsom appearance) has yet been found outside North America, although there are some apparently fluted bone points known from Manchuria but these are only so fashioned that the natural hollow of the bones forms a fluted face on the interior of the weapon.

[2] The mammalian remains recovered at this site have been held to indicate that both Sandia and Folsom artefacts are of 'Late Pleistocene' date—that is to say perhaps 25,000 years old. The 'Late Pleistocene' dating has been proposed by some American archaeologists because all the larger mammals at Sandia are of extinct forms but, as we have seen, extinction of many Pleistocene forms may have occurred comparatively recently in North America. The stratum above the calcium carbonate layer is apparently Recent since the only animal remains found were those of sloth and those only in the lower part of the layer.

Wide Area in which Yuma and Folsom Points are Found

In 1938, Dr. F. F. H. Roberts of the Smithsonian Institution led a fifth season's excavations at the camp station on the Lindenmeier site. Large numbers of mammalian bones (whose owners had apparently furnished food for 'Folsom Man') were recovered. New types of knives and scrapers were unearthed—but all of the characteristic Folsom workmanship. Bones engraved with geometrical designs were also discovered (not for the first time), but none of them seems to show any attempt at pictorial writing or even at the imitation of animal forms. They may be 'magic' ornamentations comparable with the designs from Upper Palaeolithic and Mesolithic objects in Europe. A mammoth tusk was also found. Although mammoth remains had been recovered together with Folsom artefacts in New Mexico, this was the first mammoth relic to be unearthed at the Lindenmeier site.

Other reconnaissances were undertaken by Roberts. The first was near the town of Abundance in the north-western hilly country of Wyoming. Here were recovered numerous long and slender, yet heavy, Yuma points. They had obviously served as projectiles or spearheads. These objects showed some points of affinity with the Folsom artefacts but the Abundance site yielded no evidence of Folsom industry.

A second site was explored much farther north and at Mortlach in Saskatchewan, Canada. This locality in the denuded Canadian 'dust-bowl' gave up a few Folsom points but the majority of the artefacts was of Yuma type. No stratigraphical sequence could be established because the condition of the soil is such that all heavy artefacts tend to sink to the limit of the surface-earth. A few scattered points have been, from time to time, reported from the Great Plains' Canadian extension, but it would seem improbable that there was ever, since Man appeared in the Americas, any concentration of nomad hunters so far north and in such an unclement climate.

To sum up : There is evidence that the Sandia artefacts are anterior to the Folsom. There is also evidence that the former are, for the Americas, fairly ancient. What evidence there is seems also to be accumulating to a point where we can say that Yuma artefacts are (perhaps considerably) more recent than Folsom.

It may be noted that no material evidence has yet been recovered from Siberia that inclines us to see in it a prototype of either Sandia or Folsom.

Furthermore, there is nothing to tell us whether the Yuma and Folsom artefacts found in Canada and Wyoming were scattered by Man on his entry into the Americas or whether they were discarded by hunters as they retreated before an oncoming ice-sheet.

One thing is, however, quite clear. All these American weapons are of New Stone Age workmanship and so they cannot be very ancient in the terms of the time-scale we have to consider when we are dealing with Pleistocene Man in Eurasia.

Antiquity of Man in America

The considerable antiquity of Man in the Americas is, however, in danger of becoming a popular legend, at least on the other side of the Atlantic. For instance, a recent book refers to 'Minnesota Man' as having been 'fossilized in the silt of an ancient lake-bed near Pelican Rapids in Western Minnesota to be dug up 20,000 years later. . . .'[1]

'*Minnesota Man*'

Now, the remains of 'Minnesota Man' are not fossilized and they were unearthed below the middle of a highway. The late Aleš Hrdlička had no difficulty in demonstrating that the bones were modern and not more than a few hundred years old and, moreover, that the remains are indistinguishable from those of living Sioux Indians.

'*Brown Valley Man*'

But the modern Minnesotans have another 'antique' fellow-countryman—the 'Brown Valley Man.' Pelican Lake, near to which were unearthed the remains of 'Minnesota Man,' is in the north-west of the State and some thirty-five miles from the Canadian border. Brown Valley is a township on the State border between Minnesota and South Dakota and situated between two long, narrow lakes. One—Lake Traverse—stretches away to the north-east and the other—Big Stone Lake—points some considerable distance to the south-west. The Brown Valley specimen is often referred to casually as '12,000 years old'; as a matter of fact, it is just as modern in type as that from Pelican Lake and just as unlikely to be of any great age. Hrdlička—who took delight in demolishing the claims to antiquity put forward for American 'fossil men'—proffered a piece of sage advice to some American anthropologists. It was to go to France and to Europe and there to see for themselves just what the bones and remains of fossil men do look like.[2]

Up to now no human remains have been found in the Americas anywhere for which the stratigraphic or archaeological evidence

[1] The reference is to a popular—and excellent—book by Mr. Harlan Hatcher, *The Great Lakes* (1944). Professor G. A. Jenks, of Minneapolis, would have it that 'Minnesota Man' lived during the last Glacial Epoch and that he was a *homo sapiens* 'of primitive type' showing 'mongoloid traits.' *Vide* Jenks, *Minnesota Man*, 1931.

[2] *Vide* Hrdlička's contribution to MacCurdy's symposium, *Early Man in America*, entitled 'What have the Bones to Say?'

would establish claims to great antiquity. Man in the Americas appears to be definitely post-Pleistocene and fossil men have not been found for the excellent reason that there are none to find. The raking of the earth's surface over large areas of the North American continent and the search for human fossils has been so keenly pursued that it is more than probable something would have turned up by this time if there were anything to discover.

The so-called 'Pleistocene Men' of America—Trenton, Penon, Lansing, Rancho la Brea, Calaveras, Florida, Minnesota, Brown Valley and the rest—are all 'fakes' as far as their Pleistocene dating is concerned.

Explanation of Errors in Dating

But it may be noted that the skulls of so recent a period as only five thousand years ago often exhibit peculiar features differentiating them from the crania of modern times. The conformation of the teeth, especially, tends to be different. This state of things is perhaps not surprising if we consider the conditions of relative isolation in which, it would seem, the sparse populations of the New World lived right up to Columbian times.

Quite recent Amerindian skulls often display features more 'primitive' than those found, generally, in so-called 'white' specimens. And, moreover, some Amerindian skulls of admittedly modern date are almost replicas of some European Magdalenian or even late Aurignacian crania. Very occasionally there come to light Amerindian skulls suggestive of those of the 'generalized' Neanderthaloids or, perhaps, it would be better to say that such Amerindian crania would be suggestive of Neanderthaloids had they been found in conditions indicating geological age.

Again, after a lapse of time—that may be comparatively short, only a few score or hundreds of years—most traces of earth-disturbance disappear where burials have taken place and there may even occur some measure of secondary stratification over the remains. Mineralization, again, *by itself*, is no sure indication of age, since different soils induce mineralization at different rates.

'Folsom Man'

Yet, from time to time, sensational finds are announced in the American Press. One example will suffice. In 1935 a Mr. Figgins unearthed some human remains that were hopefully baptized 'Homo Novus Mundus' (*sic*). The bones came from an *alluvial* deposit (and thus were undoubtedly water-borne into mud) and were discovered thirteen and a-half feet below the surface. But the find was made on the banks of the Cimarron River and only eight miles from the famous Folsom site in New Mexico. Here was a

discovery indeed! What else but 'Folsom Man'? The bones were most carefully examined by anthropologists of the standing of Messrs. Hooton, Shapiro, Woodbury and Hrdlička. They all agreed that the remains were quite indistinguishable from those of any Ute or other contemporary Indian of the United States south-west.

South America

As a matter of fact, and as far as the Americas are concerned, the most 'primitive-looking' skull has been recovered from the southern and not from the northern continent, and as there is every reason to think that South America must have been peopled some time after North America, we can see that 'primitive' appearance is no criterion of age.

Lagôa Santa Type

In the Lagôa Santa region of Brazil and half-way up the hundred and forty foot-high cliff-face of the Rio das Velhas valley, is a cavern known as the Confins or Mortuario cave. The grotto is large—some sixty-five feet deep and tapering from a width of twenty-five feet at the entrance to five feet broad at the rock-face opposite the opening on to the precipice.

Here in February, 1935, were found the skull and the almost complete skeleton of a man. The bones had been scratched by the claws and teeth of small rodents. There is nothing about the skull that is not 'modern' and *sapiens* or indeed that could not be paralleled in living men although the cranium does show a generally archaic look. It is 'hypsicephalic' (i.e., long-headed and with raised vault) but it has not the marked pyramidal shape generally noted for the 'Lagôa Santa' populations though there is a marked degree of submaxillary prognathism.

The 'Lagôa Santa' skulls are crania of an exceptionally long, narrow and high-vaulted variety comparable to those of some existing Brazilian Indians. Diquet recognized the type in Lower California and in 1917–19 v. Valin found 'Lagôa Santa' skulls near Point Barrow in Alaska. And now, as has been said, there are 'Lagôa Santa all over the place.' The type seems to be a peculiarly American variant but its diffusion tends to dispel the old stories that it was an importation from across the Pacific.[1]

Conclusion

In sum, all the ancient human remains from the Americas are ancient specimens of the current Amerindian type and therefore

[1] The Lagôa Santa type has been noted by Rivet, Soren, Hansen and others. There is also the 'Punin' skull from Ecuador of undefined affiliations. Keith and some others would find in it 'australoid' features.

representatives of an early branch of the Mongoloids from Asia. So, the farther back we put the first immigrations into America the farther back we set the differentiation of the Mongoloid type in Asia.[1]

Date for Man's Arrival

And, weighing such evidence as we have, it can at least be said that it is *possible* that man's sojourn in the Americas has not exceeded 4,500 to 5,000 years.[2]

This is a very long time in human history, though it is a short time if we are reckoning in geological epochs. As has been well said, 'there is a vast amount of data indicating an indigenous development of American cultures from very simple Neolithic or Upper Palaeolithic level.'

Of course, man may have appeared in the Americas many centuries before 3,000 B.C. and as all the evidence we have points to the peopling as having been effected by successive waves of immigration, if there were prolonged periods during which few or no men trickled through, then, perhaps, 5,000 years may seem rather too short a time.

Sequence of American Culture-Stages

As far as can be seen, the sequence of American culture-stages of the Middle West is as follows:

(*a*) Nomad hunters, probably relatively few in number, with a primitive culture, but adept at fashioning spearheads, who lived on the great plains and especially in the north-east of what is now New Mexico and in the upper valley of the Cimarron. Some would set these peoples' ('Folsom' and 'Sandia' men?) existence at as far back as 12,000 years ago.

(*b*) The men of the 'fumaroles'—extinct geysers whose flanks were occupied by hunters.[3] These 'men of the fumaroles' were more recent than the 'Folsom men' but the former preceded the men of the Oklahoma grottoes. The 'fumaroles' date has been set at 2,000 B.C. 'or earlier.'

[1] It may be noted that the Amerindians (generally speaking) south of the Rio Grande show more Mongoloid appearance than those north, but the North-West coast Indians of British Columbia are Mongoloid enough and it may be that the heavier type of Plains and Woods Indian may be either (*a*) a specific American evolution or (*b*) a late immigration of less marked Mongoloid type.

[2] Although this is by no means the same thing as saying that a much longer time-lapse is impossible. Some of the American anthropologists' claims seem, however, unfounded. MacClintock, for instance, wants 15,000 to 20,000 years as the age of artefacts found in California and Harold S. Gladin also demands what appears to be an unwarranted antiquity for remains from Gila Pueblo, Globe, Arizona.

[3] *Vide* E. B. Renaud's observations in 1929 on the discoveries in the Cimarron valley 165 miles east of Raton, in the north-east of New Mexico.

(*c*) The men of the 'grotto culture' who have been identified at, e.g., Kenton, Oklahoma, and at the volcanic grottoes of New Mexico.

(*d*) The 'Basketmakers,' whose first appearance some would set as early as 1,500 B.C., made their appearance probably about the beginning of the Christian era.

Amerindian Physical Types

It may be remarked that *all* the Amerindian types both existing and extinct can be paralleled in the Old World—the older the Amerindian skull, generally speaking, the more marked are its 'Mongoloid' features—and,

The Amerindians can be classed into four main groups:[1]

(*a*) The older long-heads—many tribes from South America to Mexico and California.

(*b*) The older short-heads—e.g., the 'Toltec' type extending over the Antilles, Yucatan, parts of Central America and Ecuador and down the coasts of Peru to just north of Arica.

(*c*) The later long-heads, e.g., the Algonkin tribes and most of the Iroquois.

(*d*) The later short-heads, e.g., Athapascan tribes which reach in a narrow stream from Alaska to northernmost Mexico.

Amerindian Agriculture

Two of the stock arguments against a short time-scale for Man in the Americas are based on (*a*) the cultivated food-plants and (*b*) the diversity of Amerindian languages.

As Merrill has well put it:

'The biological evidence is absolutely and wholly in favour of an independent development of agriculture in America, and if such a complex art as this, involving the domestication of plants and animals, selection, breeding, the use of fertilizers, the construction of terraces, and the application of irrigation, could be thus independently developed in America, there is every reason to believe that the higher cultures based on this agriculture could also be developed.'

As far back as 1883 A. L. P. de Candolle wrote in his *Origines des Plantes Cultivées:*

'*Dans l'histoire des végétaux cultivés je n'ai aperçu aucun indice de communications entre les peuples de l'ancien et du nouveau monde avant la découverte de l'Amérique par Colomb.*'

[1]It may be noted here, without going into further details, that the Mongoloids of the Old World and the Chinese especially are remarkably short-headed.

Those who would seek in the independent development of Amerindian agriculture confirmation for their theories of Man's great antiquity in the Americas often affirm that the American food-plants are farther removed from wild types than are the cultivated plants of Eurasia and Africa. But there is reason to think that extensive specialization may take place in a comparatively short time under the ceremonial and quasi-magical controls we know were exercised by the Amerindians in historical and, therefore also presumably, in pre-historical times.

Agriculture is, indeed, the mother of culture and agriculture seems nearly everywhere to have been surrounded with ritual and 'quasi-magic.' If the earliest American immigrants brought with them from their Asiatic home the *idea* of ceremonial control of agriculture we can see, in a general way, how Amerindian agriculture—and cultures—may have arisen.

Thus:

'The accepted ring-calendar of the south-west'—of the United States—'allows a thousand years for the evolution of eight or more segregated types of maize among the Tewa. In a much shorter period the Navajo forced maize to germinate when planted as much as thirty-two inches below the surface in dry stream-beds with little sub-flow.'

Again, the domestication of the llama seems to have been an independent invention and there must have been throughout the world several centres of domestication although the *idea* of domestication—like the *idea* of ceremonial control of agriculture or in another order of things the *idea* of writing—may have proceeded from one centre. On the other hand, pottery seems to have been invented independently in the New World and pottery is one of the basic requirements of any advanced culture.[1]

'Origins' of Language

'No language would be adopted and developed by an alien race without being subjected to profound alterations in its phonetics, in its morphology and in its meanings.'—A. H. HOOTON.

Language, in its origins, must be closely related to physiological and anatomical variations of human organisms especially as to the conformation of the larynx, the throat, the teeth, the tongue, the palate and the internal nose. There is, therefore, nothing

[1] Professor E. B. Renaud in the fifth paper (1946) of the archaeological series being issued by the Department of Anthropology of Denver University deals with finds in the mountainous region to the south-west of Denver. The most common type of site is an encampment with, frequently, an adjacent workshop for the making of stone tools. Implements and *pottery* occur in different horizons and both Folsom and Yuma points have been recognized.

essentially unscientific in maintaining that phonetical tendencies are, in some measure, related to differences of physical type.

About few subjects, perhaps, has greater nonsense been written than about the origin, dispersal and diversities of languages. Far from languages having been derived by differentiation from a few widely-spread tongues, the primitive condition was, more probably, one of extreme diversity with a separate language for each small group or tribe. Early Man was dispersed. He and his kind were not numerous. Communication was difficult. Thus five hundred 'languages' have been noted for the 200,000 odd Australian aborigines. In the 150,000 square miles of the State of California Professor Kroeber finds thirty-one 'families' of languages and at least one hundred and thirty-five dialects of them.

Language-Differentiation

Yet, on the other hand, the observed rates of language-differentiation are most various. In all its wide spread Eskimo is essentially one language. All its speakers are mutually intelligible. The Nahua language of Mexico has remained almost unaltered from pre-Columbian times. The Bantu-speakers in Africa use tongues that are so closely allied that all Bantus are to a certain extent able to make themselves understood to all others. We may conclude from these three examples that (*a*) the Eskimo and Bantu speakers have spread in comparatively recent times and that (*b*) the Nahua language having been that of a conquering and imperial people was so fixed and stylized that it was given a special resistant character.

On the other hand, the Siouan or Salishan group of idioms in North America has changed very rapidly and the development of the different Indo-European languages (late comers to the Mediterranean area) seems to have proceeded comparatively quickly.[1]

'Primitive Speech'

Language has so profoundly changed since comparatively recent times that all attempts to reconstruct 'primitive' speech must be dismissed as the wildest fantasy. The connection between sound and sense is random for all languages known to us. Whether the sound-sense relation was also random in the far distant past of language's origins we have no means of determining. Even if, however, the sound-sense relation had not been random, during the immensely long period which elapsed between the beginnings of

[1] The early (and 'reconstructed') Indo-European tongue—generally referred by philologists to about the third millennium B.C.—was apparently already the speech of a people of considerable culture and with long ages of masking sound-change between it and its origins.

speech and the oldest forms of speech known to us, language would have been reduced to randomness. In fact, the ever moving linguistic change is, like all other changes known to us, heterogenizing in its tendency. That is to say, in a metaphor from physics, there is an increase in 'entropy' or disorder and randomness.

Prejudice, deductive reasoning, legend, tradition and education all induce us to favour a theory of progressive diversity from single origins. Yet it is clear that the growth of culture and literacy has exercised a unifying influence. Only a century ago one might wander through almost any European country and find communities speaking jargons unintelligible to their neighbours only a few miles away.

There is no reason to suppose that language had anything but a polycentric origin. Language is a culture-trait and it may well be that there is something in Sir Richard Paget's contention that an essential stage in the development of language was what he has characterized as 'general pantomine accompanied by mouth gabble.'

Diversity of Amerindian Languages

The late Dr. Sapir maintained that the Amerindian languages can be resolved (though only with difficulty) into twelve main families showing no relation whatsoever to each other. These twelve main groups comprise nearly two hundred sub-families which are themselves divided into nearly one thousand dialects. Later investigators, however (e.g., Kroeber), are inclined to hold that this great diversity is more apparent than real.

America, it may be assumed until proof to the contrary is forthcoming, was occupied by successive waves of peoples formerly occupying a deep sector of the Old World with its apex at East Cape and that these populations were always—in the relevant periods—differentiated as regards speech.

Those, indeed, who would postulate an early condition of few widely spread languages are not far from the position of those who would derive all human speech from one primeval tongue. This point of view has so many adjuncts in legend and prejudice that it may for those reasons alone be held suspect.

The late Frank Boas considered that language-capture has caused apparent over-simplification in many regions of the Old as well as the New World. The general trend of the evidence—such as it is—is indeed not that languages formerly of wide distribution have become differentiated locally but that several far-flung stocks have absorbed others by acculturation, leaving the old diversified conditions of men's languages in sluggish and backward and isolated areas (e.g., the Americas).

We may conclude on a word of the American anthropologist, Professor Hooton of Harvard:

'language consolidates and perpetuates not only custom, ritual and belief, but also the material arts and industries.'

American Cultural Affinities

The native Amerindian semi-civilizations—Kechua, Aztec, Toltec and even Mayan—are admittedly comparatively recent things, and in dealing with them we are at a disadvantage in not possessing any clue as to possible culture-clashes which may have produced them.

Just as in certain circumstances it would seem that mutations are produced more frequently than in others, so cultural changes (which may be so intimately dependent upon physical mutations although the relationship between the two phenomena is obscure) may occur fairly rapidly.

In fact, in invention and cultural change, as in mutation and physical change, men's evolution is discontinuous. One is almost tempted to say that we can make the quantum theory apply to men's works as well as to their bodies.

When we say that, e.g., 'Shang civilization shows evident traces of a long evolution behind it,' what do we mean by 'long'? The ancestors of three-quarters of the inhabitants of these islands were totally illiterate in 1800. Their descendants read and write with the same facility as those whose male ancestors, at least, have been literate for, let us say, four hundred years. How old are most of the gadgets we take for granted to-day? The mechanical revolution was as profound as the agricultural.

It may well be that the striking new ways of life [that leave remains] have arisen very quickly. What was the lapse of time between the Greek Neolithic and the Age of Pericles? Perhaps a fifteen hundred years—so short a period that we cannot measure it in Pleistocene times.

Certain cultural elements and art-motifs common to the American North-West and to north-eastern Asia point, perhaps, to relatively late contact between Amerindians and peoples of (or in touch with) proto-Chinese culture.

But because, for instance, the Chinese 'phoenix' is a creature partly bird and partly snake, and the Mayan Quetzalcoatl is a feathered serpent, we should be rash indeed to assume even the remotest connection between the two. There are no more cunning pitfalls than those lying in wait for us when we would correlate widely separated art-forms. Such correlation is of a piece with the all too frequent 'interpretations' of modern forms of place-names

without reference to the earliest forms preserved in documents. As a matter of fact the modern Chinese 'phoenix' is not a form that can be traced back before Ming times (i.e., the fourteenth century of our era).

The classical high cultures of the Maya (and still more of the Toltec and Aztec) are obviously not very ancient. The oldest—the Maya—seems to date back to a little before the beginning of our era.

The Evidence from Tres Zapotes

But there are things in southern North America that are more evocatory for our story of Man than the jungle-ruins of Mexico and Guatemala. In the following notes condensed from the reports on excavations at Cerro de las Mesas and Tres Zapotes in the Mexican province of Vera Cruz[1] there are objects and evidences of rituals and customs comparable with those of the European Palaeolithic as well as the Neolothic. And the comparisons suggested will come from far and wide. There is something to remind us of the death-pits of Ur and something of Neolithic and of Shang China.

At Tres Zapotes a trench was dug in the 'Large Mound.' In the upper section were found five pottery vessels each one of which contained the neatly sawn-off facial portion of a human skull. A lower mound had been prepared to contain the remains of one individual. 'The body had been tightly flexed and laid on its side in the exact centre of the mound. It had been decapitated and the skull placed face down in a large orange-coloured marine shell filled with red paint . . . the exceptionally wide jaw had been detached and placed alongside the skull . . . the incisors and the canine teeth were carefully and neatly inlaid with circular pieces of pyrite . . . around the skull and the shell was a string of fifty-six massive shell beads an inch in diameter and still lustrous. In each was utilized the natural colour of the shell from which it was made, so that half of each bead was coloured a rich orange hue and the other half a creamy white. In the shell under the face and buried in the red paint were a large pearl, two jade beads and a cleverly carved monkey head of jade. The skull was flanked by a pair of beautifully polished and matched jade tubes each about six inches long. Resting against the back of the skull were two large disk-shaped ornaments with scalloped edges, perforated . . . also

[1] Tres Zapotes site was investigated in 1938–39 and 1939–40 and that of Cerro de las Mesas in 1940–41.

Reports on the National Geographic Society-Smithsonian Institution Archaeological Expeditions to Mexico (1939–40, 1940–41) led by Matthew W. Stirling, who by 1945 was investigating the burial mounds in the Chiapas Mountains in the east of the Tehuantepec Isthmus. Cerro de las Mesas is near the Rio Blanco and not far from the town of Cocuite.

behind the skull was a turtle shell covered with an elaborately engraved sign representing a plumed serpent. . . .'

Again at Cerro de las Mesas were unearthed (between three cement floors) fifty-two pottery vessels of hard red ware almost identical in size and appearance. Each contained the skull of a young adult with two or three vertebrae attached . . . the skulls had been artificially flattened and in many cases the front teeth were ornamentally filed with notches giving them a serrated appearance. In another trench at Cerro de las Mesas[1] were discovered many red painted stones and then no less than seven hundred and eighty-two specimens of jade ornaments.[2]

[1] The Cerro de las Mesas site may be dated from A.D. 1,000 to 1,500. The lower and middle Tres Zapotes site from A.D. 0 to 500.

[2] With this latter cache was no burial. The mention of jade leads us at once to think of China ancient and modern, but beyond stating that the ancient Chinese and the ancient Mexicans (the objects recovered at Tres Zapotes and Cerro de las Mesas are obviously not very ancient) prized jade, we cannot go far. As the Chinese, the Mexicans did not distinguish between different types of stones resembling jade and called them all *chalchihuitl*. At Cerro de las Mesas the colours of the stone varied from porcelain white through shades of green to deep blue. In Mexico (as in China) the use of emerald-green jade seems to have been a late custom and in Mexico, at least, this jade was not used, it would seem, until a few centuries before the Spanish conquest.

CHAPTER FIVE

HITHER ASIA

Uzbekistan

IT seems probable that we are at the beginning of an epoch of outstanding archaeological and anthropological discoveries in many regions of the immense Soviet territory. The opening-up of Asiatic Russia and the plans for the development of hitherto almost inaccessible regions encourage us to hope for great things. For we still know far too little about the succession of human cultures on this sixth of the habitable globe.

The Soviet Republic of Uzbekistan is made up of what were formerly known as parts of Turkestan, of Khorezm and of the western plains of Bukhara. In the south-west of the republic rises the Hissar Range or *Koh-i-Tau* that is the southern arm of the Tian-Shan's westward prolongation after its bifurcation (at 67° 45′ East), and this continuation of the Altai divides the Zarafshan—the ancient 'Scatterer of Gold'—from the Oxus' tributaries, the Surkhan, the Kafirnihan and the Vakhsh.

The length of the Hissar Range is some two hundred miles and it is traversed by passes only a thousand to three thousand feet lower than the surrounding summits peaking up to twelve or even fourteen thousand feet. The southern foothills are covered with loess (the fine loam-like soil laid down in times of dry cold at the end or the beginning of a glacial period) and these regions form to-day the fertile valleys of the Hissar and the Vakhsh. The prevailing climate is dry and there are no Alpine meadows nor thick forests, though when the fierce rain-storms strike, or at the melting of the snows, the torrents and streams rush with churning waters.

From the Hissar Range northwards to Tashkent is about two hundred miles—if you fly—and southward to the Afghan frontier on the Amurdarya it is about the same distance by air. Samarkand lies to the west of these mountains.[1]

Along the foot of the range runs the sun-scorched, half-desert valley of the Sharabad Darya or Turgan Darya. The river bites its way through gorges gloomy and narrow whose walls are pitted with

[1] On the north-west boundary of the Hissars, between Khuzar and Derbent, is the defile known as *Buzgholkhana* or the Goat-House (see *infra*) though formerly the canyon bore, in different tongues, a name meaning the 'Iron Gate.' The chasm is narrow and gloomy and in places but five feet wide. Through this gorge passed the Chinese traveller Hsuan-Tsang in the seventh century and he found that the defile could be closed by an iron gate hung with jangling bells, but when Clavijo, the Spanish explorer, came this way eight hundred years later the gate had disappeared.

caves and grottoes. And the caverns are haunted with local legend. Thus, the *katta-kurgan* hides an immense white snake, the *katta-jhilan* is stocked with treasure, while the *amir-timur* is, like so many other sites in central Asia, linked in story with great Tamerlane himself.

Teshiktash

Teshiktash or the 'Pitted Rock' in the Zautolosh Darya gorges is nearly five thousand feet above the bed of the Sharabad Darya stream and at a point where the defile is sheer. In places the overhanging walls could, from side to side, be spanned by a bridge of sixty feet in width and the torrent's course is choked with limestone blocks detached from the cliffs. Teshiktash is on the left bank and it opens north-east with a wide bow-like arch about twenty-two feet high. The cave itself is approximately sixty-four feet deep and sixty feet broad. The floor rises gradually to a rocky barrier shutting off a small inner space whereto the sunlight never penetrates. The cavern is fairly dry but the walls are incrusted with calcareous deposits, while the water seeping slowly through the roof gradually disintegrates the stone.

No shepherds nor herds visit so narrow a gorge where is neither pasture nor pool and hunters rarely pass this way, so that in the Teshiktash there is no such layer of ash as covers so many of the gorge's other caves, nor is there the humus formed as the sheep's dung decays. The floor covering is a layer of light-coloured yellow clays mingled with stones fallen from the vault while, in some spots, pot-holes have been sunk by the drips from the roof.

Such is the curious place visited in 1938 by Dr. V. D. Zaporozhskaya and Professor A. P. Okladnikov of the Marr Institute in Leningrad.[1]

Teshiktash Industry

During his first visit Okladnikov picked up fragments of animal bones and pieces of limestone—all showing traces of having been worked by men. Under the upper layer of clay was one containing artefacts. Then came a sterile stratum and after that another stratum with stone instruments. Thus, each cultural layer was separated from another by a sterile stratum. The thickness of both sorts of layers varied from place to place for the surfaces had been rather disintegrated by water-action, but the total depth does not exceed four to five feet.

[1] The expedition working in the Hissar region both in 1938 and 1939 was organized under the joint auspices of the Soviet Institute for the Study of Material Culture and the Uzbekistan Committee for the Preservation and Study of Cultural Monuments.

The history of the cavern must have been something like this. The floor had originally been a huge saucer-shaped depression that had gradually filled up by the deposits of the same torrent that had formed the cave. Periods of consolidation—when crushed stones and boulders had been laid down—alternated with ages when the floor of the grotto was covered with slime and stagnant water. By the time the uppermost cultural layer had been formed the cave was cracking and the roof of the overhanging entrance collapsed, releasing the water within and washing away some of the layers.

The Teshiktash men made their artefacts of the local flinty limestone—for flint is very rare in the district—of quartzite, of grey-black volcanic stone and even of ordinary quartz. The instruments are all of advanced (i.e., presumably late) Mousterian type (almost identical with those of western Europe), with an abundance of chips and nuclei of classical Mousterian discoid forms. Although there are four black cultural layers separated by sterile strata of clays, the artefacts—which include scrapers, flakes and what looks like a rough 'Audi' knife (see p. 225)—show from bottom to top little change in type. The cave, however, must have been inhabited for long ages since the succession of strata indicates a succession of wet and dry climates.

There were also some worked, or rather utilized, animal bones (such as have, e.g., been recovered from the Chokurcha site in the Crimea) and there are also some so-called 'bone retouchers' characteristic of Mousterian sites. Some of the widest and heaviest flakes approximate to Levalloisian pattern and, in many cases, the nuclei themselves (from which the flakes have been detached) have been used as tools. Two large and massive scrapers—chipped on both faces to a sharp edge—were recovered together with coarse choppers (in the second cultural layer) and a graceful sharp point of green jasper was found in the fourth stratum.

The closest parallels for all this material, says Okladnikoff, are to be found in the Caucasus and the Crimea (e.g., in the lower layer of the Akhtyr Cave examined by S. N. Zamyatnin and the lower stratum of Shaitan-Koba in the Crimea excavated by the late G. A. Bonch-Osmolovsky), in Kurdistan (the Hazar-Merd grotto) and in the Tabūn Cave in Palestine.

The Fauna

The fauna found at Teshiktash is mostly of 'modern' (i.e., *late* Pleistocene) forms—wild boar, Siberian mountain-goat, wild horse (now unknown in Uzbekistan), leopard, marmot, etc. But the mountain-goat (*capra sibirica*) remains account for no less than 97·2 per cent of the whole. It would seem, then, that goat formed the staple food of the Teshiktash men. Nowadays the *kiik* (mountain-

goat) does not descend to much below 7,500 feet, at which height the vegetation ceases. He likes the lonely rocks, the snow and the gorges of swift-flowing streams and he has, moreover, in recent times, been largely superseded in the Hissar region by the immigrant screwhorn goat from the south. But the snow-leopards (one only of their bones was found in the cave) still stalk the goats and prey upon them.

Even to-day the hunting of these wild goats is a difficult and dangerous sport but the ancient Hissar hunter managed to kill off splendid old males. Perhaps he laid in wait for them above their drinking-holes and then rolled down rocks upon them or he may have driven them over precipices or into the deep snow hated of the *kiik*.

The Human Bones

But the mountain-goat did not only furnish food to Teshiktash Man. In the cave lay a human skeleton embedded in a sterile layer (i.e., one containing no other bones or any artefacts) so that the remains had evidently been intentionally buried, but they were found only twenty-eight centimetres (or a little over *eleven inches*) beneath the surface of the cave's floor.

The human bones recovered consisted of a skull with the lower jaw and all the teeth, the cervical vertebrae, fragments of the ribs, shoulder-blades, humeri and tibiae.[1]

Between the ribs lay the coprolite of some small beast—perhaps a rat—and some of the human bones seem to bear the marks of animals' teeth.

The skull (as usual with those recovered from the earth) had been crushed and flattened but the yellowish bones are well preserved and the remounting of them was comparatively easy.

The Teshiktash grave, however, seems to have been mangled by beasts and the remains in part destroyed. They are those of a child about seven or eight years of age.

Teshiktash Child a Neanderthaloid

It is admittedly difficult to ascertain, from the skeletal remains of a child, what is the exact type to which he belongs, and to determine, as Weidenreich says, the 'phylogenetic stages' in a child's skull. Okladnikoff, and after him Hrdlička, would have it that the

[1] In 1943 Okladnikoff published a preliminary and popular account of his finds in the American review *Asia* and in the same year the Uzbekistan section of the U.S.S.R. Academy of Sciences devoted an entire fascicle to the Uzbekistan finds. Vera Gromova dealt with the fauna and Okladnikoff and Debetz with the human remains and the artefacts. Hrdlička (after his visit to Russia in order to examine the Teshiktash bones) published an article in *Science* (1939) where he adopted Okladnikoff's conclusions as to the 'Neanderthaloid' type of the skeletal remains.

Teshiktash bones are those of a 'Neanderthaloid' though what sort of a Neanderthaloid (whether 'generalized' or 'classical') neither of them declared. Now, our material of Neanderthaloid children is very sparse. We may count out the Le Moustier youth for his bones are those of an individual about sixteen years of age. So, we have left just the cranium of the Gibraltar child and the La Quina specimen.[1] We may take it that the former is of 'generalized' Neanderthaloid type and the latter of 'classical.'

Judging from N. S. Sinelnikov's photographs, it is certain that the Teshiktash skull does convey a general Neanderthaloid appearance. The *foramen magnum* appears oval, but it is evidently broken. The eyebrow ridges are undoubtedly more strongly marked than in those of any 'modern' child of comparable age. The cranial capacity is large (about 1,490 c.c. that would give approximately 1,600 c.c. for an adult of the same type) and, as we know, the Neanderthaloids had voluminous brains. There is no canine fossa (but this is not an absolute indication of 'primitiveness') and although there is little trace of a chin, Weidenreich holds that there are traces of chin formation (e.g., a 'mental trigonum' is present) and the lower jaw does not 'slope backwards' as in many Neanderthaloids —but not in all, as we saw from the Monte Circeo mandible. Weidenreich also draws attention to the fact that the teeth-eruption sequence is, in the Teshiktash skull, of 'modern' type (i.e., the second molar was, apparently, going to erupt after the premolars, whereas in the Neanderthaloids, as far as we know, the second molars erupt before the premolars).[2]

Again, in pursuance of his theory that the *Sinanthropus* general type was ancestral to the Mongoloids, Weidenreich recognizes 'Mongoloid' features in the Teshiktash skull—notably in the 'shovel-shaped' form of its upper lateral incisors. Analogous incisors, moreover, are observable in some of the Mount Carmel material.

Weidenreich, however, is guarded in his appreciation of the Uzbekistan specimen, stating:

'I do not consider as proved that the Uzbekistan skeleton is of a Neanderthalian of the Mousterian European type.'

That is to say that he does not regard the Teshiktash boy as being of the 'classical' Neanderthaloids.

[1] There are also the Pech de l'Aze Neanderthaloid child's remains.

[2] Weidenreich would have it that the Teshiktash boy represents a type comparable to specimens from Mount Carmel (Skhūl), Předmost, Obercassel and the Upper Cave of Choukoutien, and therefore, perhaps, a type due to (as he would argue) evolution from a Neanderthaloid type into a 'modern' Man type. But Weidenreich is committed to the theory that 'modern' Man passed through a Neanderthaloid stage (which may possibly be one day provable) and also that, e.g., the Mount Carmel material proves such evolution, whereas the consensus of opinion is rather that this material indicates Neanderthaloid-*sapiens* inter-breeding.

But, it is not rash to say that he was no 'modern' Man.[1]

Neanderthaloid Remains from Farthest East Yet Recorded

And we may take it as probable that from the Teshiktash evidence we have proof of the existence of a Neanderthaloid type in an area far more easterly than any before recorded. Now, the dating of this Hissar material is obviously difficult. If we remember that the total depth of the strata in the cave nowhere exceeds five feet (little for a prehistoric site), that the human bones were found at less than a foot from the surface and that the fauna associated with the human bones is not incompatible with a late Pleistocene date, we may be inclined to think that the Teshiktash material tends to show that a form of Neanderthaloid Man lingered on in remote places of Central Asia when his fellows had disappeared as a type in Europe.

The Protecting Horns

The Teshiktash boy's body had evidently been surrounded at burial by five pairs of fine old male *kiik*'s horns. One pair, lying almost vertical, with the base upwards and the points down, had kept its original position. Another pair lay flat. The two horns of the third set were found slightly slanted with the points stuck in the ground. On the other side (and on a flat piece of limestone in the southern part of the grotto) was recovered a fragment of horn while, a little lower down, was unearthed another piece. The next horn, unbroken, lay flat on its side with the point directed towards and only twenty centimetres away from the skull. Nearby was a fragment of a second horn of the same pair. A line traced through all the horns gave a circle enclosing the skeleton.

Here, then, was an obviously ritual burial and as one pair of horns shows traces of having been scorched and as there are the ashes of a fire nearby, we have, perhaps, evidence for an interment in the home and under the hearth.

But the whole site, as far as we can judge, does not 'look' very ancient. And it is interesting to note that to this day goats' horns must be placed upon saints' graves in many parts of Moslem central Asia. Moreover traces of a pre-Moslem goat and sun cult are observable in some parts of the Tajikistan Mountains to this day.

[1] Weidenreich would compare the Teshiktash skull with the fragment found at Podkumok (Caucasus) and with other Russian and European specimens (e.g., the Chwalynsk cranium-fragment) that, despite their apparently late date, are held by some to be of general Neanderthaloid type. But Weidenreich would rather compare them with the Skhūl material from Mount Carmel. But the Podkumok, etc., material seems undoubtedly to be *sapiens*.

'Reconstruction'

'The outstanding exhibits in Leningrad were the reconstructions from the skeletal material of faces and busts ranging from the Neanderthaler of Teshik-Tash to historical personages like Timur and Yaroslav Mudryy, executed by the sculptor anthropologist, Gerasimov, and exhibited with a convincing explanation of his methods.[1]

'Reconstructing' from skeletal material seems irresistible to some anthropologists, but 'reconstruction' is full of pitfalls. When we are dealing with the remains of 'modern' type men we may seem to be on fairly safe ground and some very pretty models are often presented to us. In the Iraq Museum, for instance, a young sculptor of Baghdad exposes some of his work. There is a 'reconstruction' of a limestone mask discovered at Warka in 1939 and the result is what looks like a legitimate deduction from the original material. In fact, we possess a number of busts, portrait statues and masks enabling us to visualize the physical appearance of the ancient Sumerians. The same Iraqi sculptor has also produced a bust on which has been remounted the beautiful jewelled headdress of one of the female attendants whose remains were discovered in one of the Ur 'death-pits.' And here, again, in addition to the skeletal material of the slaughtered handmaid we can check off the 'reconstruction' by the general type exhibited in Sumerian sculpture. Probably reconstructions made in such circumstances as these are not far from presenting us with a fairly truthful image. And we are dealing with 'modern' type men whose appearance is familiar from a thousand documents.

Still, there is a margin of error and how wide the margin is was once brought home very forcibly to me. During a stay in Vienna in 1936 Professor Weninger (then director of the University's anthropological laboratory) one day showed me a plaster-cast of a man's head—a cast made during the subject's lifetime—and asked me what I thought about it. The bust was that of a type not uncommon in Germanic lands—an apparently short head, thick and fleshy neck, prominent hooked nose, double chin, pendant cheeks and back of head and neck running into one.

Then Weninger put into my hands a skull. A nice, clean, white modern skull of the usual mixed type but of what, if pressed, one would class generally as 'Atlanto-Mediterranean.' Did the skull belong to the bust? 'Oh! no.' But it did. A Vienna lawyer interested in anthropology had had during his lifetime a cast made of his bust and had then willed that after his death his skull should be presented to the laboratory.

Šuk has appositely remarked:[2]

[1] Professor V. G. Childe in *Nature*, August 25th, 1945.

[2] Vide, *Fallacies of Anthropological Identification and Reconstruction*, by Professor Šuk (Pub. de la Faculté des Sciences de l'Université Masaryk, Brno, 207, 1935).

'that part of anthropology that is too much occupied with osteology and osteometry loses any solid ground when it does not take into consideration the whole body, for man is not merely a skeleton.'

No, man is not merely a skeleton, but, unfortunately, for us, Neanderthaloid Man is merely a skeleton and likely always to so remain except in the (most unlikely) event of a frozen Neanderthaloid turning up in the tundra of northern Siberia!

Neanderthaloid Appearance

The fact is that we know little concerning the soft parts of the Neanderthaloids, of the shapes of their noses (the bony nose tells us relatively little of the exact profile and outline of the soft nose), of their lips, of their genitalia, of their breasts, of their buttocks and so forth. Neanderthaloid Man left no glyptic art (and what 'reconstructor' would have dared to adorn the 'modern' type women of the Moravian mammoth-hunters (see p. 233) or of other Upper Palaeolithic peoples with the steatopygous buttocks and the generous rolls of fat that appear in the statuettes of, e.g., Willendorf?) We do not know the colour of Neanderthaloid Man's skin or hair, whether he was of great bodily hair or of little or none, we do not know what was the shape or size of his eyelids and eyes. We may *suppose* that perhaps his skin was dark brown (as may have been that of the earlier 'modern' men with 'pink' and 'black' and 'yellow' as later variations) and he does seem to have been more muscular than most types of modern men, but the 'reconstructions' which are still sometimes presented in museums and figured in 'popular' text-books are not only valueless but misleading.[1]

The Crimea

Zamiatin's surveys in Abkhasia (western Caucasus), begun in 1934, brought to light not only artefacts of Clactonian and Mousterian types but also the first undoubtedly Acheulian hand-axes to be recovered in the Caucasus region. Some apparently Neanderthaloid human bones have been recovered from caves in the Caucasus and the bones were associated with a 'pre-Mousterian' industry recalling that found with the Ehringsdorf skull (see p. 219) but detailed reports on the finds are not yet available to us outside Russia.

In the Crimea, however, the caves have yielded evidence of a most interesting sort.

[1] External red lips are a characteristic peculiarly human and it is shared by no other mammal. Negroes possess this characteristic more developed than any other men. It could be argued, therefore, that negroes are more 'evolved' than other varieties of men. But if the negro type had been long extinct and we had to try and 'reconstruct' it from skeletal material only, who would guess that we should 'reconstruct' full, red lips?

The Crimea is, for the most part, a peninsula of steppes and rolling downs but the country is traversed from Sebastopol to Feodosia by the Yaila-Dağh range lying back some five to eight miles from the Black Sea's shores. The Yaila-Dagh is really double; the more northerly ridge, though lower, is a replica of the coastal heights. The former ends in steep crags to the south and merges on the north into the downs. The southern face of this range is pitted with many hundreds of caverns and caves. Some of them have yielded artefacts in abundance. Mousterian of 'Acheulian tradition' at Kiik-Koba, Chokurcha and the Grotto of the Wolf. 'Typical' Mousterian at Shaitan-Koba. Azilian at Shan-Koba. Tardenoisian at Fatma-Koba. This region was therefore for long inhabited by men both Neanderthaloid and 'modern.'

Kiik-Koba

In 1924 (a few months before the recovery of the Galilee skull, see p. 160) the Kiik-Koba cavern, near Simferopol, yielded the remains of two human skeletons. But, although the cavern bears the name of the *kiik* whose horns surrounded the little boy of Teshiktash, goats' remains were not so abundant here as at the Uzbekistan site.

In this grotto or rock-shelter and in its deepest and oldest stratum were found the bones of men. A man had here been buried and near him also an infant (aged about one year)—the heads of the two were directed towards each other. Later, it would seem that the part of the cavern where the skeletons lay was excavated and most of the human bones thrown out, for only the right leg-bone and part of both hands of the man (or it would be more prudent to say adult) and some of the child's bones from the waist downwards, remained. Of the missing parts, only a worn lower incisor tooth was recovered and it would not be out of place in the Mauer jaw (see p. 206). Judging from the length of the adult's tibia, his stature in life must have been about 1·59 metres (5 ft. 2·6 in.).

The artefacts found with the human remains have been called 'Acheulian' together with some Mousterian of Acheulian tradition. The stratum in which they were recovered has been held to be comparable with the Mount Carmel layer that held the remains of the Tabūn woman (see p. 162). But it must be admitted that the dating of the Kiik-Koba deposit is impossible and guesses at its date can only be the merest approximations.

'Acheulian Man'?

Bonch-Osmolovski considered that the man of Kiik-Koba must be referred to an age preceding that marked by the first appearance

of the Neanderthaloids in western Europe and that the Kiik-Koba Man represents the population that made and used artefacts of later Acheulian type, and the same Russian scientist held, moreover, that the only other 'Acheulian' Man was represented by the Tabūn skeleton from Mount Carmel.

Both at Kiik-Koba and at Tabūn the bottom stratum gave up artefacts of the remote Palaeolithic known as 'Tayacian' and into this 'Tayacian' stratum the Kiik-Koba bodies had been apparently *buried*; that is to say, that when they were interred the 'Tayacian' layer was already ancient. If this interpretation of the evidence is the right one, the Kiik-Koba grave would be the most ancient human grave yet known.

Although Bonch-Osmolovski did brilliant work in reconstructing the hand of the Kiik-Koba adult, we have such sparse material to go upon that we can form little idea as to the general human type to which he or she belonged. The hand, however, would seem to be Neanderthaloid and, until further discoveries which may invalidate the hypothesis, we may conclude that the Kiik-Koba adult was not essentially different in type from, say, the Tabūn female of Mount Carmel.

We have not got much farther towards identifying 'Acheulian Man.'[1]

Bonch-Osmolovski placed Kiik-Koba Man as far back as the end of the Mindel-Riss Interglacial but there are really no valid grounds for this guess. And the evidence of the artefacts is confusing and obscure.[2]

Palestine

In the years from 1897 to 1900 Zumoffen recovered from various sites in Palestine a 'Chellean-Acheulian' industry, and from the Adlun grotto, south of Beirut in Syria, mid-Palaeolithic artefacts.

Later, Neuville unearthed from the base of the deposit at the Um-Qatafa cave in Palestine a flake industry comparable with the French 'Tayacian' from La Micoque in the Vézère Valley. Above this Um-Qatafa flake industry he recovered a fine Acheulian industry with bones of *rhinoceros mercki* (a 'warm' form).

[1] The hand-bones preserved are two of the carpus, two of the ten metacarpi and fourteen phalanges of the fingers—some of the right hand and some of the left. The right hand was slightly the larger. Hence it may be inferred that the adult was right-handed. The predominant use of the right hand is an essentially human habit. Apes use either hand indifferently.

[2] In the lowest layer at Kiik-Koba there is an 'amorphous' ('Tayacian'?) industry, that seems to have Clactonian affinities; this 'amorphous' layer is followed by an 'Upper Acheulian' (with the remains of Man) and this 'Upper Acheulian' exhibits Levalloisian affinities and, indeed, may be rather Levalloisian-Mousterian (i.e., it consists largely of bifaces mostly on flakes and of hand-axes worked on one side only). Then immediately above the 'Acheulian' layer comes a surface stratum with recent 'historical' material, so that dating is impossible.

Mousterian artefacts have turned up in several regions of Palestine. Some have been found in Phoenician caves, some at Mount Carmel, others on the maritime plain and on the summits of the Judaean Mountains, still others in the Valley of Samaria and on the uplands of Moab.[1]

Galilee Man

The first discovery of ancient human remains was made near the Lake of Galilee. The 'Sea of Galilee' is set deep in hills rising on the east to about two thousand feet, while, on the west, they fall to the desolate oleander-fringed shores in precipices of black rocks which tower up some seventeen hundred feet above the waters. These cliffs are pitted with caves and in one of them known as the *mugharet-ez-zuttiyah* was unearthed in 1925 the now famous 'Galilee Skull,' in association with an Acheulo-Mousterian industry.

The cranium, on which has been published a full monograph, is in an unsatisfactory state, since only the fore portion has been preserved. There is some evidence that the individual had been exposed to considerable suffering before death since not only is the skull crushed from a blow but there are also traces of cicatrization of the bones. In this connection it may be mentioned that we are inclined to see in such (by no means always certain) evidences of injury the results of blows with stone instruments. And, although it is undoubted that some early men did use stone war-hatchets (in comparatively late times when composite tools and weapons came into fashion) we may take it that the stone tools of, for instance, Neanderthaloid men, were tools and nothing more. The earliest weapons of Man were, no doubt, wooden ones. Knob-kerries and wooden clubs can be made to deal terrific knock-out blows as fatal as any produced by a stone 'axe-head.'

Several portions of other skeletons were unearthed near this Galilean site.

The skull is undoubtedly Neanderthaloid, though, as far as can be judged from the fragmentary state of the evidence, it is not of the 'classical' group. The Galilee skull indeed would seem to fall into the class of the Saccopastore and Gibraltar crania or that of what S. Sergi calls the 'Mediterranean' Neanderthaloids.

Keith holds that the skull is that of a female.[2] The late Aleš Hrdlička, on the other hand, considered that it was that of a male aged about thirty to thirty-five years.

Although the Mousterian industry of Palestine is somewhat different from that of Europe, there is some reason to think that

[1] No bones of Neanderthaloid Man have been discovered in the contiguous lands to Palestine, but a Mousterian industry is traceable in Kurdistan (Hazar Merd grotto).

[2] It is marked by what, for a Neanderthaloid, is a high cranium.

the two cultures were, roughly, contemporary. When, however, there was ice in northern Europe, Palestine was, apparently, wet and fertile, for the zones of climate closed in with the ponderous flow of the glaciers. The period of Palestine's Mousterian industry was one of abundant rains and plentiful game. As Europe became warmer and dryer, Palestine parched to the arid land it has since remained.

Mount Carmel

The Mount Carmel of Elijah is a limestone ridge scored with ravines and pitted with caves. Innumerable legends haunt the Mount and some of them are perhaps legacies from the first wave of the Semitic-speaking peoples' push northwards.

The ridge of Carmel runs for about twenty miles in a south-easterly direction, then it dips and rises again as the mountains of Samaria. Only a generation ago most of the Mount was clothed with a sparse coppice of oaks, myrtles and pines. But, in recent years, the hill has been almost denuded. Carmel is a landmark from afar and as you fly westward from Damascus, avoiding Hermon, the Mount stands up from the plain until you are far out over the waters, when the lone bluff seems to rise right from the girdle of white surf curling round the curved shore.

Into the western flanks of Carmel is carved a valley bearing the name of *wadi-el-mugharet* or 'Valley of the Caves', and this ravine is five and a-half miles from the Franks' Athlit Castle. The gully debouches on to the plain some two miles from the Mediterranean's strand. The grottoes wherein were discovered the human remains are nearly all in the southern side of the canyon.

The three most important caves are named *es-Sukhūl* or *Skhūl*, *el-Wad* and *et-Tabūn*. The human bones from these sites were numerous and their importance is of the first order for our story of Man.

The bottom strata yielded artefacts of the remote Palaeolithic type known as 'Tayacian' (that is, a phase of Acheulian). Above this layer, sixteen feet of another stratum gave up thousands of 'late' Acheulian ('Micoquian') hand-axes and, at the top of the layer, one 'Chatelperronian' tool. The total depth of the deposits in the Tabūn cave was eighty feet.

In the 'Acheulian' stratum were also found a much-worn lower molar tooth of a man and the greater part of a femur-shaft. And from the length of this femur-shaft we may deduce that its possessor stood about 5 ft. 5 in. in height. It is not possible to identify these bones as having belonged to a Neanderthaloid and, up to now, no remains undoubtedly Neanderthaloid have been discovered associated with a typical hand-axe industry of (Abbevillian-) Acheulian

inspiration or general type. It is possible that these fragmentary relics belonged to an ancestor of the 'Mousterian' Carmelites (see below) but we are not helped by the Mount Carmel evidence to visualize 'Acheulian' Man (i.e., the makers and users of Acheulian artefacts).[1]

Above the Acheulian layer was recovered a group of skeletons in association with a flint industry of mixed Mousterian and non-Mousterian tradition (this stratum was forty feet thick) and in the stratum where were found Mousterian (or rather Mousterian-Levalloisian) types of artefacts, were also discovered skeletons of men displaying mixed Neanderthaloid and 'modern' characteristics.

And the culture-sequences as revealed, for instance, by the strata in No. 111 Cave, overlap. Thus, the record carries us from Acheulian through Levalloisian-Mousterian to Aurignacian and culminates in 'Natufian,' a new, peculiarly Palestinian, culture (see below).

The Carmel Aurignacian suggests affinities with that of the Crimean caves whereas the Levalloisian resembles that of Egypt. Again, the Carmel Chatelperronian is followed by a 'true' Aurignacian which develops into a peculiarly Palestinian industry dubbed 'Athlitian.'

The fossil Carmelites' remains were found only in the deeper Levalloisian-Mousterian layer and they fall into two main classes: (*a*) the Tabūn, and (*b*) the Skhūl.

Tabūn

The Tabūn type is represented by one skeleton only—together with (possibly) the two lower mandibles (also found in the Tabūn Cave), of which one is practically chinless and the other shows a fairly well-developed chin-prominence. This latter specimen is almost as large, heavy and robust as the Mauer jaw (see p. 206) but differs from it in having a chin-eminence. The teeth of these jaws show no 'taurodontism' (see p. 34) so, for the present, it would be as well to refer them, perhaps, to the Skhūl group rather than to that of Tabūn.

The Tabūn skeleton is that of an apparently young but adult female. It was found lying on the side, the legs slightly flexed. The subject when alive was possibly about 1,656 mm. (or about 5 ft. 5 in.) in height. The skull was recovered smashed but has been reconstructed. It is not very low-vaulted but has a heavy frontal ridge. The cranial capacity would be about 1,271 c.c. The rounded

[1] Professor D. Garrod sums up the evidence of the Carmel artefacts thus: 'At the earliest stage for which we have detailed criteria, the Upper Acheulian in Palestine and Syria can be compared on general lines with Western Europe. In the Middle Palaeolithic African influence predominates and apparently spread eastwards. With the Upper Palaeolithic, Asiatic influence gains the upper hand and persists into the Mesolithic.'

occiput, is not that of a typical Neanderthaloid of the 'classical' type. The lower jaw is chinless and the facial parts projecting, forming a sort of 'muzzle.' The pelvis (especially in the flat and elongated pubic bone) displays anthropoid features not before noted in any human type (our material for this part of the skeleton is, of course, very scanty) either Neanderthaloid or 'modern.' But the foot of the Tabūn woman is fully 'modern' and it is clear from other *indicia* that the gait and bearing of the Tabūn woman were as in 'modern' Man.

Skhūl

The Skhūl material is much more abundant. In 1931 McCown recovered the skeleton of a child aged about three years. These remains seemed to be of general Neanderthaloid type. In 1932 eight other skeletons were found. Altogether the bones of ten individuals were unearthed. The most immediately striking thing about this series is its variability. Had the specimens not been found in the same stratum they would hardly have been classed in the same group.

Four adult males show, however, a definite and related type. These are the remains of tall men, varying in height from 1,723 mm. to 1,780 mm. (the latter figure is the equivalent of but little less than six feet), and their lower limb-bones approximate in measurement to those of Cro-Magnon men. The skulls are large and well-domed but display prominent frontal ridges in varying degrees of development. The large palates protrude but the lower jaws bear clearly defined chins and are of 'modern' conformation right to the symphysis. There are no 'taurodont' teeth and these men were certainly not Neanderthaloids although their bones exhibit archaic traits present in no 'modern' people either extant or extinct.

The Carmel skeletons can be arranged in three groups:

(*a*) The Tabūn female.

(*b*) A slightly larger type that might well be intermediate between the Neanderthaloids and 'modern' Man, and may be compared with, say, the Krapina material (see p. 216).

(*c*) The remainder of the specimens which exhibit for the most part the characteristics of Upper Palaeolithic (i.e., 'modern') men of Europe[1].

[1] The ten Skhūl individuals are mostly males. They are I, male aged 4–4½ years; II, female, 30–40; III, male, adult (only part of left leg-bones recovered); IV, male, 40–50; V, male, 30–40; VI, male, 30–35; VII, female, 35–40; VIII, male, 8–10; IX, male, over 50; X, male, 5–5½. In no case are all the remains complete for any individual. All the skulls are crushed. Only Skhūl IV and V are in a fairly good state. The other remains are fragmentary. Skhūl V is of a peculiar type with a high-vaulted skull recalling the Galilee cranium and with nearly vertical forehead, a well-developed chin but heavy supraorbital ridges.

Both the Tabūn and Skhūl material were found associated, with approximately the

Neanderthaloid and Modern Men Living Side by Side?

As far as the Mount Carmel evidence goes, it would seem that two pluvial phases in Palestine corresponded to the fluctuations of the Würmian glaciation in north-western Europe. Also from this Mount Carmel evidence it would appear that two types of men were living *side by side* in Palestine at some period before the change-over occurred in Pleistocene climate and fauna (i.e., that of the disappearance of the damp-loving animals and the appearance of a dry and modern-type of climate). Therefore, it is probable that the Mount Carmel men lived during the last or Riss-Würm Interglacial. And that is, in the history of Man, quite a long time ago.

So the Skhūl people may have flourished before the La Chapelle-aux-Saints, the La Ferrassie, the Spy and the Neanderthal Neanderthaloids of western Europe.

If this be the case, then we have evidence in Palestine for the existence of 'modern' men (although 'modern' men showing Neanderthaloid traits in a greater or lesser degree) at a time when the Neanderthaloids seem to have alone inhabited Western Europe.

Now, if we take into consideration all the evidence from Mount Carmel (and it is abundant and partly at least difficult of interpretation) we shall come to the conclusion that the ancient Carmelites were the product of hybridization between Neanderthaloids and 'modern' men. Of course, it may be maintained that we have here from Palestine proof of the *evolution* of Neanderthaloid men into 'modern' Man. But as Professor Hooton of Harvard has well phrased it:

> 'That Neanderthal man should have changed thus rapidly into modern man within the space of two caves and a city block would seem to me a more incredible miracle than the changing of water into wine at Cana in Galilee a few miles away, which happened perhaps fifty thousand years later.'

It is true that all the Mount Carmel material has not even yet been sifted out and exhaustively examined, but up to now it is allowable to say that despite the intriguingly 'mixed' aspect of these human relics, the *essential* differences between 'modern' Man and the Neanderthaloids have not been obliterated.

We have, however, a range of material that presents, at one end of the scale, the Tabūn woman falling not very far short of the 'classical' Neanderthaloid type of the West (although in some ways recalling rather the eastern European Neanderthaloids) while, at the other end of the scale, we have some Skhūl males' skeletons

same Levalloisian-Mousterian industry and with the same fauna (abundance of wild ox). At Tabūn there is a lower layer 'B' (but not that of the human remains) showing a quite different fauna with abundance of gazelle bones.

which approximate to the general Cro-Magnon type (while displaying, nevertheless, some Neanderthaloid features such as great eyebrow-ridges and projecting jaws) and thus leading one to think that the Cro-Magnon Upper Palaeolithic type may well have been the result of a Neanderthaloid-Sapiens hybridization. To quote the capital work of Keith and McCown:

'The great physical variation of these ancient Palestinians is striking. The difference between the sexes is marked, not only between the Tabūn woman and the Skhūl men, but also between the Skhūl females and the males. More striking even than this is the unexpected variability in the Skhūl population. It is no exaggeration to say that if these individuals had been found in different sites at different times and each one described by a different anthropologist or anatomist, we should have a corresponding number of fossil races.'

Jebel Kafzeh

MM. Neuville and Skételis found in the grottoes of Jebel Kafzeh, near Nazareth, the remains of five individuals whose date seems to be about the same as that of the Skhūl people of Mount Carmel. One of these skeletons displayed more noticeable Neanderthaloid features than the others, but all the skulls had a marked superciliary torus or ridge, though the moderately dolichocephalic crania (of an average cranial capacity of about 1,560 c.c.) had fairly high vaults, no occipital torus and little of the 'snouty' appearance characteristic of some Neanderthaloid remains. The orbits are set low as in the Cro-Magnon men and, generally speaking, these Jebel Kafzeh men may be compared with those of Skhūl.

Wadi-Shukbah

In its southern parts, Palestine forms a plateau, and Jerusalem, though but thirty miles from the Mediterranean shores, is nearly two thousand six hundred feet above sea-level. On the western slopes of these Judaean hills and about midway between Jerusalem and Joppa, at about a thousand feet up and near the railway station of Lydda, lie the *wadi-en-natuf* and the *wadi-shukbah* caves. The first inhabitants of the Shukbah caverns were Neanderthaloids with a characteristic Mousterian industry. The human remains from the upper levels are those of 'modern' men with a Capsian industry.[1]

Natuf

From *wadi-en-natuf* have been recovered the remains of men of a similar type to those from Shukbah and, indeed, men of approxi-

[1] The 'Capsian' is named from 'Capsa' (the modern Gafsa) in southern Tunisia, where he industry was first recognized.

mately the same sort are known from Mount Carmel (*mugharet-el-wad*) and from *erq-el-ahmar* (south of Bethlehem)—altogether more than a hundred and thirty specimens of the 'Natufians,' as they have been dubbed, are known. These 'Natufians' do not, however, form a quite homogeneous group. The bones from *erq-el-ahmar* may well be, as Coon puts it, 'descendants of Upper Palaeolithic Neanderthaloid-*sapiens* hybrids.' But the mass of the Natufians is in physical type comparable with the pre-dynastic Egyptians; that is to say, they are of Mediterranean stock. Possibly one may be able to distinguish between the earlier and later Natufians—perhaps the later ones came from some reservoir of Mediterraneans that may have existed perhaps farther east.[1]

At Mugharet-el-Wad (Mount Carmel) the Natufian skeletons were flexed and adorned with shells, pendants of birds' bone and pierced teeth. The Shukbah Natufians were interred in a squatting posture and often under hearths.

The Natufian culture (with four sub-divisions) has been classed as Mesolithic. But there is no Neolithic in Palestine, and above the 'Natufian' comes an 'Eneolithic' (i.e., polished artefacts with some bronze utensils); thus, the 'Natufian' may really be an early Neolithic and, indeed, possibly one of the ancestral phases of this, later, very widespread culture. The Natufians had a microlithic (small blade) industry but they were already agriculturalists.

It is interesting to note that the Natufians (apparently only the women) suffered, during youth, the removal of one or both of the central upper incisors. This avulsion of front teeth is recorded from many regions from Neolithic times and the practice was most probably a ritual one and (since for the Natufians at least) the teeth were removed in early youth (the affected portion of the upper jaw is atrophied and the lower teeth have grown up above the level of their neighbours) this tooth-removal was probably a feature of what the French call a *rite de passage* or ritual performed at puberty.

Suggested Chronology of Palestine Culture-phases

The Lower and Mid-Palaeolithic cultures of Palestine are:

(*a*) Tayacian (that is, a phase of Acheulian).

(*b*) Mousterian with a Levalloisian 'facies' or tradition together with some scrapers and burins resembling those of the European Upper Palaeolithic.

The Tayacian seems to have flourished during a subtropical

[1] Though we have no indications as to where the Mediterranean type became differentiated, except that it was somewhere out of Europe and, therefore, in Asia or Africa.

climate, while the Mousterian prevailed during a wet but mild climatic phase.

The Upper Palaeolithic cultures are:

(*c*) Aurignacian—relatively dry climate.

The Meso-Neolithic is:

(*d*) Natufian with a modern climate.

After the Natufian come culture-phases called by Neuville 'Tahunian' and 'Ghassalian' with more abundant metal objects, These phases take us into proto-history with 'classical' Mediterraneans as the dominant population.

Keith would arrange the post-Mousterian cultures of Palestine thus:

(*a*) Pre-Capsian.

(*b*) Middle and Upper Aurignacian.

(*c*) Capsian of Shukbah.

(*d*) Upper Capsian or Mesolithic of Athlit (Mt. Carmel).

Moreover, he would class these cultures as contemporary with the late Ice Age cultures of Western Europe. If this dating be accepted, then the Athlit 'Upper Capsian' must have come to an end about ten thousand years ago and this culture would have been followed by one of settled communities, tillers, stock-raisers, spinners, potters, etc., whose culture developed into the early dynastic civilizations of Mesopotamia and of Egypt.

Syria

Syria is strewn with artefacts of 'European' types from Abbevillian to Neolithic and although Asia Minor and the Iranian plateau were covered with ice during the glaciations of the Pleistocene, Professor Kansu has found Abbevillian near Ankara and Miss Garrod Mousterian in a southern Kurdistan grotto.

Ras Shamra

Palestine and the Syrian coast play such a prime part in man's prehistoric and historic story that a few words on the most significant site of Ras Shamra will suggest inter-relations and connections between the culture of the early men of the Palestinian hills and the civilizations which have so profoundly influenced our own.[1]

[1] Ras Shamra is a mound lying some way inland from a well-protected bay (called in Arabic *minet el-beida* or the 'White Inlet' that is the ancient Limen Leuke) on the Syrian coast just north of Latakia. Ras Shamra with its harbour-suburb formed, in ancient times, a little city-state which, as early as the second millennium B.C., was called Ugarit.

The site was occupied by Lower Palaeolithic men, for Abbevillian and Acheulian hand-axes have been found at the lowest level, so that we may suppose that Ras Shamra was inhabited by 'Acheulian' men at the same time as (presumably) the same sort of men were living in the Mount Carmel caves, and that these people preceded the Tabūn and Skhūl peoples.

Ras Shamra was inhabited right through Neolithic times and during the later New Stone Age (i.e., about the fifth millennium B.C.) it is clear that the people of Ugarit and those of the upper Euphrates valley and those of Palestine were in contact with each other, since the artefacts from all three places exhibit certain common features. Thus, the Neolithic pottery excavated at Jericho shows a clear resemblance to that from Ras Shamra. In these times the lower Euphrates valley and that of the Tigris were still swamps and as yet unsettled by the Sumerians' ancestors.[1]

The Near East has been an important centre of religious diffusion from at least the second millennium B.C. and the Ras Shamra tablets present us with names (e.g., the God YW, El, etc.) strangely familiar.[2]

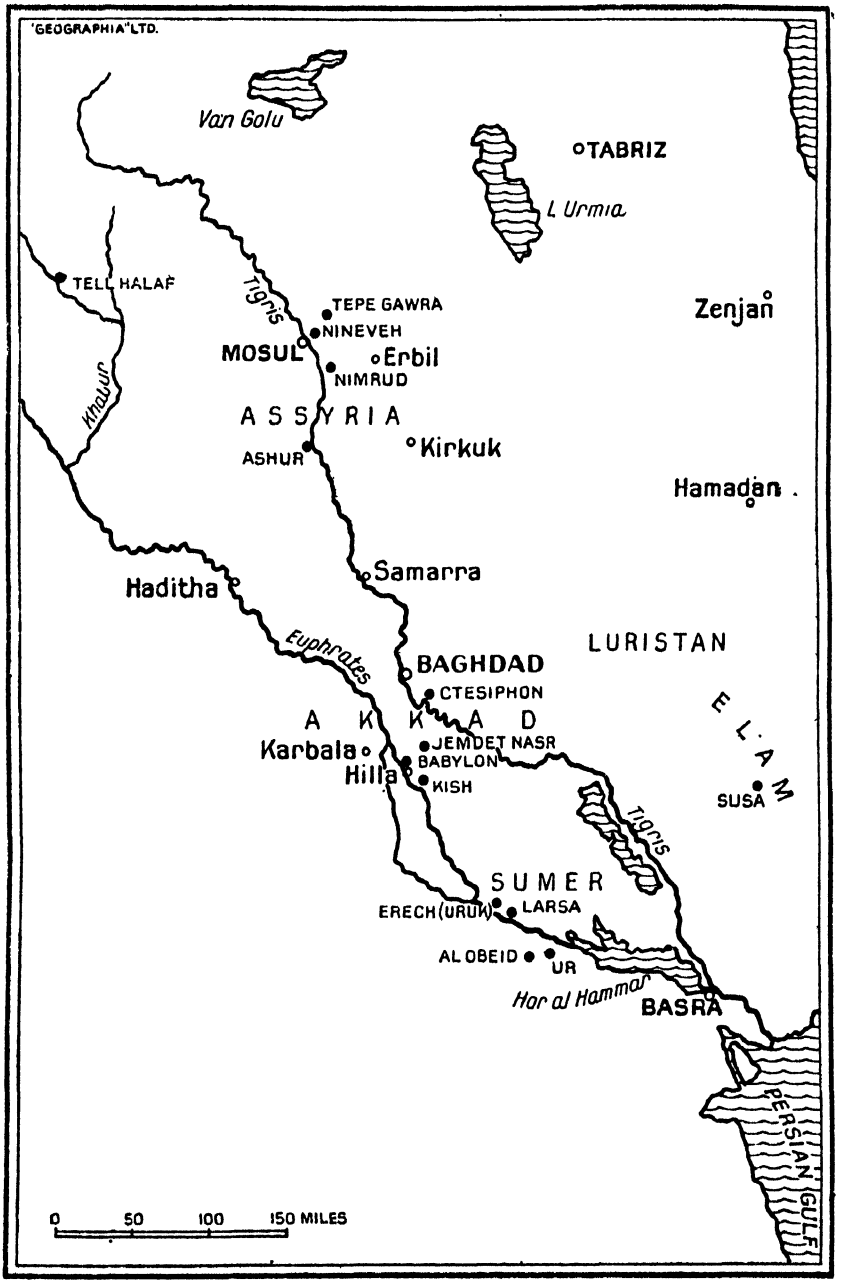
At Ras Shamra the dead (as at Ur and with some of the Neanderthaloids) were buried in their dwellings. It is only a few generations ago since with us all members of the more favoured classes were buried in churches.

In chalcolithic times (that is, those with flint, obsidian, bone and copper tools and painted pottery) datable to the end of the fourth and the beginning of the fifth millennia B.C. the Ras Shamra pottery is identical to the smallest details with that from numerous proto-historic sites in Syria and Palestine as well as with that from the upper Euphrates valley, and in this Syro-Mesopotamian technique men showed the same artistry and mastery as did the Cretans some thousand years later. In late chalcolithic times the Ras Shamra ware is comparable with the painted pottery of the Iranian plateau and the Indus valley. And the Mesopotamian influence then traceable at Ras Shamra is even stronger in the fourth millennium. The culture contacts in proto-historic times stretched surprisingly far afield.[3]

[1] If the invention of writing may fairly certainly be attributed to the Sumerians they seem to have had little to do with the alphabetical-writing revolution. The men of Ras Shamra wrote in cuneiform signs borrowed from Sumeria, but they used these signs in a new and startling way, for they formed out of them an alphabet which does not, however, enable us to explain how the classical Phoenician alphabet (ancestor of our own), well developed by 1,400 B.C., came into being. It may be that the idea of writing being 'in the air' among the commercial communities of the Near East, the Phoenicians did borrow Egyptian signs to fabricate their own alphabet.

[2] The words attributed to the dying Harvest-God (Mot) ring through the centuries —'I am the lamb offered in expiatory sacrifice.'

[3] Ugarit or Ras Shamra was later conquered by the Akkadian kings and on the overthrow of their empire, tribes from the Caucasus (and even from the Balkans) poured down



Prehistoric sites in Mesopotamia.

Mesopotamia

The beginning of the dynastic period at Ur may be set at about 3000 B.C. In northern Mesopotamia, however (southern Mesopotamia with Sumeria was still uninhabitable marshland long after the north was settled), the sequence of cultures must now be established as follows:

(*a*) Hassuna.
(*b*) Samarra.
(*c*) Tell Halaf—scarcely later than the fifth millennium B.C.[1]
(*d*) Jemdet-Nasr.[2]
(*e*) Uruk.
(*f*) Al-'Ubaid.[3]

Of which (*a*), whose lowest levels reveal a coarse pottery and finely chipped flint and obsidian artefacts, must be dated well back into the sixth millennium B.C.

Sumerians

We may set the date for the appearance of Sumerians in southern Mesopotamia probably at some time in the fourth millennium. The Sumerians were, physically, a rather new sort of people with jutting noses (if we may judge from the nasal bones) and in skull and face-bones they resembled not a little some types of living Englishmen.[4]

Whence came these men? They may, of course, have come immediately from northern Mesopotamia (a complete skeleton was found at the 'Hassuna' level in northern Iraq in 1945 but it has not been described). But it is probable that the Sumerians' ancestors

on to the rich plains. Pepi I of Egypt pushed his armies to stay the tide and bore his standards as far as the 'Cape of the Gazelle'—that may be Mount Carmel—about 2,500 B.C. By about five hundred years later the ancestors of the Phoenicians and of the Jews had carried their Semitic speech up to the Anatolian foothills.

[1] Tell Halaf and Arpachiyah (near Nineveh) are about contemporary and therefore hardly later than the fifth millennium B.C. The site of Mersin in Cilicia seems to yield evidence of a still more remote antiquity. In Elam the first Susa culture may be as old as that of Samarra in Mesopotamia (that precedes Tell Halaf and may go back to early in the fifth millennium or even to late in the sixth). The settlers whose traces are thus revealed in the northern Mesopotamian sites seem to have arrived in the country bringing their culture-complex with them. But their tools of flint and obsidian have an archaic and even a Palaeolithic look. If these immigrants came from the highlands to the north-east, then it would seem that their ancestors must have taken the path that was to lead to civilization direct from some region where Palaeolithic culture still ruled.

[2] At the Jemdet-Nasr level appear the first ideographs with numeral-symbols used for making up accounts.

[3] Al-'Ubaid is distant some four miles from the mound of Ur.

[4] The Nordics' bones are, metrically, very like those of an over-grown Mediterranean type. Some pre-dynastic skulls from Egypt resemble English seventeenth century crania from the Plague pits.

descended from the uplands lying to the north-east. The plateau of Persia has not yet been scratched archaeologically and it must hold much.[1]

At any rate, certain features of Sumerian culture seem to bear obvious affinities with those of the north-eastern uplands, where, most probably, was at least one, if not the main, region of agricultural development.

[1] The Zarzi cave in the Cham-Tabin valley near Sulaimani (east of Kirkuk, Upper, Mesopotamia in Iraq) and in the slopes of the Zagros range has yielded a very rich Aurignacian industry of a sort comparable with that of Grimaldi (see p. 234). The 'Dark Cave of Hazar Merd, in the same region, has relinquished plenty of Mousterian hand-axes' but no physical remains of Neanderthaloids, but here is evidence that Neanderthaloid Man at one time lived in the southern slopes of the Iranian tableland.

CHAPTER SIX

AFRICA

Egypt

AT times during the Pleistocene the plains of Libya were great grasslands where grew, with emmer wheat, the wild barley (*hordeum spontaneum*) which may be a native of the Abyssinian highlands.

It must have been increasing desiccation that drove men into the Nile Valley—hitherto a shunned region of swamps and floods.

On the cliffs bordering the Nile can be traced the gravel terraces of the miles-wide Pleistocene river and these terraces are comparable with those of the western European streams. The same sorts of artefacts are found by the Nile as by the Somme and the Thames, and at levels apparently corresponding with those bordering these northern European rivers.

Near Thebes there is a full succession of culture-levels ranging from Abbevillian through Acheulian (Micoquian type) to a Levalloisian-Mousterian.[1] After receiving its Levalloisian culture (with some Aterian) Egypt seems to have become an area closed to foreign influences. During the Upper Palaeolithic, when elsewhere to the north of the Mediterranean Aurignacian was spreading, the Egyptian Levalloisian was developing into a peculiar and local flake and microlithic industry—the Sebilian.

Egyptian Upper Palaeolithic

Indeed, the beginnings of Upper Palaeolithic cultures in Egypt are difficult to trace. There is, it is true, a sort of 'Mid-Aurignacian' but the special Egyptian Levalloisian-Mousterian seems to merge directly into the Sebilian, of which three levels can be identified. At any rate, the merging of the Levalloisian into the Sebilian is confirmed from the *typological* standpoint.

There is some doubt about the chronology of the prehistoric sites in the Nile Valley but, from Mesolithic times, they may be provisionally arranged as follows:

Merimde—from the north-west of the Delta.
Lake Karun—from the Fayum.
Deir Tasa } the two last from sites on the Nile Banks some
El Badari } 245 miles south of Cairo.

[1] In other Egyptian areas, notably in the Delta and in the Oasis of Kharga analogous successions of cultures may be observed. At Kharga an Aterian culture (comparable with that of Barbary but not, as yet, found elsewhere in Egypt) comes *above* the industry its discoverer (Miss Caton-Thompson) calls 'pre-Sebilian.'

But the first Neolithic (the Tasian) seems to be quite a novel industry in Egypt and to owe little or nothing to the preceding Egyptian Mesolithic (Merimdian). So, although the Merimdian Mesolithic culture may have been indigenous, it is possible that the Neolithic Tasian may have owed something to outside influences.

Early Egyptians

Egypt, so rich in the remains of Man's handiwork, is a country of capital importance for the history of civilization, but it is a country distressingly poor in the relics of very early Man. It is, however, not improbable that we should look for the remains of the earliest Egyptians not in the Nile Valley itself but rather in what are now the deserts to the east and the west of the cultivated strip making up the Egypt of our days. It is now widely held that the agricultural way of life was first adopted not in the valleys themselves but on the higher lands between them. The valleys in early Neolithic times were, it may well be, too marshy and too wet to allow of plant-raising, so that men moved down from the higher ground as increasing drought swept the former hunting-grounds and grassy plains into stony wildernesses while taming the marshy swamps and confining the great streams to a narrower bed.

No Neanderthaloid's bones have been reported from Egypt's soil and the skeletal remains associated with the Sebilian 'pre-Neolithic' of Upper Egypt are of a definite, and fine, Mediterranean type. The origin and the affinities of these 'Sebilians' are doubtful. They may have been akin to the Natufians of Palestine (see p. 165) but they show no close resemblance to the peoples of the Mesolithic culture-period from Barbary, to the west. It may be, again, that these Sebilians came down the Nile's course through Nubia and from some East African area.[1]

The 'Merimdians' of the Delta seem to have had a culture which linked the Capsian Mesolithic of southern Tunisia (and south-eastern portion of the Province of Constantine) with the Egyptian Neolithic. And the 'Merimdians' are also Mediterraneans.[2]

The 'Tasians'—or people whose physical remains have been recovered from Deir Tasa—appear to have resembled more the later Natufians (see p. 165) of Palestine than did the Merimdians. Coon suggests that these Tasians may link the later Natufians of Palestine with the Afalou people of Algeria (see p. 184). And,

[1] In Palestine the settlements showing a culture-phase comparable with that of the Sebilians seem to be later in date than those of Egypt and the former cannot, apparently, be referred to the Natufians alone.

[2] It has been suggested that it may have been men of the general 'Merimdian' type who carried the methods of Neolithic agriculture through Barbary to Spain.

although the Tasians seem to have disappeared as a distinct stock, there are 'dynastic' Egyptians who show a Tasian type.

The Badarians (whose culture makes its appearance about 4,000 B.C.) were, perhaps, newcomers to the Nile Valley. In any case, their physical type is of a more delicate Mediterranean than is the Tasian.

Moreover, although there are some recognizable physical differences between the pre-dynastic and the dynastic Egyptians (and these differences may be due to admixture with other stocks) still, since Mesolithic times, the population of the Nile Valley has been predominantly 'Mediterranean.'

The Mediterraneans

Since men of the Mediterranean type were, as far as we can see, the inventors and the originators both of Neolithic culture and of the civilizations which grew out of it in the Near East, the history of the 'Mediterranean' stock is of uncommon interest.

To-day the Mediterranean racial zone reaches unbroken from the Iberian Peninsula, through Barbary to Egypt and across to India, in one direction, and from Egypt down both shores of the Red Sea to the Horn of Africa (i.e., Cape Guardafui).

The 'typical' Mediterranean of a generalized type is represented by most pre-dynastic Egyptian skeletons. A comparable extant type is found to-day in the Arabian peninsula.[1]

What little, however, we know of the early history of the Mediterranean type is mostly negative information. It is clear that the Mediterraneans are not natives of Europe. If we can class the earliest Sumerians in the Mediterranean group (though there is already observable in the skeletal material from Ur a tendency towards short-headedness indicating, probably, some admixture with other types) then we may guess that *one* (but not necessarily the only one) of the dispersal areas (and not necessarily the differentiation area) of the Mediterraneans was somewhere on the uplands stretching from Armenia to Afghanistan, uplands whence the Mediterraneans may have moved down to Mesopotamia as well as up to the grassy steppes of South Russia.[2]

[1] The predominant Arab 'Mediterranean' type of to-day is, however, more specialized (i.e., more 'Mediterranean'—even exaggeratedly so) than is that of the pre-dynastic Egyptians of eight thousand years or so ago. Arabia may hold the clue to many mysteries in its soil. It is archaeologically an almost unknown land and this vast area has, at times, been truly *felix* and covered with forests and gay with grassy plains. There is a site between Amman and Ramadi (in Transjordan) that has yielded artefacts of Abbevillian type but they are water-worn.

[2] It is possible, but by no means certain, that the south-western Mediterraneans entered the Iberian Peninsula by a path through Barbary, though if they trod this way they left few physical traces of their presence.

In any case, the Mediterraneans represent from many points of view the most specifically 'human' and 'modern' of all types of *homo sapiens*. The type must have a long history and it is probably a southern history, i.e., one set south of the Eurasiatic mountain-barrier. A possibly profitable line of investigation and inquiry might be that guided by the hypothesis (at present largely gratuitous) that the Mediterraneans may, in their origins, have some connection with the formerly widespread and 'primitive' Australoid types.

Egyptian Cultures and Civilization

The Egyptian culture-phases from Merimdian Mesolithic to Badarian Neolithic (known from El Badari in Upper Egypt) are characterized by an almost complete absence of metals. The agriculture, however, with wheat-growing, cattle-raising, domestic animals and the use of flint-set sickles, was by no means 'primitive.' There seems to have been, nevertheless, at all relevant periods a recognizable difference between the cultures of Upper Egypt and of Lower.[1]

As pieces of cloth and limestone spindle-whorls have been recovered from the Neolithic sites the early Egyptians must have grown flax and have spun and woven. Their pottery was quite good and they used rather rough tools of bone and of ivory as well as the usual stone implements.[2]

Two Streams of Culture

When we come to 'pre-dynastic' times, copper, although by no means abundant, is found in all the sites excavated. And there are two pre-dynastic phases. The burying-places belonging to the first phase are centred around the villages of Ballas and Negade, some four hundred and fifteen miles south of Cairo. The tombs are rather shallow pits in which the dead were placed covered with sheepskins or mats and with their heads towards the south. The pottery is ornamented not only with geometrical designs but with figures of elephants, hippopotami and dogs. The whole 'atmosphere' of this culture is African and it remained localized where it has been discovered—in southern Upper Egypt.

[1] The custom of burying the dead in their houses (without any special grave gear or gifts) is known from Merimde in the north. From Deir Tasa and El-Badari, in the south, the evidence shows that the dead were separated from the living in the first Egyptian cemeteries. Perhaps, in the north the dead were still felt as being in close touch with the living—a 'primitive' concept. Burial in living men's houses survived at Ras Shamra until about 1,400 B.C.

[2] The climate of Egypt in 'Badarian' times must have been wetter than at present, since the Badarians cultivated emmer wheat.

'African' Culture-Stream

The second 'pre-dynastic' culture is attested by a group of cemeteries—all in Middle Egypt. The decoration of the pottery is quite different from that of the Ballas-Negade type. It is less 'African' and shows what appear to be the emblems of the historic *nomes* or provinces. The human figures (which, when they occur, and they are rare, in the first pre-dynastic culture, represent the males wearing phallus-sheaths and bedecked with feathers) show tall, slender men (always drawn in profile) and women with arms raised (and always drawn full-faced.) And there are other features differentiating the two cultures.[1]

Culture-Stream from North-East

The second pre-dynastic culture, indeed, points to extra-Egyptian contacts mostly with the north-east (Palestine and Mesopotamia) and the deeper we peer into the origins of Mesopotamia the more clearly we perceive the influences from the uplands of the Iranian plateau.

There is, therefore, in pre-dynastic Egypt a remarkable dualism. On the one hand we have a typical North African culture and on the other, a culture showing a number of elements in common with Palestine and Syria as well as with Mesopotamia and the Mediterranean lands.

The second pre-dynastic culture was to prove the stronger of the two. It moved south and, in a large measure, absorbed the 'African' culture of Upper Egypt. We do not know how long this first 'Horus Kingdom' lasted and the finds do not reveal when it split into Two Lands. But we do know that it did so split although, again, we cannot tell how long Egypt remained divided until it was definitely united under the traditional rule of 'Menes.'

Dynastic Period in Egypt

By dead-reckoning, we can calculate that the beginning of the First Dynasty was about 3000 B.C. which was, also, the time of the First Dynasty of Ur and of the 'Early Minoan' epoch in Crete.

This date, five thousand years ago, is about the first 'historic' date. Civilization has not lasted long in the story of Man.

It seems clear, moreover, that in so far as Egyptian culture was a peculiarly Egyptian thing, it owed its origin to the progressive desiccation of the Nile Valley forcing relatively large numbers of

[1] Most of the bodies in the second pre-dynastic graves are buried with heads towards the South and facing West, but from the earliest tombs have come remains interred with the head towards the North and facing East. The new custom thus evidenced (that in Old Kingdom days became universal) may have something to do with an increasing importance of sun worship.

men into a relatively small but potentially very fertile area. In all its later developments the civilization of Egypt was so bound up with the unique climatic conditions of the Nile Valley that the Egyptian civilization was not exported as was that of Sumeria. It is curious to reflect that, despite all its glories, Egypt did not even civilize any other part of Africa, whereas the Sumerian lies at the base and foundation of Western civilization.

But so far as we can see, even the apparently 'unique' and very peculiar Egyptian complex was the product of a clash of cultures—and, therefore, of a mingling of genes—that is of interbreeding. One culture, as we see it, was indigenous to the Nile Valley and one other owed much to importations from the north-east. We do not, however, have to suppose that the bearers of these two culture-streams were of markedly different type—they seem both to have been, essentially, of Mediterranean stock though possibly of two or more varieties of that stock.[1]

And, moreover, we can see from the archaeological evidence that there was no violent break between pre-dynastic and dynastic times. The revolution which marks our conventional grouping of Egyptian history-periods was a political revolution and not an economic, nor a social nor even a religious one except in so far as the new united kingdom moulded its new united culture from a fusion of old elements.

The Sahara

The Sahara has yielded magnificent Abbevillian artefacts, tools of general 'Mousterian' type and plenty of 'Aterian' instruments and the Aterian culture appears to have lasted to the end of the Upper Palaeolithic. Neolithic is abundant and is known from many sites now right out in the desert, indicating progressive desiccation.[2]

The Würm glaciations seem to be represented in the Sahara by pluvial periods, fluctuating in intensity, but, for the most part, transforming much of what is now bitter and sterile desert into a region well-watered and rich in animal and in plant life.[3] Right

[1] It may be worth noting that the ancient Egyptian language displays features linking it both with the Hamitic and Semitic groups. Philologically it looks as though on to an old Hamitic basis had been superimposed a Semitic language. As the Semitic and Hamitic families are, in their remote origins, allied, a fusion of Hamitic and Semitic elements might well give rise to such a speech as ancient Egyptian. Were the pre-dynastic people I the speakers of a proto-Hamitic tongue, while the pre-dynastic people II spoke a form of proto-Semitic?

[2] For evidence as to the desiccation of the Sahara in historical times see Conrad Kilian in *Compte-rendu sommaire des séances de la Société geologique de France*, 1934.

[3] It is not improbable that the whole succession of European glaciations is represented as a succession of Pluvial and dry intervals in the Sahara. But Sahara Pluvials do not coincide exactly with European glaciations.

out among the lone wastes of rock and stone and sand there are wall-engravings representing giraffes and hippopotami and crocodiles and other water-loving beasts. But no rock-engravings of this type in the Sahara are, probably, earlier than the time of the North African Neolithic 'of Capsian tradition' (see p. 180).

The pre-history of the Sahara is almost unknown. Traces of a pebble culture are found and it seems to have merged into or have been superseded by one of Acheulian technique. Then comes what appears to have been a long arid phase relieved by another Pluvial, and to this period may be dated a varied complex of Levalloisian and Mousterian artefacts.

It is probable that there are few areas in the world where intensive archaeological research would yield a richer harvest than in the Sahara.

As compared with Asia, Africa is a continent of easy communications. As an American anthropologist (Professor C. S. Coon) has put it, Asia is a roof sloping northwards to the cold and the tundra, while to the south the roof is divided by gables into areas between which communication is difficult.

The great spaces of the Sahara have been several times, since man appeared upon the earth, fields and hunting grounds and gardens watered by great rivers. *Homo natus est in horto.*

The region of the Tibesti heights and highlands in the south of Libya might well be one where discoveries might be made of a startling nature. It is to be hoped that the Americans (who to-day are the only people with the resources necessary for elaborate scientific expeditions) will be able to conduct excavations in the Sahara in the near future.

Asselar Man

In 1927 MM. Besnard and Monod discovered in the heart of the Sahara near the valley of the Tilemsi, now dry but through which once flowed a tributary of the Niger, the skeleton of a fossil Man whose bones were as mineralized as are those of Tertiary mammals from European deposits. The Man of Asselar (for the relic was so named from the neighbouring military post) had been drowned in ancient times. The bones had been revealed by the shifting of the sand-dunes and the knees and portions of both upper and lower legs had been sawn off by the fierce sand-blasts of the desert. In a comparatively short time nothing would have remained of the bones. When we wonder that dry Africa has given up so little evidence of Man's ancient bones, it may be as well to bear in mind these hazards of the desert, comparable with those of quite different sort that have doubtless caused the disappearance of countless human remains in countries where damp and ice have been

destructive. For the Asselar specimen is practically the only fossil Man yet found in the Sahara. The sand and sandstone formation in which the Asselar bones lay was rich in the remains also of great fish, of crocodiles and of mammals. Judging by the degree of fossilization of his remains, and by the associated fauna, we must set the Asselar Man's date at least as far back as the European Mesolithic if not to the Upper Palaeolithic.

The Asselar skeleton was made the subject of a monograph by MM. Boule and Vallois in 1932. The remains are those of a 'modern' Man but not one of Mediterranean type; in the shape of the nasal and the long bones, from the prognathism and from other features it is clear that the Man of Asselar is some sort of negroid although not a 'typical' Negro.

A 'Proto-Negroid'

The Asselar specimen shows no affinities with the existing populations of North Africa or of the Sahara (except insofar as these may be negroid), neither is there a resemblance to the prehistoric men of the 'Mechta' type from Algeria. On the other hand, the Asselar Man is distinct from the West African negroes. He is rather to be classed perhaps in the general class of the 'Bantu' peoples, although the facial parts of the Asselar Man recall those of the Hottentots and Bushmen of South Africa.

In any case, the Asselar specimen tends to confirm what was already probable from other indications, namely that the present-day South African native populations moved down into their present homes from the North and also that some of these populations together with the Man of Asselar represent a 'generalized' negro type less specialized than that of the equatorial forests.

The Man of Asselar presents also indubitable points of resemblance with the 'negroids' of Grimaldi in southern France (see p. 230) and it is possible that this resemblance is due to a very remote common origin.[1] But we know, as yet, almost nothing about the early history of the negro type of Man.

North-West Africa

Scattered all over Barbary is found an industry quite comparable with the European Chellean-Abbevillian.[2] The true Abbevillian

[1] This 'negroid' of Asselar—who was at least in late middle age at the time of his death—suffered, in his youth, an extraction of the median incisor teeth, as did also some of the fossil men from Palestine. Comparable mutilations are noticeable in Cromagnoid type of skulls from, e.g., the Beni-Segoual Algerian grottoes, though the skulls from the Erq-el-Ahmar Algerian site show no such mutilations.

[2] e.g., at Palikao (near Mascara), at Lake Karar (near Tlemcen), at Ouzidan (in the same area), at El Hank (near Rabat), and at Gafsa in southern Tunisia. The prehistoric archaeology of north-west Africa has been the subject of an exhaustive monograph by F. R. Wulsin (see 'The Prehistoric Archeology of North-West Africa' *Papers of the Peabody Museum of American Archeology and Ethnology*, Harvard University, Cambridge, Mass., 1942).

of Barbary is perhaps dateable (as elsewhere) to the Günz-Mindel Interglacial. Some time during the Second Pluvial Phase (which was divided from the preceding First Pluvial by an apparently long arid period terminating with volcanic disturbances) men who made and used Mousterian-type tools entered north-west Africa.

What was their line of invasion? Right here at this first appearance of Mousterian industry in Barbary we are confronted with the problem of communications. It was formerly assumed that, at various times during the Pleistocene Period, Europe and Africa had been joined at least in the Gibraltar area and possibly, also, in the Tunisian-Sicilian region. French geologists and prehistorians, with their usual acuity, were the first to combat this theory of land-bridges, and the view now prevails that at no relevant time during the Pleistocene did the land-bridges exist and that, for instance, the traces of intense volcanic activity in the Gibraltar area suggest that no way from Spain into Africa was open for men to tread. The Strait of Gibraltar seems to be an ancient sea-way.

There are some north-west African sites yielding 'typical' Mousterian but, generally speaking, the artefacts of the Mid Palaeolithic in this vast area make up a rather special industry of general Mousterian appearance but with nuclei, disks and flakes suggesting Levalloisian techniques.

Three Peculiarly North-West African Cultures

The first peculiarly north-west African industry is that called 'Aterian' which, as we have seen, penetrated into Egypt. Wulsin calls Aterian 'Mousterian with one new tool,' that is to say the 'tanged point.' But 'pedunculated' or 'tanged' pieces have been recovered from Mousterian levels both in the island of Jersey and at La Ferrassie in south-western France. Moreover, Aterian is more than just an 'enlarged' Mousterian. It is, indeed, a culture bearing an appearance of hybrid origin. There are 'typical' Mousterian forms and tanged triangular points, laurel-leaf points and notched scrapers which latter suggest Solutrean (i.e., Upper Palaeolithic) technique. It seems not unreasonable to refer this culture—at least in its origins—to contact between two culture-streams.

Evidently Barbary has been, at times through its history, a region where have met and mingled varied traditions.

The peculiarly North African Aterian, stretching from Kharga Oasis in Egypt to Morocco and southwards into the Sahara, lasts, in places, right through to the end of the Palaeolithic. But Aterian was superseded, in central Barbary, by the 'Oranian' blade-culture and by the 'Capsian' blade-culture in eastern Barbary.

During part of the late Pleistocene, therefore, when Europe lay under the burden of the Würmian glaciations, North African

men used three distinct tool-techniques in a land of cool climate and abundant plant life.

'Capsian' culture may have come from some area to the south-east and may possibly be akin to the so-called 'Upper Aurignacian' of Kenya. On the other hand, the Algerian 'Capsian' (e.g., that from Mechta-el-Arbi), though not identical with that from Shukbah in Palestine, is of the same type, and the two industries may represent terminal types both deriving from the same basic tradition—possibly from the Kenya Upper Aurignacian.[1]

Still, the Capsian is basically related to the European Aurignacian, suggesting that both culture-streams derive eventually from the same source.[2]

To resume, the Upper Palaeolithic cultures of Barbary are represented by three rather distinct types—the Capsian, the Oranian (which is a westward extension of and closely related to the Capsian), and the old Aterian which is essentially a Mid-Palaeolithic culture surviving in Morocco.

Thus, it seems clear that the Chatelperronian culture (which is the first phase of the western European Upper Palaeolithic) cannot have reached Europe through North Africa as such culture could only have attained Spain through Morocco, where the Mid-Palaeolithic Aterian lasted on, apparently undisturbed, until the end of Old Stone Age times. Morocco was the last part of Barbary to become desiccated and, at least until the Tardenoisian microlithic invasions, the country was a sack out of which nothing seems to have escaped towards Europe. We may take it that invasions into Spain from Africa or through Spain to Africa are not probable until Mesolithic times.

European and North African Late Upper Palaeolithic

But we can say that the North African and European late Upper Palaeolithic cultures seem to have been, roughly speaking, contemporaneous, that they both came from the East and that they had, at least in part, common origins.

By the end of the Würm glaciation the rain-bearing Atlantic winds began to be deflected northwards by the melting of the European ice-sheet. The last Pluvial Phase of North Africa dried away.

[1] The first important prehistoric site to the west of Egypt is that at Gafsa in southern Tunisia, and Gafsa is two hundred miles away from the middens at Mechta-el-Arbi in Algeria (excavated by A. W. Pond for the Logan Museum, Beloit College, Wisconsin). It may be noted that both at Shukbah in Palestine and at Mechta-el-Arbi in Algeria, the dead were buried in the debris of their habitations.

[2] The Capsian differs from the European Aurignacian by having a microlithic blade element (which appears in Europe as the Tardenoisian). Moreover the Capsian shows apparently some 'Gravettian' affinities.

The microlithic blade-technique is found on both sides of the Gibraltar Strait and the same technique extends to Palestine and through the Caucasus to South Russia and Europe.

During the Mesolithic, Barbary lived on as an antique and provincial area. The rock-engravings[1] and paintings show that the hunter's mentality and preoccupations lingered on. The borrowings, with a diluted and faint echo of Egyptian influences, are all from the East.

Again the Barbary Neolithic appears as a slow infiltration (probably from Egypt) into a very conservative and backward area.

Neolithic in North Africa

Neolithic cultures appear in Egypt from the fifth millennium B.C. From about 4,500 to 3,300 B.C. flourished there the Neolithic (i.e., mixed bronze and stone) cultures known as 'pre-dynastic.'

All the features of the North African Neolithic—bifacial arrow-heads, polished axes, vases with conical bases, grooved stones, perforated terra-cotta disks, spirals, 'Libyan' or penis-sheaths, plumed head-dresses, girdles with tails, boomerangs, the 'Amen-Ra' disk and domesticated animals, etc., are found in Egypt during Neolithic and Eneolithic times. The Saharan and 'Maghrebian' (i.e., Barbary or north-west African) Neolithic may have lasted from about 4,000 to 2,000 B.C., although some sites may possibly be earlier, but from the fourth to the second millennia B.C. all of what is now French North Africa lived through a Neolithic phase of Capsian cultural tradition.[2]

Early Man in Barbary: El-Hank

Morocco is the only region of North Africa from whose soils have been recovered the physical remains of Neanderthaloid Man.

At El-Hank, a suburb of Rabat, were found in 1933 and in the Pleistocene sandstone of the old sand-dunes about twenty-three fragments of probably more than one skull together with a fragmentary human jaw.

These ancient sand-dunes date apparently from the dry-period which intervened between the two last Pluvials of North Africa. In any case, the formations are anterior to the Würmian glaciation. The human remains consist principally of the right half of a palate, the outer edge of the maxillary bones and the greater part of a lower jaw with all the relevant teeth in position. All these remains

[1] In the In-Ezzan grotto, for instance, the oldest paintings do seem to form a typological link between the earliest art of the Southern Rhodesian cave-paintings and those of eastern Spain, the latter of which are certainly (in part) older than the Neolithic.

[2] Vide, *L'Art Rupestre Nord-Africain*, by R. Vaufrey.

seem to belong to the same individual, probably a male not more than sixteen years old.

As far as can be judged from such rather scanty material, the face was prognathous or 'snouty,' the vault of the palate very voluminous (and typically Neanderthaloid). The lower jaw displays 'primitive' features and is thicker and more massive than that of almost any Neanderthaloid known—the mandible is, indeed, comparable with those of the *Sinanthropus*. The El-Hank teeth are much larger than those of any extant Europeans and the teeth (or some of them) display a curious circular protuberance or fold, unrecorded for any Neanderthaloid but present in *Sinanthropus* teeth. The teeth are 'taurodont' (see p. 34) as often with Neanderthaloids and also with *Sinanthropus*—such a condition is exceptional in 'modern' Man.

In fact, the El-Hank remains may be held to be those of a Neanderthaloid but one of a type perhaps more 'primitive' than any yet found in Europe. The curious combination of Neanderthaloid and *Sinanthropus* characters makes the El-Hank evidence of the greatest interest and of importance as tending to prove the derivation of the Neanderthaloids from a pithecanthropoid (i.e., *Pithecanthropus-Sinanthropus*) form.

Tangier

To the south of Cape Spartel (which is the most north-westerly point of the African continent) the rocks of the headland fall down to comparatively low cliffs which are essentially consolidated sand-dunes. Near the Moslem sanctuary known as Sidi-Kassim a wide *wadi* is pitted on its northern side with a number of caves,[1] while on the western face of the cliffs giving directly on to the Atlantic and rather to the south of Sidi-Kassim are the caves known as the 'Grottoes of Hercules.' Here in the *mugharet-el-'aliya* or the 'High Cave' was unearthed in 1939 the left side of the upper jaw belonging to a child of about nine years of age, together with a left upper molar belonging to another, older, individual. The jaw fragment is large and thick. It has no canine fossa but shows a pronounced outward and backward slope of the zygomatic process. The 'simian' nasal groove is present.

The bone is obviously that of an individual of Neanderthaloid type. The scantiness of the material and the immature age of the subject make it impossible to determine whether we have here the remains of a Neanderthaloid comparable with that of El-Hank or with one of 'generalized' Neanderthaloid type such as is shown by the skull of the Gibraltar child. But if we take into account that, despite the geographical proximity between Gibraltar and Cape

[1] In 1947 an American expedition under Dr. H. Hencken explored these caves.

Spartel, there is no evidence of any land-bridge between the African and the European sides of the Straits during the whole of the Pleistocene Period, and if we also consider that the El-Hank remains appear to be those of a very 'primitive' sort of Neanderthaloid, we shall be led to think that the Neanderthaloids of southern Spain and those of north-western Morocco represent not populations which settled on either side of the Straits but rather populations which had pushed to the extremities of Europe and of northern Africa from regions farther east and by distinct routes, one through Europe and the other through Africa.

'In many respects, the industry of level deposit 6 (the human remains were found in deposit 9) is similar to the Upper Mousterian (Layers 1 and 2) of the Devil's Tower, Gibraltar (Garrod 1928) but in addition to the typical points, scrapers, etc., distinctively North African elements are present. Only tentatively, therefore, can it be said that the specimens are of late Pleistocene date, and of a general Middle Palaeolithic cultural association.'[1]

This layer No. 9 contained in addition to human bones Solutrean-type points, and Mousterian and Levalloisian artefacts together with animal bone fragments including those of jackal, cave hyaena, zebra, Algerian pig, wart hog, hippopotamus, hartebeest, gazelle, rhinoceros and other fauna mostly of savanna-inhabiting species. In fact, a fauna indicating a very different climate from that to-day prevailing in this part of Morocco.[2]

Upper Palaeolithic Man

Human remains associated with Upper Palaeolithic artefacts have been recovered in some numbers (about one hundred specimens) from sites in the Algerian province of Constantine (and especially from Afalou-bou-Rummel and Mechta-el-Arbi—the former with 'Oranian' artefacts and the latter with 'Capsian.'

At Afalou there are two distinct types of men. One type (known only from one skeleton 'Afalou No. 28') is of a variety that can be described as 'generalized' or 'basic' Mediterranean.

Mechta Man

The other Afalou skeletons represent men of a much more robust physique comparable with that of the Cro-Magnon of south-western France. This Afalou or Mechta type shows a distinct tendency to shortheadedness or brachycephaly. Coon thinks that

[1] See a preliminary account by M. S. Senyürek s.v. 'Fossil Man in Tangier' in *Papers of the Peabody Museum of American Archeology and Ethnology*, Harvard University, vol. xvi, No. 3, 1940.

[2] *Vide* 'A Stone Age Cave Site in Tangier,' by Bruce Howe and Hallam L. Movius, Jr. *Papers of the Peabody Museum*, Cambridge, Mass., 1947.

Mechta and Cro-Magnon may represent two parallel termini of comparable immigration movements from the east of peoples whose type resulted, possibly, from Neanderthaloid-*sapiens* crossing.[1]

The men of Mechta-el-Arbi are comparable with the later Afalou men and they may together be regarded as typical of the men who made and used the 'Capsian' tools of Upper Palaeolithic Barbary.

The remains of the 'Mechta' type of men were, at one time, regarded as those of Neanderthaloids but, although they are clearly *sapiens*, the skulls do present a rude and coarse appearance. The vault of the skull is fairly high but the superciliary ridges are heavy and projecting. The skulls vary from dolichocephalic ('long-headed') to mesocephalic ('medium-headed') and the faces are (like those of Cro-Magnon men) short and broad. It seems probable that the Cro-Magnon Aurignacians came into Europe (and North-West Africa if we take the Mechta men to be of the same type) from some region not very far from the Mediterranean basin.

Mesolithic and Neolithic Mediterraneans

In Mesolithic and Neolithic times Barbary was apparently traversed by a small type of Mediterraneans on their way to Europe across the Strait of Gibraltar. The later, taller type of Mediterraneans seems to have reached the Iberian Peninsula both by sea from eastern parts of the Inland Sea and also from North Africa. The Mediterraneans, however, did not influence the population of Barbary in the way they did those of the Iberian Peninsula and the western Mediterranean islands. As the Mediterranean invaders passed through and on, the older types in Barbary seem to have reasserted themselves.

Africa

The mass of the African continent consists of a plateau surrounded by a comparatively narrow coastal strip. Despite changes of the shore-contours during the rise and fall of sea-level during Pleistocene times, the aspect of Africa has little altered since the Miocene epoch when the central and southern parts of the continent were thrust upwards to a height of about four thousand feet of vertical uplift, thus forming the so-called 'Great Miocene Peneplain.' This movement affecting about one-third of Africa was completed without any very great folding of the crust.

[1] *Vide* C. S. Coon, *Races of Europe* (1939), commenting on the Afalou material: 'Thus a fully *sapiens* individual, resembling in every respect Combe-Capelle, preceded a group of over-grown, large-headed, wide-faced Neanderthaloid-*sapiens* hybrids with a tendency to brachycephaly. Possibly both Afalou and Cro-Magnon streams set out from the Palestine region. The earlier waves brought Combe-Capelle and Afalou No. 28 must have come from a different centre.' The later Afalou men (*vide supra*) removed the upper incisors in youth and this practice is not recorded for Europe until mesolithic Tardenoisian times.

The formation of the Great Rift Valley, however, and the sinking of the Red Sea trough are comparatively recent phenomena. East Africa and Arabia were for long united and the former area was certainly an important breeding-ground of anthropoid apes. It is not improbable that we may find, one day, evidence of importance in the archaeologically unknown expanses of the Arabian peninsula which was certainly, for long periods in the past, a fertile region full of game and pastures.

Early Primates in Africa

It is possible that the cynodont reptiles of the Upper Triassic Karroo sandstone in Africa may have been the ancestors of the small rat-like mammals of the Cretaceous. But although mammals make a somewhat timid appearance in later Secondary times, the Tertiary period is the one of the mammals' great development and supremacy.

At the beginning of the Eocene, creodonts or primitive carnivora are discernible, while, later, several of the main groups of mammals are identifiable—including the generalized ancestral forms of probably both monkeys *and* apes.

The earliest traceable primate forms have been recovered from the soil of North America, but these early monkey-like creatures (only with difficulty differentiated from forms of other mammals, e.g., the insectivora) appear to have died out in America.

Although no remains of Oligocene primates have been reported from Europe, *parapithecus* (that is a monkey) and *propliopithecus* (known only from a jaw complete with teeth), that is an anthropoid ape—judging from the dentition—are known from Egypt.

The Miocene was, however, the intensive period of mammalian evolution and especially of that of the primates.

From the beginning of Tertiary times, vegetation had changed. Grasses, modern trees, flowering plants appear. Birds, butterflies and all kind of winged insects lent a new aspect to the world's face.

And the earth-convulsions, the epeirogenic—the continent-making—upheavals of the Miocene provided a moving background for mutations and evolution of forms.

Fossil Apes

Fossil gibbon and *dryopithecus* remains have been excavated from northern Egyptian Miocene strata,[1] and Miocene anthropoid remains were recovered from Koru, in Kenya, by Hopwood in 1931.

[1] But no trace, up to now, of fossil tarsioids.

The beds are supposed to be of Lower Miocene age and Hopwood[1] described three new types of apes as well as a fossil monkey. Leakey and his co-workers also found more fossil ape material in apparently Lower Miocene deposits on Rusinga Island (at the mouth of Kavirondo Gulf in the north-eastern corner of Lake Victoria Nyanza) in 1931 and 1932, at Songhor in 1932 and again at both Rusinga and Songhor in 1935.

Hopwood named the three types he identified as *proconsul*, *xenopithecus* and *limnopithecus*. He regarded the first as being allied to the chimpanzees and the last as of the same stock as the gibbons. Keith stated (in 1934) that in his opinion *proconsul* was of the *dryopithecus* variety recorded from the Upper Miocene of Europe and the Siwāliks.

Morphologically, *xenopithecus* may be held to bridge the gap, in some measure, between the large and the small anthropoids. Whereas *limnopithecus* serves to link up the whole assemblage of Miocene hominoids[2] with the *propliopithecus* from the Egyptian Oliocene (*vide* supra).

Rusinga Jaw

In 1942 Leakey recovered from the supposed Lower Miocene beds on Rusinga a jaw of *proconsul* and about fifteen feet away a jaw of *xenopithecus*. On one side of the *proconsul* jaw the greater part of the ascending ramus had been lost, but on the other the external angle only of the ramus had been broken off and the condyle was intact. When cleaned the specimen proved to be what is probably the least imperfect mandible of a fossil ape up to now discovered.

It is, however, less like the jaw of a chimpanzee than Hopwood had imagined judging from the fragments found in 1931. The chin-region is less oblique, there is no simian shelf (the ledge of bone on the interior aspect of the symphysial area) characteristic of all living apes, and the condyle is also more like the form found in Man than that of the extant apes, and in a number of features this *proconsul* jaw suggests human characteristics and contains details of structure not found in the great apes (form of chin, condyle and symphysial region).

The question which is of the greatest interest is of course whether we have here the representative of a generalized form of anthropoid from which both the extant great apes are descended (in the course

[1] Hopwood was a member of Dr. L. S. B. Leakey's 'Third East African Archeological Expedition,' and examined the fossil beds at Koru discovered by Dr. H. L. Gordon and Mr. E. J. Wayland. The following account of the Kenya material is taken from Dr. Leakey's reports.

[2] i.e., members of the super-family *hominoidea* including Man and the anthropoids (*vide* Simpson, 'Classification of Mammals.').

of their descent having acquired specialized characteristics) and from which Man also derives, Man having kept, in some way, a more 'generalized' structure than that of the living apes, or again, whether *proconsul* represents a line that died out.

The Kenya Lower Miocene beds (if they are of this date) would be much older than the Upper Miocene and Pliocene which have yielded fossil apes outside Africa.

Taungs Ape

Until 1924 no fossil apes had been recovered from the soil of South Africa.[1] Then at Taungs, in Bechuanaland, a fossil primate skull was found and submitted to Dr. R. A. Dart of Witwatersrand University in Johannesburg. The remains consisted of the entire facial region and the base of the skull together with a natural limestone cast of the endocranial cavity. The cranium was recovered from a cave filled in with travertine limestone deposit of uncertain age.

The specimen was given the name of *australopithecus africanus.*

The remains are those of a young animal whose first permanent molar teeth were just becoming functional. For the rest the milk dentition was preserved. In 1929 Dart removed the lower mandible from the upper and revealed the occlusal surfaces of the milk molars' crowns. The side view had shown these teeth as unlike those of gorilla or chimpanzee and more resembling those of Man and the appearance of the occlusal surfaces did not diminish this resemblance. The teeth are, in fact, more human that those of any known ape, living or fossil. But, contrasting with the small milk incisors and canines, the first permanent molars are considerably larger than those of a chimpanzee.[2]

On the whole, although the skull is like that of an immature chimpanzee, not only are the anterior teeth very much smaller but the profile of the lower jaw is rather less anthropoid, the forehead is fuller and less receding and the supraorbital ridge (which shows even in quite young apes) is lacking. Moreover the Taungs skull is dolichocephalic and most apes are brachycephalic. The cranial capacity may well be greater than that of a young chimpanzee of comparable age (although Zuckerman is of the opinion that the capacity is not greater than that of a gorilla of comparable age).

[1] No remains of fossil anthropoids had been found nearer to Taungs than the Congo (two thousand miles away) and the present-day habitat of the great apes is no less than one thousand five hundred miles to the north of Taungs.

[2] Gregory, of New York, agreed with Dart that the dentition was more like that of Man than any known in another anthropoid, while Adloff of Königsberg was so moved by the discovery that he went so far as to declare that the Taungs ape's dentition was practically human.'

On the whole, it is probable that had the skull been that of an adult animal and not that of a young specimen, the 'human' appearance would have been much less striking as the jaws would have projected (much as they do in chimpanzees) to accommodate the large permanent teeth. In extant anthropoids of the dental age of the Taungs ape, the brain has attained nearly its full volume so that the adult *australopithecus* cranial capacity would be little, if any, greater than that of a full-grown gorilla.

With projecting jaws and a small cranium the adult *australopithecus* would be much more anthropoid in appearance than is the Taungs immature specimen.

The *australopithecus* discovery provoked a copious literature.[1]

Without adopting the extravagant claims which have been put forward in some quarters (that, e.g., *australopithecus* is a direct ancestor of Man), it is a fact that the dentition of the Taungs ape (e.g., in the number of cusps on the first upper and lower milk molars) is more like the human pattern than is that of either chimpanzee or gorilla. But the dentition of the latter forms is highly specialized and it is not unreasonable to suppose that they are derived from types possessing a dentition more like that displayed by *australopithecus*.[2]

Sterkfontein Ape

In August 1936 Dr. R. Broom of the Transvaal Museum was told of the Sterkfontein cave, about six miles from Krugersdorp (and some two hundred miles north-east of Taungs), where the skulls of small fossil baboons had been found, and in this same year while blasting operations were going on there was exposed, and at the same time shattered, the cranium of a fossil ape. But several portions of the skull as well as a nearly complete natural cast of the brain-cavity were preserved. The remains were referred by R. Broom first to an *australopithecus transvaalensis* and now to a *plesianthropus transvaalensis* (although the latter name is tendentious). This ape's skull is larger than a chimpanzee's (cranial capacity about 600 c.c. as against 655 c.c. for the maximum volume recorded for a gorilla's). The frontal sinuses are large. The maxillary bones and several of the upper teeth have been preserved. The molars are larger than in the chimpanzee or in Man, but the empty socket of the upper canine tends to indicate that this tooth was relatively

[1] *Vide*, e.g., the late Marcellin Boule in *L'Anthropologie*, vol. xxxv, p. 123, W. Abel, *idem*, vol. xli, p. 562, and the reports and studies of Dart and Broom.

[2] Broom (in 1942) expressed the opinion that both *australopithecus* (or rather the *australopithecines*) and Man are derived from a pre-dryopithecoid form. This is a view favoured by Weidenreich and is not far from the opinion of Wood-Jones.

slender (as are the milk canines of the Taungs ape). 'Plesianthropus' has a maxillary antrum rather like that of Man and unlike that of the chimpanzees.

The fossil mammalian bones found associated with the Sterkfontein specimen are all different from those associated with the Taungs ape. Both specimens were recovered from filled-in limestone caves and we may thus conclude that perhaps *australopithecus* was a ground-dwelling variety of anthropoid. Near the 'plesianthropus' remains were recovered a portion of a femur (described as 'resembling that of existing Bushmen' and unlike that of living anthropoids) and a wrist-bone (*os magnum*) from the form of which a number of controversial deductions has been made (e.g., that 'plesianthropus' perhaps possessed 'a useful opposable thumb').

In April 1947 another Sterkfontein ape skull was recovered not two feet from where the first was found. The new skull has very large eye-orbits and the occipital bone is nearly half an inch thick. The teeth are wanting and the cranium may be that of an aged female. This second skull was found broken in two and embedded in rock.

Fragments of other skulls were also found together with the snout and teeth of a young male Sterkfontein anthropoid and the jaws of a subject aged perhaps three years with fine milk-teeth.[1]

Kromdraai Ape

The Kromdraai ape or *paranthropus robustus* represents another type of South African australopithecoid. The other mammalian bones found near the Kromdraai specimen are, in almost all cases, different from those discovered in the Sterkfontein skull level, and Broom considers that the 'paranthropus' may be much older than the 'plesianthropus.' As a porcupine occurs at Sterkfontein not differing, apparently, from the existing South African species, Broom thinks that the Sterkfontein specimen should be kept in the Pleistocene, despite the presence of two varieties of sabre-toothed cats (but *vide infra*).

With the 'paranthropus' remains true horse's teeth are abundant (there is a large horse and a small one), so perhaps the Kromdraai ape belongs to some phase of the Pleistocene (when only do true horses begin to be found).

The fauna associated with the Taungs Ape skull is unlike that of either Sterkfontein or Kromdraai and almost certainly the first specimen is considerably older than the other two. Broom placed the *australopithecus* in the Lower Pleistocene or possibly the Upper Pliocene.

[1] An expedition from the University of California started work at Sterkfontein in July, 1947.

The Kromdraai ape skull was embedded in a block of breccia which has also yielded the distal end of a humerus, the proximal end of an ulna and two toe bones. The matrix in which the maxilla rested contained excellent impressions of the premolars and of the first and second molars, but when the matrix was opened in it was found embedded a well-preserved second metacarpal of the left hand. It is quite certainly not human. Close to the metacarpal were two phalangeal bones and in another piece of matrix much of another phalangeal bone. If the hand of the Kromdraai ape really contained this metacarpal (and it was not that of, say, a giant baboon whose remains have already been recovered from the soil of the Transvaal) then we may say that 'paranthropus' possessed a hand somewhat intermediate in type between that of the baboons and Man.[1]

Dating of South African Fossil Apes

One thing is clear from this South African material and that is, that we are confronted with the remains of anthropoids which may be 'pre-' rather than 'proto-hominid.' The australopithecoids are, it is true, as far as we can see, not the ancestors of any living anthropoids. And it is also true that in some respects (teeth form and possibly hand-bones *i.a.*) the australopithecoids seem to resemble a type which may have been ancestral to Man. In Pleistocene times some anthropoids were, in some ways, closer to Man than are the existing anthropoids. And there is nothing surprising in this. The extant great apes are highly specialized mammals. Man has remained, in many respects, a 'generalized' primate and, therefore, some of the remote anthropoids may be expected to display features which in their 'generalized' type recall those of Man.

What has gone before does not in any way diminish the high interest and great importance of the South African studies or the important contribution to palaeontology furnished by the discoverers and the describers of this interesting series of fossil anthropoids (e.g., Messrs. Broom, Dart and Schepers). But from the point of view of our study of Man's evolution, what must most fix our attention is the dating of this australopithecoid material.

As we have seen, Professor Broom was inclined to set the Taungs Ape in the early Pleistocene (or possibly Upper Pliocene) and the

[1] At Sterkfontein have been discovered a large baboon-like pelvis, a femur and three vertebrae that may perhaps be parts of *dinopithecus ingens* or the giant fossil baboon of the Transvaal. It is therefore possible that *dinopithecus* may have been the contemporary of the Kromdraai ape and that the supposed finger-bones of this type may really belong to the former.

Sterkfontein and Kromdraai specimens at considerably later. In 1945 the *abbé* Breuil (then visiting professor at Witwatersrand University) presented Broom with the snout of a fossil hyaena found in 1942 in the lower part of the Sterkfontein cave about sixty feet below the spot where was discovered the 'plesianthropus' skull. This hyaena is of a definitely Pliocene type. If this evidence be taken in conjunction with the presence of the sabre-toothed cats (sabre-toothed felines are a typically Pliocene form although some specimens lasted into the Pleistocene) it looks as though the Sterkfontein cave deposits may be of Pliocene date. If they are, then the age of the Taungs specimen must be greater than some would allow (while the evidence of the associated fauna would indicate that Kromdraai ape would be more recent in date than that of Sterkfontein). But the difficulties of dating are immense and the evidence slender. As long ago as 1925 the Director of the South African Geological Survey gave it as his opinion that 'there was no probability of the age of the (Taungs) deposit being determined.'

But we may say that, for the present, it looks as though the Taungs skull may be assigned to the lower part of the Upper Pliocene (or even to the Middle Pliocene), the Sterkfontein material may be dated provisionally to the Upper Pliocene and the Kromdraai remains to the Lower Pleistocene.

Australopithecoid Group

Although the exact relations of the different australopithecoid groups to one another have hardly yet been worked out, we can say that it looks as though the australopithecoids probably represent late, and only slightly modified, survivors of that ancestral stock whence Man was derived.

And, although in stating this we do not necessarily suppose that this ancestral stock was indigenous to the African continent, still when we combine the South African evidence with that from East Africa it does look as though we must, at least, admit the possibility that Africa was the continent where the line which was to lead to Man broke away from the line which was to lead to the existing anthropoid apes.

The femoral fragment ascribed to the Sterkfontein ape (*plesianthropus*) would indicate not only the ability to assume an erect posture but also the ability to walk upright. The wrist-bones attributed to plesianthropus are sufficiently 'human' to justify the supposition that these anthropoids may have possessed an opposable thumb.

Nevertheless, the morphological similarities in skull and denti-

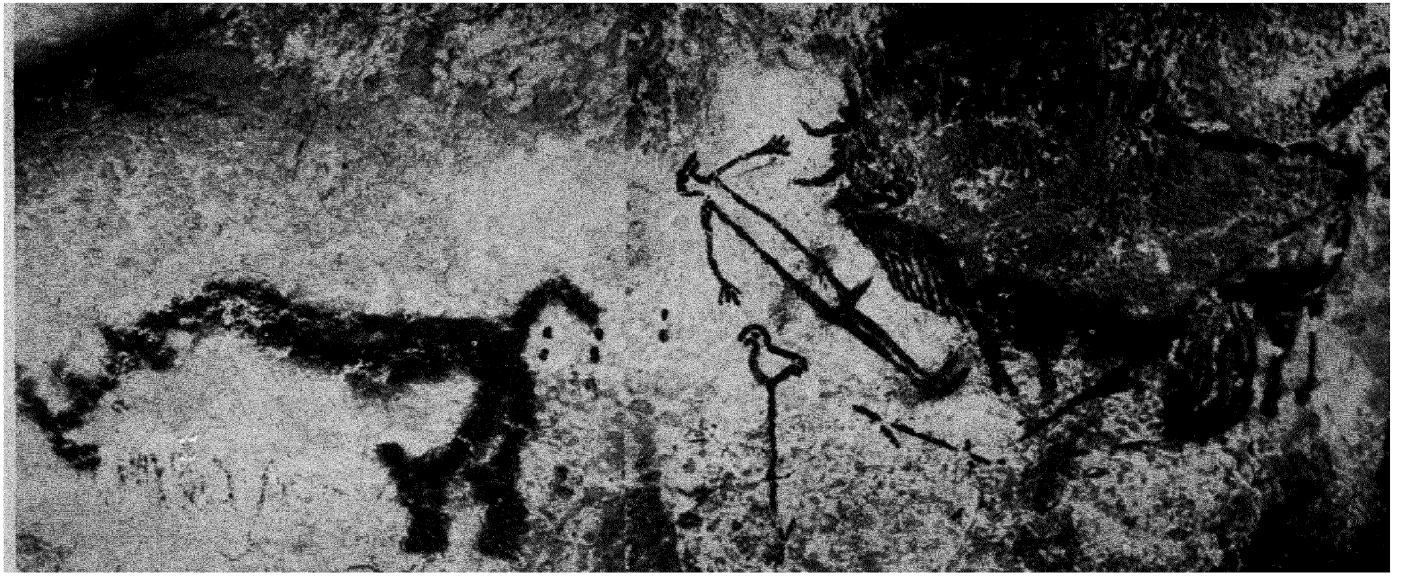


FIG. 18—Lascaux : the Prehistoric Tragedy : the wounded and disembowelled bison, the dead hunter, the bird-symbol on a pole, and the woolly rhinoceros



Photo. Prof. H. Breuil

FIG. 19—The Bisons of Lascaux

tion as between the 'australopithecoids and Man are such (too 'numerous, detailed and intimate' as the South African anthropologists put it) that they can hardly be interpreted as the results of parallel or convergent evolution.

Regarding only the undoubted evidence of the crania we have a dentition almost human in association with a brain scarcely exceeding in volume that of an extant gorilla or chimpanzee.

The implications are far-reaching.

It is reasonable to say that the australopithecoid evidence suggests that the ancestors of the hominids and of Man were apes which had acquired freedom of the fore-limbs, hands with thumbs functioning in a measure like our own, the possibility of walking on the hind-limbs only and a general reduction of the facial portion of the head together with a dentition more like that of Man than of the extant anthropoid apes. And all this with little or no increase in brain size if we compare the volume of the australopithecoids' brain with those of the existing apes of comparable body-size.

In other words, the ancestors of Man appear to have acquired the essential postures of Man before acquiring much of the increase in brain-size which to-day marks off Man most sharply from the other Primates.

It is, of course, possible that the australopithecoids represent, in some measure, the sort of ape from which the existing anthropoids have diverged by specialization, whereas Man has remained a more 'generalized' sort of ape in his general bodily form while specializing himself to an extraordinary adaptability by his superior brain functioning.

In any case, it is clear that even if by mutation a large increase in brain-volume, in pre-frontal area and in complexity of structure, had arisen *before* any anthropoid had acquired freedom of the fore-limbs and opposability of the thumb, his enlarged brain would have served him but little.

It is not unreasonable to consider that the ability to 'fiddle' with the hands, to make things, however crude and clumsy, is the essential characteristic of Man. And speech, the very basis and creator of our humanity, arises in close connection with 'making.' If it is sufficiently clear that we 'think' because we can talk, we can push the investigation back a stage farther and postulate that we can talk because we can 'make' and we can 'make' because we have the free fore-limbs and the opposable thumbs which distinguish us from our ape-cousins.

The big-brain mutation can be used only by those *hominoidea* who can 'make' and talk and so 'think' and so create the word-

world in which we live, the world of credulities and fears and forethought and imagination and discovery and research . . . and the rest.

Rhodesian Man

The remains of 'Rhodesian Man' were recovered in 1921 in rather strange circumstances. The bones were dug out of a cave in the Broken Hill lead and zinc mine[1] and they were not found mingled with the accumulation of other mammals' bones filling much of the cavern. The human relics were, indeed, unearthed at the depth of ninety feet below the surface and at about one hundred and twenty feet from the entrance of the cave. A fissure reaching out to the hill-side above opens over the portion of the cave-floor where 'Rhodesian Man's' bones were found, so that there is, at least, a possibility that the remains had, at some time, found their way down the cleft from the outside.

For many years past—and most of Broken Hill is carved away by quarrying operations—not only the ore but heavily mineralized animal bones have been smelted for the metal they contain and the native miners who came across the relics of 'Rhodesian Man' had destroyed everything except the skull, the femora of two individuals, a sacrum, an iliac bone and some other small fragments.[2] These latter remains are not any of them (in the opinion of G. v. Bonin) parts of the skeleton to which the skull belonged.

The first thing that is striking about these Rhodesian bones is that they are only slightly fossilized. Although they are heavily mineralized, they still contain some organic matter. Thus, *a priori*, one would not be inclined to assign to them any very great (geological) age.

When cleaned, the cranium (lacking the lower jaw) was found to be uncrushed and in an excellent state of preservation—with the exception of part of the left side. In the character of its sutures, of the ear-region and in jaw-form the Rhodesian skull recalls a 'modern' cranium, though at a first glance it does seem very anthropoid and 'primitive.' The cranial vault is depressed, the ridge over the eyes is more prominent than that recorded for any Neanderthaloid (and not quite of the same form), the great length from the nasal opening to the upper teeth is more considerable than that noted for any other human skull. The palate is enormous. The mastoid process is fairly well developed (as in 'modern' Man). The occipital region is not shaped like that of the Neanderthaloids,

[1] North of the Kafue River in north-eastern Rhodesia.
[2] Including a small fragment of an upper jaw.

although the occipital *torus* or ridge and the traces of muscle-attachments are very developed.

The cranial capacity is about 1,280 c.c. to 1,300 c.c.—surprisingly small for so huge a facial region. The femora (which, as we have noted, are probably not from the same individual as the skull) indicate a tall stature and there are no traces that would suggest a flexure of the knee-joint.

The teeth are decayed—and caries is unknown in Neanderthaloid jaws.[1] In fact, the condition both of the skull and of the teeth suggests a date more recent than the Pleistocene.

Relations of Rhodesian Skull

Dr. G. M. Morant's conclusion after a study of the Rhodesian skull is that it is clearly distinguished both from that of the Neanderthaloids and that of 'modern' men by 'a number of independent characters of the calvaria and facial skeleton.' But that 'the Rhodesian and Neanderthaloid types are more closely related to one another than either is to modern Man.'

Weidenreich has pointed out that Rhodesian Man seems to be (morphologically) nearly related to Solo Man (see p. 78) and 'as far as the calvaria are concerned could pass as an enlarged Solo type.' The 'Rhodesian Man' may, indeed, represent (the survivors of?) a type ancestral to the Australoids. The apparently late date of the South African specimen presents few difficulties if we reflect that most probably ancient and archaic types of men flourished and survived in odd corners of the world until comparatively late times. Until quite recently (geologically speaking) Man was almost certainly a rare beast and despite the increase in human numbers during the later Palaeolithic the population of Man was sparse until Neolithic times.

In the layer where was found the Rhodesian skull were recovered no other objects but the human remains and the smashed skull of a large specimen of the cat family (probably a lion) and a round stone identical with those still used by South African natives in grinding their corn.

Southern Africa: Fossil Men

The rather numerous remains of fossil Man that have been recovered from the soil of South Africa seem to fall into three main classes: (*a*) that of Florisbad (*b*) those of Boskop and Fish Hoek that may be taken to be 'proto-Bushmen,' and (*c*) those of Bayville, Mistkraal, Barkley West and Cape Flats that differ from the

[1] Though the *Pithecanthropus* jaws seem to show sign of teeth-decay.

Bushman type (and still more from that of the Kaffirs) and have a general 'Australoid' appearance.

The remains of 'proto-Bushmen' seem to date back at least to the beginning of the Recent Period. The negroids of South Africa ('Kaffirs') are recent immigrants who since medieval times have steadily displaced both Bushmen and Hottentots.

Florisbad

What seems to be the most ancient—or, at any rate, the most 'primitive'—of these ancient South African skulls is the 'Florisbad.' The type is known from one incomplete cranium discovered in the Orange Free State. Of this skull the major portion of the frontal, of the anterior and juxtamedian parts of the parietal with a portion of the nasal bones have been preserved. There is also an isolated piece of the palate-vault together with the right maxillary region and some molar teeth.

The late Ariens Kappers maintained that the Florisbad specimen is that of a 'modern' Man type. Dreyer is of the opinion that the Florisbad skull is 'Australoid' and it does seem to show affinities with what may be called a 'general' Australoid type and also perhaps with the Boskop skull (see below). The receding forehead, the heavy brow-ridges and the prominent jaws have led some observers to see in 'Florisbad' a reduced form of the Rhodesian (see p. 194) skull.

And now the view is coming to be held in many quarters that the Florisbad specimen is probably not *sapiens* and should be classed, provisionally at least, in the general Neanderthaloid class to which, also, despite its undoubted points of divergence from the European Neanderthaloids, the Rhodesian skull should probably be referred.

The presence on the African continent not only of undoubted Neanderthaloids from the north-west (see pp. 182–184) but also of such clearly non-*sapiens* specimens as *Africanthropus* and Rhodesian together with such a very primitive form as Florisbad tends to show that Africa must have been an important region of human evolution and differentiation.

As to the age of Florisbad, it can only be stated that the relic was found sealed up in the eye of a spring together with artefacts of Middle Stone Age type. But what is the comparative date of the South African Middle Stone Age?

Boskop

The Boskop skull (recovered in 1913) together with some fragmentary limb-bones probably belongs to the period of the Second

South African Pluvial, since the associated artefacts are of 'Still Bay' type (see below). The cranium displays definitely 'primitive' features. It is flat on the top. The bone is thick and the jaw is massive. The cranial capacity is great (about 1,630 c.c.)—greater than that of the average European of to-day—although (judging from the endocranial cast) the brain-convolutions may have been of a more simple type than those of most extant men. The skull is dolichocephalic, the forehead is vertical, the face is orthognathous. From some points of view, but perhaps chiefly from its size, the cranium recalls those of the Cro-Magnon group (see p. 231) in Europe. But whatever may be the exact classification adopted for 'Boskop,' it falls into a general 'proto-Bushman' group. And it may well be that the proto-Bushmen developed into the 'Strand-loopers' or kitchen-midden people of later times. And these, again, appear to have been the direct ancestors of the historic Bushmen. The leg-bones of the Boskop remains indicate a very moderate stature; indeed, to our ideas, disproportionately low for the size of the head.

Fish Hoek

At Fish Hoek near Cape Town was discovered another 'proto-Bushman' skull (associated with 'Still Bay' artefacts) but this Fish Hoek specimen is smaller than that of Boskop though larger than that of the modern Bushmen. The head is particularly long behind the ears. The face is small and the stature did not exceed 5 ft. 2 in. —and that would be tall for any of the modern *Khuai*, as the Bushmen call themselves—for with them the average height of the adult males does not exceed 4 ft. 9 in. Another (incomplete) skull—and other bones—of Fish Hoek type was found in 1921 at T'zitzikama on the South African coast.

Dreyer found at Knysnain specimens of other individuals of the Fish Hoek stock. The skeleton is of medium height. The thick skull is of the Boskop type. Some of the skeletons had wide faces and some a facies so reminiscent of the Neanderthaloids that one is almost inclined to ask whether we have not in this Knysnain material some evidence for Neanderthaloid-sapiens hybridism. With the bones were recovered artefacts of Middle Palaeolithic type.

Cape Flats

From Cape Flats (near Cape Town) have been also recovered the bones of another variety of early South African, a variety with strong brow-ridges, receding forehead and prominent jaws reminding one of the extant (and indeed fossil) Australoids.

Springbok Flats

On Springbok Flats, near Pretoria, have been unearthed some quite modern-looking skulls whose owners, however, seemed to have lived at the same time as the extinct giant buffalo. The crania show no pronounced brow-ridges. The bones are thin and present no obvious affinities with the Boskop, Fish Hoek or other 'proto-Bushman' types. The Springbok men rather suggest the 'Hamites' of southern Somaliland and may have been quite recent immigrants into the South African pocket or *cul-de-sac*.

Immigration Routes

Immigrants into South Africa took, as far as we can see, mostly the same route. They crossed the Zambesi about the region of the Victoria Falls, traversed the Rhodesias, avoided the deserts of Kalahari, Damara and Namqua, and fanned out into South Africa —but even the Kalahari desert is strewn with artefacts.

Australoids in Africa

The appearance of Australoid features among the ancient population of southern Africa is interesting. To this day the Korana people of South Africa can be classed among the general Australoid group. The 'Gamblian' remains from East Africa also show Australoid affinities. And there stretches from southern Arabia, through southern India and Ceylon to the Malay Peninsula (Semang and Sakai peoples) and to Australia proper a (sometimes submerged) 'Australoid-Veddoid' zone of population indicating that, at one time, the Australoids must have enjoyed a very wide extension. If we remember the evidence from Java, we shall be inclined to see in the South African evidence (such as it is) further support for the view that the Australoids not only represent a 'primitive' type but that they may also be the descendants of a type that gave rise to other sorts of 'modern' men who seem to-day so far removed from Australoids.

South African Industries

South African cultures can be plausibly arranged in a certain order but these cultures can only rarely be assigned to definite geological periods even within the framework of South African epochs.

Man may have appeared in Central and in South Africa about the beginning of the Middle Pleistocene and this epoch corresponded with the end of a wet era which may possibly be equated with the Mindel glaciation of north-western Europe. These early men were

chipped pebble makers and users but only few groups of these men survived the long arid period (corresponding to the Mindel-Riss Interglacial?) that next prevailed.

Stellenbosch

Later, the rains of the so-called 'First Pluvial' made forests, parks and grassy plains. Attracted thereto, hunters from the north appeared to have descended the continent. These hunters were makers of Chellean-type hand-axes and of rostrocarinate and flaked tools identical with those of Europe. But this African culture has received, unfortunately, a special name, largely because this Stellenbosch culture shows a greater variety of tools and far more 'choppers' than does the European Chellean and also because in the Stellenbosch artefacts the 'Clactonian' technique was used and for the making of sorts of tools both cores and flakes.

This Stellenbosch industry, even in its peculiar composition, does not stand alone and it is practically identical with one recognized in India and even a Javan industry resembles it closely (see p. 82).

Flint becomes increasingly scarce south of the Sahara, so that the flake industries of the Stellenbosch type may have been fostered by the necessity of obtaining tools by striking off pieces from very hard rocks. If the European makers of the Acheulian tools wanted hand-axes, they nearly always (but there are some exceptions) took a core of flint and chipped away at both sides. The African makers of some of the Stellenbosch types might do likewise, but they seem to have been more disposed to strike a flake off a boulder and then fashion the chip into hand-axe shape.[1] Thus here, at least, is a probable instance of material dictatin technique or of necessity being the mother of invention.

We have no evidence as to what sort of men made the Stellenbosch tools. They may have been men of a comparatively modern type. On the other hand, the Kanam and Kanjera men from East Africa (see p. 204) lived certainly later than this First Pluvial.[2]

In any case, the evolution of the South African Stone Age followed a course comparably parallel with that followed in northern Africa, in western and southern Europe, in Asia Minor and in India, although there is, of course, no evidence that these cultures were contemporaneous with each other.

Still, as regards the stone implements of South Africa, we have, as a French authority has put it, the 'impression that we have not

[1] In Europe the two methods have been used but, apparently, only by two different peoples. In Africa, the 'Stellenbosch' people (if they were homogeneous at least in culture) used both methods indifferently.

[2] To which period their discoverer (as well as some others) at first attributed them.

left that world of which Europe is the north-western neck and India the north-eastern corner.'[1]

After the First Pluvial came a long period of aridity when sand was piled up, for instance, in the Vaal River basin so that it still lies there thirty feet thick. Some few tools have been recovered showing that survivors lingered in the desert.

Fauresmith

The next South African stone culture is the so-called 'Fauresmith' (that may be equated with the 'Nanyukian' in East Africa); this type of industry appears in East Africa (see above) at the end of the First Pluvial, at the Victoria Falls, Zambesi, in the following dry period and in South Africa, properly speaking, early in the time of the Second Pluvial.

This Fauresmith culture appears to be the result of a fusion between the old hand-axe culture and a Levalloisian-Mousterian. In Europe similar fusions also took place, giving rise to hybrid cultures (such as that of Combe-Capelle), but in Africa not only is the fusion more pronounced but it was permanent. The Fauresmith industry is one of small hand-axes, side and end scrapers, Mousterian points, occasional cleavers (and towards the end) blades and gravers. It is, indeed, a mixture of Levalloisian, Micoquian and Upper Palaeolithic techniques.

The population of South Africa was apparently increasing again in favourable living and hunting climates. Fresh groups, mixing and borrowing, pressed down from the north. Some of these groups had learned, apparently, from Upper Palaeolithic men how to make blades and gravers—unless they were themselves the forerunners of the Upper Palaeolithic penetration into South Africa.

The Fauresmith culture-complex disappeared with the oncoming

[1] For convenience of reference I give a provisional arrangement of the South African stone-tool cultures with their European equivalents in type.

Old Stone Age:

(1) Stellenbosch: (*a*) Lower (Chellean and Clactonian).
(*b*) Middle (Old Acheulian).
(*c*) Upper (Upper Acheulian).

(2) Fauresmith: (*a*) Ancient—Old Levalloisian-type flakes.
(*b*) Middle—Neat bifaces (comparable with those of La Micoque).
(*c*) Upper—Disks of small size and thinner flakes.

(3) *Middle Stone Age*
(*a*) Mosselberg—Lower Mousterian.
(*b*) Glencraig—Lower Middle Mousterian.
(*c*) Stillbay—Upper Middle Mousterian.
(*d*) Howieson's Poort Caves—Upper Mousterian.

(4) *Upper Stone Age.*
(*a*) Smithfield.
(*b*) Wilton.

of a second arid period and after this dry epoch there appeared a number of hybrid cultures due to intermingling (before arrival in *South* Africa) of peoples with Mousterian-Levalloisian and with blade industries.

The result was the appearance of a number of more or less distinct types of cultures peculiar to South Africa. Some may have been earlier than others, but there is evidence to show that, for instance, the 'Mossel Bay,' the 'Still Bay' and the 'Howieson's Poort' industries were probably contemporaneous with each other.

Rock Paintings

There are, also, in the South African area superb rock-paintings and rock-engravings, some of them are demonstrably modern—the Bushmen have been rock-painters in historical times—but the oldest of them are associated with Middle Stone Age levels and show Upper Palaeolithic influence. These pictures are probably more or less contemporaneous with our Upper Palaeolithic art (of, e.g., France and Spain), and the cave-art of South Africa seems to be connected *in its origins* with the frescoes of the eastern Spanish shelters and with some of the engravings or paintings of the Sahara and of Libya.

Pastoral Peoples

One phase at least of the African rock-paintings seems to have been associated with the migrations of the first pastoral peoples. Breuil would see in the rock-painted representations of Sourré, near Harrar in Abyssinia, evidence for an essential stage in flock-formation. The cattle at Sourré are dun and speckled. Farther north they are dun and farther south only speckled.

Southern Rhodesia

From Southern Rhodesia to the Cape extends an area of rock-paintings representing not one art but many periods and, doubtless, peoples. Some of the painted rocks are obviously of late Bushman workmanship. Some of those in Rhodesia—of superb technique—may be old.

In one Southern Rhodesian cave is figured an elaborate ceremony comparable with some scenes represented in western Europe (and especially with that of the dead hunter at Lascaux, *vide* p. 242).

There is a most intriguing recumbent swathed figure bearing an antelope-mask. The corpse (if it is one) is ithyphallic with an ejaculation in the form of a stalked flower. The straggling non-

chalantly posed limbs seem to live lazily. What does it all mean?[1]

East Africa: Climatic Phases

The succession of climatic phases has been worked out for East Africa as follows:

(1) A wet period with an industry of roughly chipped pebbles —KAFUAN.
(2) The First Dry Period—arid desert conditions.
(3) Rainy Period—KAMASIAN—artefacts from Abbevillian to Acheulian type with some Clactonian and Levalloisian.
(4) Second Dry Period—great tectonic movements.
(5) Rainy Period—GAMBLIAN—Levalloisian and Aurignacian industries.
(6) Desert conditions.
(7) Rainy Period—MAKALIAN—with Upper Palaeolithic tools and types of transition from Levalloisian.
(8) Dry Period.
(9) Rainy Period—NAKURUAN—Neolithic tools and some 'Tumbian.'
(10) Dry Period of to-day.

Role of Africa in Man's Early History

It is becoming clearer that Africa as a whole, and East and South Africa in particular, played a considerable role in the early history of Man. It does look as though, at several periods in the Pleistocene, Africa served as a sort of sack or reservoir to which populations retreated from elsewhere (and particularly from Europe) and it is not at all improbable that surprising evidence may be forthcoming from African soil.

Africanthropus

In 1935, Kohl-Larsen recovered from the shores of Lake Eyasi in Tanganyika fragments of a primitive type of human skull. Over two hundred fragments (belonging, so Kohl-Larsen holds, to two or more crania) were found embedded in a block of sandstone that, normally submerged by the lake, was revealed owing to a prolonged period of drought. With the human remains were found the heavily mineralized fragments of other mammalian bones, dyed black with age, and of a fauna characteristic of the Mid-

[1] There is a good deal of literature on the South African (and especially on the Rhodesian) rock-paintings. See L. Cripps (in the *Proceedings of the Rhodesian Scientific Association* 39, 1942) on the rock-shelter paintings of Southern Rhodesia. The well-known site of N'danga-Victoria district was first described by Dr. Impey, who likened the paintings to pre-dynastic Egyptian work, but they are more like the rock-shelter paintings from Ido in the Fezzan (southern Tripolitania)—*vide* Leo Frobenius, *Ekade Ektob, die Felsenbilder Fezzans*, 1937. Mr. Miles Burkitt of Cambridge is the leading authority in Britain on these intriguing and rather mysterious pictures.

Pleistocene of the region (*hipparion* among other types) and these fragments were very much rolled from water-action. There were other mammalian remains not rolled and characteristic of the second Rainy Period or Kamasian. The human remains were probably contemporary with this fauna. Numerous Mousterian-type tools were also recovered.

The cranial calotte of one of the skulls was reconstituted by Weinert, who named the type *Africanthropus Njarasensis*. The skull is of moderate dimensions and recalls both the Neanderthaloid and *Sinanthropus* types. The superciliary ridges are remarkably developed and united in a 'visor' as heavy as that of the pithecanthropoids. There is the same receding forehead and flattened vault. The greatest width of the skull is measured from rather low down but not so low down as in the case of *Sinanthropus*. The mastoid processes are reduced, the *foramen magnum* seems to be set relatively as far back as in the great apes and the cranial capacity may be—though the estimate can only be very approximate—about 1,000 c.c. Weinert would class his *Africanthropus* as a pre-hominid, but certain of the features rather recall the Neanderthaloids. The vault is rounded and not 'keel' shaped, the occiput has not the highly special form seen in the *Sinanthropus*, the formation of the temporal bone is also in some respects like that of 'modern' Man. It is probable that the *Africanthropus* should be classed—provisionally, at least—with the Rhodesian skull (see p. 194) rather than with the pithecanthropoids, and it may be that both the *Africanthropus* and Rhodesian Man represent an African quasi-Neanderthaloid phase of human evolution. In any case, *Africanthropus* is a primitive form considerably removed from any type of *homo sapiens*.

Neanderthaloid Man in Abyssinia

The only Neanderthaloid remains discovered in Africa (if we except the Rhodesian skull which cannot be claimed as belonging to any Neanderthaloid category yet established) south of Morocco were found in Abyssinia.

In 1932 Wernert recovered from the 'Porcupine' grotto near Déré-Dawa, in the province of Harrar, a portion of a human lower jaw associated with an 'evolved' Mousterian industry. The relic was fossilized and apparently contemporary with the artefacts. The jaw-fragment was deposited in the Institute of Human Palaeontology in Paris and has not, as yet, been made the subject of a detailed and published report, but it seems certain that the jaw belonged to an individual of Neanderthaloid type.

'Oldoway Man'

In the Oldoway district (in what was then German East Africa),

Tanganyika Colony, Hans Reck unearthed in 1913 the famous 'Oldoway skeleton' in strata he thought must be classed as early Pleistocene.[1] The remains are not in any way 'primitive' and were, apparently, intentionally buried. The skeleton seems to be that of an individual of the general type represented by the extant Masai people.

It is now generally admitted that Reck was mistaken in his identification of the stratum and that the 'Oldoway skeleton' is of comparatively recent date. The find aroused a good deal of discussion and the early Pleistocene dating of the remains was supported by some of those who are eager to seize upon any evidence to establish the existence of 'modern' men in remote times.

The Oldoway skeleton displays, moreover, filed incisors (as with modern African peoples), and although the habit of sharpening the front teeth is undoubtedly ancient it would be, to say the least of it, surprising to discover in a jaw supposedly of early Pleistocene date evidence for a custom performed exactly as by living Africans. In fact, we were asked to believe that a man using 'Abbevillian' artefacts should have been of quite modern type, that he should have been buried in a crouching posture, that all his bones should have survived in anatomical order for countless millennia and also that men hundreds of thousands of years ago filed their teeth—with what?—presumably a great coarse, chipped flint of Abbevillian type.

Kanam and Kanjera

After the 1914–18 war, Dr. L. S. B. Leakey, the Kenya palaeontologist, recovered at Kanam a mandible which he claimed was of early Pleistocene date. The jaw had a definitely marked chin. There is no prognathism (not even alveolar) and the bone is, to all appearances, undoubtedly that of a 'modern' Man. Moreover, as with the Oldoway specimen, the Kanam mandible displayed filed teeth. Leakey also unearthed at Kanjera (in Kenya also) the remains of another skeleton which he would have dated to the Middle Pleistocene.

These datings have not found acceptance.[2]

[1] *Vide* Hans Reck, *Erste vorläufige Mitteilung über den Fund eines fossilen Menschenskeletts aus Zentralafrika* (Sitzungsberichte der Gesell, naturforschende Freunde z. Berlin, 1914). From the first there were sceptics. Weinert was against the fossil character of the Oldoway material, But then Weinert was also sceptical about the undoubtedly ancient Boskop skull, while he was inclined to attribute what seems too great an age to the Springbok remains.

[2] In 1935, Dr. P. G. H. Boswell, the geologist, investigated the Kenya sites and in a report expressed himself rather severely on Dr. Leakey's correlations. The human bones he found are certainly not contemporaneous with the hand-axes of general Abbevillian type found nearby. Leakey had based upon the Oldoway, Kanam and Kanjera material a theory of the African origin of *homo sapiens* and of his biface industry contrasting with that of the Neanderthaloids' flake-artefacts.

'Proto-Hamites'

The men of the Kenya Upper Aurignacian culture-phase have a general look of 'proto-Hamites.'[1] East Africa seems to have been rather in liaison with the north (and the north-west?) than with that part of the continent where the negroes were perhaps differentiated, since from the Upper Aurignacian phase in Kenya until comparatively recent times no 'true' negroes are reported. The crania of the East African Neolithics are, moreover, not by any means typically negro.

Culture Sequences

The central and western African regions are, as yet, too little known (despite much work in recent times) for us to form any clear idea of the culture-sequences comparable with those elsewhere and no remains of fossil Man have been reported from these vast areas. But they are obviously of great importance. The Congo, for instance, is perhaps a key-region for African prehistory.[2]

East Africa is better known. Acheulian bifaces, large flakes of Levalloisian type and 'leaves' of Solutrean appearance have been recovered in Abyssinia. Messrs. Andrews and Arkel have discovered Abbevillian-type and Acheulian-type artefacts in the ironstone gravels of the Khor Abu Anga in the region of the confluence of the White and Blue Niles.[3]

Olorgasailie Acheulian Living-Site

Leakey reported in 1946 the discovery at Mount Olorgasailie (forty-three miles from Nairobi) of an Acheulian hand-axe culture living-site and there is no doubt that the lengthy and widespread hand-axe culture-phase is represented in many regions of Africa as well as in Asia and Europe. He makes the interesting point that as hand-axes were clearly a 'general utility' tool and not a weapon, his discovery of what look like out-size 'bolas' at Olorgasailie affords us a clue to the hunting-habits of early men.[4]

[1] From the Aurignacian sites of Gamble's Cave (Elmenteita), of Broomhead in the same region and from south of Lake Nakuru, the human remains are comparable with those of Oldoway ('generalized' Hamite). Leakey has distinguished two other Upper Palaeolithic human types in East Africa, (*a*) a quasi-pygmy that he equates with the Springbok remains from South Africa and (*b*) a type not unlike that of a 'proto-Bushman.'

[2] *Vide Trans.* Royal Soc., South Africa, 30, Pt. 11, 1944, articles by Professor Breuil and Professor Van Riet Lowe.

[3] Teilhard de Chardin has noted that there is in French Somaliland and in Abyssinia a lithic 'point' industry distributed over wide areas. It seems to have lasted a very long time and would indicate a period of great humidity while it flourished.

[4] 'Bolas' consist of stone balls attached to the end of a thong and on being thrown at an object wind round it in a natural knot. They are—or were until quite recently—used by 'cowboys' in S. America.

CHAPTER SEVEN

EUROPE

Mauer or Heidelberg Man

THE most ancient human relic found in Europe must still be taken to be the 'Heidelberg' or 'Mauer' jaw. This solitary mandible is of such importance in the European part of Man's story that it demands some detailed notice.

In 1907 there was recovered from a position seventy-nine feet below the surface of a sand-pit at Mauer, near Heidelberg, in Germany, a portion of a lower mandible bearing a general resemblance to that of the Neanderthaloids.

The sand-pit in question was cut through strata deposited by an Ice Age river and they extend to a depth of no less than eighty-five feet to the bottom of the Elsenz valley. Under the surface loess is sand laid down by the storms of cold seasons at the beginning and end of a glaciation. The 'Older' loess of Mauer would appear to have been deposited before, and the 'Younger' loess after, the last or Würmian glaciation. There are at Mauer eighteen feet of 'Younger' loess, then seventeen feet of 'Older' loess and then fifty-one feet of 'Mauer sands.' The position in which the jaw was found seems, therefore, to indicate great antiquity. No stone implement has been recorded from the Mauer site (perhaps, as Zeuner suggests, 'because collectors in early Pleistocene deposits are apt to look for hand-axes and consequently inclined to overlook primitive flake implements') but it would seem that some worked *bone* objects have been found.

On stratigraphical grounds alone it would not be unreasonable to set the date of the Mauer specimen at some phase of the Mindel glaciation's retreat.

The Mauer mandible is exceptionally massive, robust and large. There is no trace of a chin-prominence. The shallowness of the mandibular notch at the top and the width of the ramus (or ascending portion of the jaw) suggest a Neanderthaloid type. Boule considered that the Mauer jaw was so anthropoid in character that had it been found without the teeth it would have been taken for the mandible of an ape, whereas the teeth, if they had been discovered isolated from the jaw, would have passed for those of 'modern' Man. However, this judgment is perhaps unjustifiable. The jaw is definitely hominid and although the teeth seem very 'evolved' for such a 'primitive' type of jaw, they do display some 'primitive' features. But the canines are no longer and no larger

than in some types of modern Man; moreover, the wisdom tooth (third molar) is slightly smaller than the second molar—a human characteristic. All the sixteen teeth have been preserved. Some were displaced during the excavation of the relic and many casts of the Mauer jaw show it as wanting three or four teeth, but they all exist.

From this portion of a lower jaw it is possible to reconstruct—with some degree of reliability—the upper dental arch and the maxillary (upper jaw) and zygomatic (cheek-bone) regions. Such an upper dental arch, though rather large and U-shaped (a 'primitive' trait), is no larger than the arch of some Neanderthaloids that it much resembles. But it would seem—from such a reconstruction—that the cheek bones of 'Mauer Man' could not have sloped obliquely backwards (as do those of the Neanderthaloids) but, on the other hand, these bones must have stood out squarely (as, for instance, in *Pithecanthropus*) giving the Man of Mauer a rather wider and flatter face than that of the Neanderthaloids.

Still, the teeth of Mauer Man seem, on the whole, to be more like those of 'modern' Man than even those of the Ehringsdorf (see p. 219) Neanderthaloid skull. But, again, this massive Mauer jaw would fit rather well one of the (presumably) male *Sinanthropus* crania—and the *Sinanthropus*, as we have seen, combines in his teeth features both 'primitive' and 'advanced.' On the whole, we may conclude that 'Mauer Man' was a hominid of general pithecanthropoid type and of general Lower Pleistocene date.

The Mauer jaw which for long was the largest and most robust of any known belonging to ancient Man seems less isolated now that we have *Sinanthropus* and *Pithecanthropus*. And compared with the enormous size of the *Meganthropus* jaw-fragment, the Mauer mandible appears almost slender.

Except for a few small fragments discovered by Wardenberg, no other parts of Mauer Man have been recovered, so that 'reconstructions' of his supposed general appearance are quite gratuitous.[1]

In considering material supposed to be that of 'pre-Neanderthaloid' Europeans, we have to reject a mass of specimens[2] whose claims are quite unjustified.

Galley Hill

There remain four pieces of evidence worthy of some attention.

[1] Schoetensack was the first to describe the Mauer mandible that he assigned to a hypothetical *homo heidelbergensis*. Bonarelli even created for Mauer Man a special genus—that of *palaeanthropus*.

[2] Such as the 'Clichy' skeleton from Paris, the 'Castelnodolo' skull from northern Italy and, of course, the notorious 'Moulin-Quignon' jaw from the Somme valley, the mandible which so damaged Boucher de Perthes' reputation.

All of them, curiously enough, were recovered from the soil of southern England.

First in date of discovery comes the 'Galley Hill' specimen found in 1888 in the high terrace of the Thames Valley gravel of supposed Acheulian or even Abbevillian culture-period. The site, indeed, yielded many implements of Lower Palaeolithic hand-axe form. The human remains consist of a nearly complete skeleton in anatomical connection. In itself, this arrangement of the bones is rather suspicious. The bones of mammoth, hippopotamus and rhinoceros at the same site are all scattered. The skeleton is that of a short individual (perhaps only 5 ft. 3 in. in height when living) and both in bone-form and in traces of muscular attachments the remains are those of a 'modern' Man. The skull appears to be that of a male and its cranial capacity is about 1,500 c.c. There is nothing in the cranium to suggest Neanderthaloid or 'primitive' characteristics. In fact, the Galley Hill Man is of what may be called 'general Mediterranean type.' The remains were removed before the site was examined and there is no expert's report available as to the exact position in which the bones were found. At the best, we must regard the 'Galley Hill' specimen with reserve and not admit it as representative of pre-Neanderthaloid inhabitants of Europe. Those who accept the high antiquity of the remains would date them to the Mindel-Riss Interglacial (rather late in that epoch).[1]

Piltdown

Next we come to the famous 'Piltdown Man,' whose remains have been publicized as those of the 'Oldest Englishman.' In 1912, Charles Dawson (*d.* 1916) and Smith Woodward (*d.* 1945) announced that there had been discovered in a patch of gravel alongside a path near Piltdown in Sussex, a skull and a mandible. As a matter of fact, the skull fragments were unearthed by workmen and the mandible discovered, some time afterwards, by Dawson and Woodward together. The details of the finding have been often recounted.

The undoubtedly human remains consist of several skull-fragments in such condition that at least four 'reconstructions' of

[1] Most foreign authorities express doubts as to the Galley Hill specimen (e.g., Vallois of Paris). With us, however, Keith, and recently Zeuner, are inclined to accept the skeleton's great age. Weidenreich, also, at least at one time, was disposed to consider 'Galley Hill' as a 'modern' Man contemporary with, or preceding in date, the Neanderthaloids. C. S. Coon of Harvard, in his classical work, *The Races of Europe*, accepts Galley Hill and presents it as a prototype of the 'generalized Mediterraneans.' 'Ipswich Man' has also been supposed to be of Mid-Pleistocene date but the specimen is almost certainly not older than the 'Upper Chalky Boulder' formation—a clay corresponding with a Mousterian 'horizon' and 'Ipswich Man' probably lived at the beginning of the Upper Palaeolithic.



Photo. Prof. H. Breuil

FIG. 20—Details of roof-paintings at Lascaux

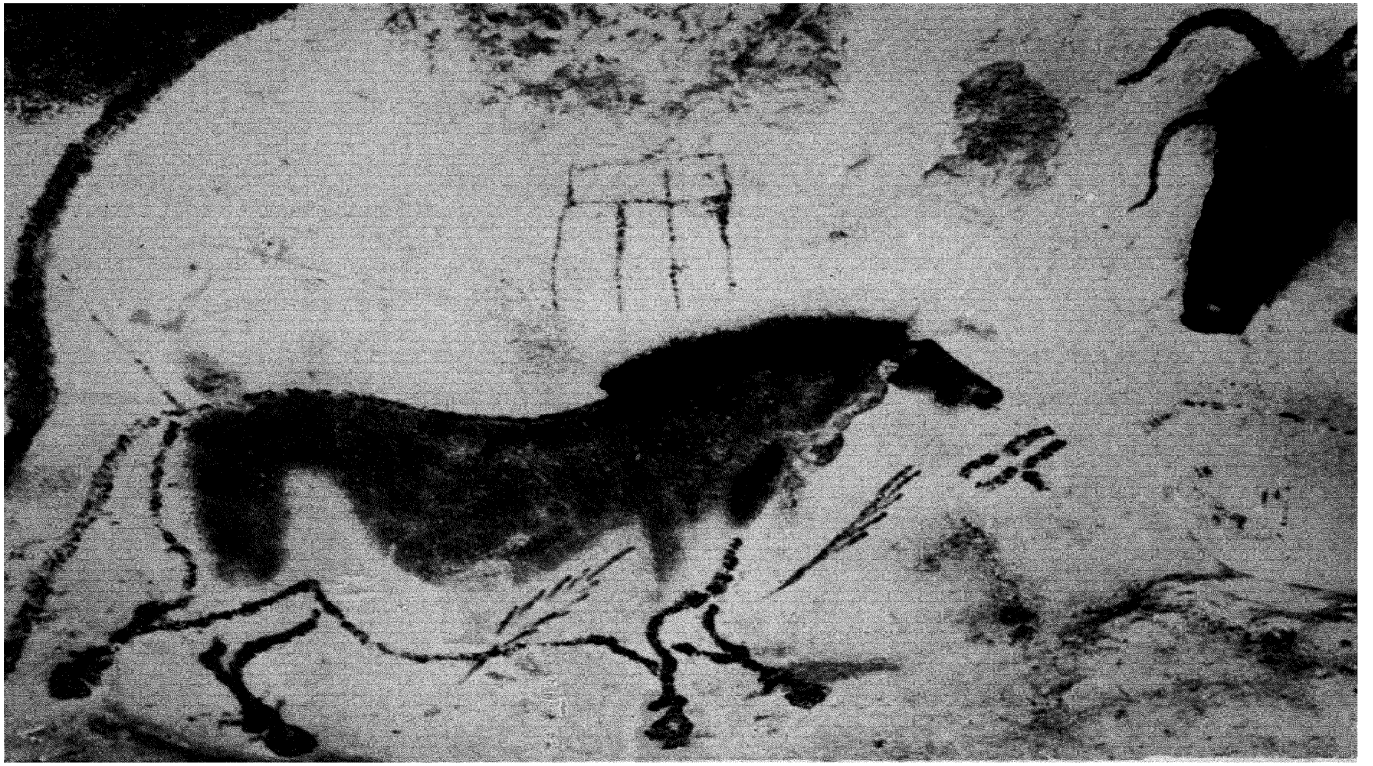


Photo. Prof. H. Breuil

FIG. 21—Lascaux : Wild ox's head. A mare in foal attacked by arrows. Above, a symbol that may be a trap or a snare

the cranium have been presented. With the exception of part of the nasal bones, the whole face is missing and the rest of the cranium in a very incomplete condition. The skull, despite its thickness, is not unlike that of some English women's crania from the seventeenth century plague-pits. The late Elliot Smith, however, maintained that the skull presented more 'primitive' features than those who had not handled it might suppose. The jaw—that was recovered at some distance from the supposed site of the cranium-fragments—is so anthropoid that it could well pass for the mandible of an immature ape.

Smith Woodward made a reconstruction of the skull and jaw together and baptized his creature *eoanthropus dawsoni*. Many authorities are now agreed, however, that this jaw cannot belong to the skull-fragments with which it has been associated. It seems clear, indeed, that the bicondylian width of the mandible is noticeably less than the biglenoidian width imposed by *any* reconstruction of the cranium. In other words, the jaw and the skull just do not fit.

Fragments of a second skull (though none of a jaw) were unearthed, later, at a point not far distant from that of the first find.

The cranium-fragments were apparently discovered in a deep bed of yellow gravel which itself was superimposed upon a layer of yellowish clay and sand covering the ancient Wealden Rock or 'Hastings Bed.' Rudely-shaped artefacts—worn by water-action—were recovered in the yellow gravel and an upper level of sandy loam furnished more finished tools. The human bones came, it seems, from the lowest stratum, but since they show no signs of water-action it is not improbable that they really belonged to the level of the unworn tools of the upper layer. If, however, the human bones were contemporary with the other mammalian bones recovered from the site (horse, mastodon and stegodon), then their date might possibly be set at early Pleistocene. But the general impression left by an impartial study of the evidence is such as to make us rather sceptical as to the great age that has been assigned to the Piltdown fragments.[1]

Lloyds

In October 1925, at a site under 'Lloyds' at the corner of Leadenhall and Lime Streets in the City of London, workmen while digging foundations discovered four skull-fragments about thirty-

[1] An (apparently) 'shaped' tool or instrument fashioned from the thigh-bone of *elephas antiquus* or *elephas meridionalis* was also recovered from the site. The sequence of the discoveries was (*a*) portions of a cranium and part of a mandible in a stratum of gravel that is, in effect, undateable (year 1912); (*b*) in 1913, Father Teilhard de Chardin, S.J., found a canine tooth apparently belonging to the mandible; (*c*) in 1915 some fragments of the skull of another 'Piltdown' individual were unearthed about a mile from the site of the first discovery.

eight feet below the level of the street and embedded in London blue-clay. The portions comprised part of the occiput, a large part of the right parietal and a small portion of the left parietal bones. Forehead, face, base and jaws were all lacking. It was, indeed, sparse material. As far as can be judged, this 'Lloyds skull' (which has been advertised as the 'Left-handed Lady of Lloyds') *appears* not to be of Neanderthaloid type, but Mousterian artefacts were recovered from nearby and the skull *may* be of a generalized Neanderthaloid type—although the bones are thin, the occiput projects at the part covering the cerebellum.

Swanscombe

The Swanscombe skull-fragment is, from many points of view, the most interesting of the four sets of human remains we are considering.

The fragment was discovered by Mr. Alvar Marston in 1935 at Barnfield pit, eight hundred yards north-west of Swanscombe church, between Gravesend and Deptford, and in a gravel of a hundred-foot river terrace. Only the hind, or occipital, portion of the cranium was recovered. The bones are in a good state of preservation and none of the sutures is occluded (not even the spheno-occipital, usually the earliest to close up), so that at the time of death the individual may have been aged between twenty and twenty-five years. It is possible that the cranium may be that of a female and it bears resemblances to those of 'modern' Man. It is not Neanderthaloid in the sense that there is no marked occipital torus, although it may be noted that in the so-called 'pre-Neanderthaloid' of Sternheim (see p. 220) the occipital and parietal bones are as close to those of the Swanscombe skull as they are to those of 'modern' Man.[1]

The stratum in which the fragment was found has been claimed as of the Mindel-Riss Interglacial, but the chronological position of the Swanscombe deposit is far from agreed upon and it may be posterior to the penultimate (i.e., Riss) glaciation. The fragment was found undisturbed and Middle Acheulian type hand-axes were recovered from within a few feet of the human bones, which, however, seem to be in too good a state of preservation for the great age that has been assigned to them. They do, however, appear to exhibit the same degree of fossilization as do the bones of the other mammals found in the site, but these are all typical of the last (or Riss-Würm) Interglacial.[2]

[1] A Committee set up in 1938 reported that the Swanscombe fragment differed in no material way from the relevant portions of 'modern' skulls. See H. V. Vallois, *L'Anthropologie*, xliii, 1937.

[2] i.e., *elephas antiquus*; *rhinoceros merki*, *bos primigenius*, *cervus elaphus*, *cervus alcea* and *equus caballus* and no trace of the antique beasts we should expect to find in a Mineld-Riss horizon.

We may say of the Swanscombe specimen (*a*) that it was found in 'satisfactory' circumstances, (*b*) that it is of unidentified—and probably unidentifiable—type, (*c*) that it is of doubtful age though possibly of Riss-Würm Interglacial and therefore perhaps contemporary with some of the 'earlier' and more 'generalized' Neanderthaloid remains (e.g., Ehringsdorf, etc.), and the Swanscombe fragment does show some affinities with the rather puzzling Sternheim skull.

But the dating, satisfactorily, of this Swanscombe fragment would be very useful. *If* the fragment is that of a 'modern' type of Man and *if* it is Lower Pleistocene, then we should have evidence for the existence of 'modern' men in very remote times and we should have to consider that 'modern' men are derived from ancestors who flourished in the Early Pleistocene—that is, earlier than either the *Pithecanthropus* or the *Sinanthropus of which we possess the remains.*

Whenever we are considering objects from sites in the open and especially from sites showing traces of water-action, we are justified in being doubtful as to the exact chronological order of the deposits. Alternations of frost and thaw alter very considerably the original stratified order of fluvial deposits.[1]

Our conclusion must be that the 'pre-Neanderthaloid' human remains from Europe consist of (*a*) one jaw-fragment (that of Mauer) whose great age seems undoubted, and (*b*) possibly, of the Swanscombe skull-fragment. It is meagre material indeed. The Mauer jaw now seems referable to a general pithecanthropoid type and is rather comparable with *Sinanthropus* jaws. The Swanscombe fragment is unidentifiable as to type and is probably not at the most older than the Riss-Würm Interglacial—if as old.

There is, therefore, little or no evidence to support the contentions of those who would have it that 'modern' type of men inhabited Europe before the appearance of the Neanderthaloids. 'Modern' men *may* have lived in our continent in, say, Mindel-Riss Interglacial times, but there is no clear proof for their existence.

Pre-Neanderthaloid Europeans

From the evidence of the artefacts we get an over-all picture something like the following. With the onset of the Riss glaciation's great cold 'Acheulian' Man in part died off and in part migrated to more clement climes—possibly Africa. It does seem, from many

[1] In this connection a note published in the *South African Journal of Science*, 41, 1945, by Professor Van Riet Lowe is illuminating. He points out that artefacts may be transferred to surprisingly deep levels by torrential water-action. He has noted a soda-water bottle under twenty feet of gravel, a waggon-wheel associated with a rolled (i.e. water-worn) palaeolith recovered from twenty-three feet under a river-bed and a Chinese Buddha in stone found in an apparently undisturbed site along the trail taken by the 1837 *voortrekkers.*

points of view, as though the African continent has played in the past, not seldom, (*a*) the role of a pocket into which have passed the overflow or the backwash of the great migratory movements across the vast Eurasiatic continent, as well as a (*b*) reservoir whence human types may have emigrated into Eurasia.

The Neanderthaloids when they arrived in Europe *may*, of course, have found an empty area or they may have found one sparsely peopled by the remnants of 'Acheulian' Man (that is, the makers and users of Acheulian artefacts). We are free to imagine, if we will, that if 'Acheulian' men were here in Europe to meet the newcomers there was interbreeding between the two types. The industries do suggest close contact and mutual influencing and it is conceivable that the earlier and more 'generalized' Neanderthaloids may have been the results of hybridization—but this is, of course, a quite unsupported hypothesis.[1]

All the European sites yielding tools of ancient men and dateable to the Würm glaciation times (phase I) have all shown (*a*) the bones of men of Neanderthaloid type, and/or (*b*) flake tools of more or less 'Mousterian' type.

But Neanderthaloid men seem to have been present in Europe earlier than the Würm glaciation. They appear in the Riss-Würm Interglacial and the human remains from sites which can be dated to this period are not only of the earlier and more 'generalized' Neanderthaloid type but the industry associated with their bones is *not* a Mousterian flake-culture but one of a general 'Levalloisian' character. On the other hand, to the same Interglacial we must probably assign also the Krapina Neanderthaloids (see p. 216) and their bones are found associated with a crude Mousterian industry.[2]

These considerations do suggest contacts and intermingling between men of at least sharply different *techniques*.

The European Neanderthaloids

The greater number of Neanderthaloid stations (i.e., sites yielding 'Mousterian' type artefacts), up to now recorded for Europe, are to be found in France.

Below is a list of the more important Neanderthaloid remains not already dealt with here.[3] I have presented the material arranged

[1] The old Acheulian core-culture left traces among the components of the Mousterian complex (*vide infra*).

[2] Moreover, the Cotte de Saint-Brelade site in Jersey has, for instance, yielded both a Mousterian-influenced late Levalloisian industry and (following on) a Levalloisian-influenced 'true' Mousterian industry. Both types of artefact are associated with a 'cold' fauna and the 'true' Mousterian tools with Neanderthaloid men's teeth.

[3] Some of the less significant (e.g., the Neanderthaloid fragment found in 1859 in the Grotte des Fées at Arcy-sur-Cure) have been omitted from the list.

in the chronological order of its discovery, but it may be borne in mind that we have here remains of which the more 'generalized' forms (i.e., Ehringsdorf, Steinheim, etc.) are earlier in date than the 'classical' Neanderthaloids and that some would exclude these earlier forms from the Neanderthaloid group.

(1) *Engis.* As long ago as 1829 P. C. Schmerling recovered two crania—one of an adult and the other of a child—at Engis, in Belgium. Owing to the apparent age of the strata in which they were discovered, it has been thought, on little evidence, it is true, that these remains may have been re-interred by 'modern' (i.e., 'Aurignacian') Man. But it is also arguable that the skulls are of *later date* than that usually assigned to Neanderthaloids. Schmerling described his finds in 1833 and J. H. Huxley in *Man's Place in Nature* compared the Engis specimens with the later found and famous skull of Neanderthal. In 1936 C. Fraipont, the Belgian anthropologist, published a monograph on the Engis child's skull and reported that it was one of a Neanderthaloid aged from six to seven years and, apparently, of the 'classical' or more robust type.

(2) *Gibraltar.* (*a*) In 1848 a fossilized skull-fragment was recovered at Gibraltar by a Royal Artillery officer stationed at the Rock. Little or no attention was paid to this relic until it was studied in 1864 by Busk. It is now generally held to be part of the cranium of a woman. The facial bones, those of the right side and those of the occiput, have been preserved. It is difficult to form an idea as to the age of the subject at death since the major portion of the cranial vault is missing. This (first) Gibraltar skull (now in the Collection of the R. College of Surgeons in London), although undoubtedly Neanderthaloid, seems to fall into the more 'generalized' type of Neanderthaloids. The cranial capacity would be about 1,280 c.c. and the cranium is comparable with those of Saccopastore I and II (*vide* p. 36).[1]

(3) *Neanderthal.* This, the eponymous skeleton of the whole Neanderthaloid group, was unearthed in 1856 by workmen digging in the limestone Feldhofer grotto giving on to the Neanderthal between Elberfeld and Düsseldorf in Rhenish Prussia. The remains recovered, or at any rate preserved (since it seems that some material was thrown away by the labourers), consist of a brain-cap, two humeri and some other fragments long (and perhaps still) housed in the Fuhlrott collection at Elberfeld. The site of this famous discovery is now destroyed. It was a small cave, high enough to admit a man upright, and extending only for about fifteen feet into the rock. The cavern gave on to the southern face of the

[1] *Vide* Sera: *Società romana di Antropologia*, pub. xv, 1909.

Neander's gorge about sixty feet above the river's bed and some hundred feet from the Düssel stream. In its earlier, and unmodified, condition the grotto opened on to a narrow terrace from which the rocky precipice descended almost vertically to the river. The bones were found under a deposit of 'mud' some four or five feet thick and they were removed without record being kept of their position, so that there is no stratigraphic evidence available as to their age or the conditions in which they were (possibly) interred. There were 'dendrites'[1] on all the bones finally preserved.

Schaffhausen of Bonn was (in 1858) the first to describe the remains that he noted as 'the most ancient memorial of the early inhabitants of Europe.' Controversy raged about the Neanderthal specimens with even more violence than did that around the *Pithecanthropus* skull nearly forty years later. Virchow, the well-known German anatomist, showed himself(as in some other matters) obscurantist as regards the Neanderthal evidence and refused to see in it anything but a 'pathological' specimen of modern Man. In Britain, Huxley and Lyell were the first to declare that the Neanderthal remains were those of an ancient type of Man.[2]

In 1899, Schwalbe issued a monograph on the remains, concluding that the subject was 'over forty years of age' at the time of death—on the other hand, Walkhoff in 1904 stated that the age could not be more than thirty years. As far as we can judge, Schwalbe was the more likely to be right since the sagittal suture is quite closed as is also the third segment of the coronal, whose first two segments (as well as the lambdoid) are open, and thus they would hardly be (judging by the analogy of *homo sapiens*) if the subject had been over fifty years of age.

(4) *La Naulette.* In 1865, Ed. Dupont recovered a lower jaw (with some other human bones—a metacarpal, an ulna and a canine tooth) from a cave called *Trou de La Naulette* whose opening lies some ninety feet above the course of the Lesse stream in the Ardennes (eastern Belgium). The cavern gives on to the rock-face by a narrow corridor. The jaw and the other remains were found in the same layer. The floor of the cave is composed of some thirty-

[1] 'Dendrites' are moss-like or plant-like markings showing on mineralized bones.

[2] The name of '*homo neanderthalensis*' (that has now unfortunately become classic though on grounds of prior discovery the name should be rather 'Engis') was first suggested in 1864 by Professor King of Queen's College, Galway. Already in 1863, Huxley pointed out the resemblance between the Neanderthal skull and those of the 'Borreby' type of modern men in north-western Europe. His comment on the Neanderthal find was 'we must extend by long epochs the most liberal estimate that has yet been made of the antiquity of Man.' In this same year 1863 (four years after the publication of the *Origin of Species*) Lyell referred to the 'ape-like' features of the Neanderthal remains as evidence for the support of Lamarck's doctrine of 'progressive development.' Estimates of the Neanderthal skull's cranial capacity are rather varied, e.g., 1,408 c.c. (Boule), 1,500 (Manouvrier) and 1,532 (Ranke).

five feet of alluvial soil divided into eight strata each separated from the other by a layer of stalagmitic matter. The human remains were recovered from under the fifth stalagmitic layer counting from the surface. Their stratigraphical position seems, therefore, to have been quite satisfactory. In the same stratum were also discovered the remains of mammoth, woolly rhinoceros, bear and reindeer.

The La Naulette mandible is incomplete, lacking the ascending parts and a portion of the right-hand horizontal part. The jaw is prognathous and slopes away below the incisors and the condition of the teeth-cavities (the jaw is toothless) indicates that the molars increased in size from front to back, and this, as we have seen, is a 'primitive' feature. The third molar of the La Naulette mandible appears not to have been quite erupted at the time of the subject's death. Such a condition in 'modern' Man would indicate an age of about fourteen or fifteen years.[1] The relation of the La Naulette remains to those of Neanderthal and of Gibraltar (1848) was not realized until the Spy skeletons were recovered, whose mandibles are of the same type as that of La Naulette—the latter specimen, therefore, was an important link in the chain of Neanderthaloid evidence.

(5) *Spy.* In 1886, Maximin Lohest and Marcel de Puydt found two nearly perfect skeletons in the *Betches aux Roches* cavern near Spy (Belgium) and at a depth of sixteen feet and together with numerous tools of Mousterian type (now in the Lohest collection at Liége). These Neanderthaloid skeletons were studied in 1887 by J. Fraipont and M. Lohest and, again, in 1937 by the late Aleš Hrdlička. Spy I is probably a male whose age may be put at about thirty years at the time of death, while Spy II (now also considered to be a male) may have been aged about twenty-three. The femur and the tibia of the second specimen show signs of suture of the epiphyses. The animal remains included those of the woolly rhinoceros (*r. tichorhinus*), mammoth (*elephas prim.*) and cave-bear (*ursus spelaeus*). According to Fraipont, the cranial capacities would be 1,565 c.c. for Spy I and 1,710 c.c. for Spy II.

(6) *Malarnaud.* In a stalactite cave near Malarnaud in the Ariège department of south-western France was recovered in 1889 an almost complete lower jaw of a Neanderthaloid. The wisdom tooth had not erupted, and we have no skulls of adult Neanderthaloids in which the wisdom teeth have not come through. The jaw, therefore, in all probability, belonged to an individual aged between twelve and eighteen years at the time of death.

[1] Of course, in many 'modern' men the third molar either erupts much later than when the subject is fifteen, or it does not erupt at all, but these hidden wisdom teeth are infrequent, save in the cramped or reduced jaws of 'civilized' men.

(7) *Bañolas.* At Bañolas, a point about twenty miles equidistant from the Mediterranean and the French frontier in north-eastern Spain, was discovered in 1887 a lower jaw of a Neanderthaloid that, up to the present, is the only physical relic of ancient-type man found in the Iberian peninsula (if we except Gibraltar). The Bañolas jaw was the subject of a monograph in 1915 by Hugo Obermaier and H. Pacheco. The bone appears to be that of a man aged, perhaps, about forty years. The real age, however, may have been less if we allow for early grinding-down of the well-worn teeth through use of an abrasive diet. As far as can be seen from so small a portion, the Bañolas fragment belonged to an individual who *may* be classed with the Ehringsdorf or generalized Neanderthaloids rather than with the 'classical' type.

(8) *La Quina.* The La Quina site in the commune of Gardes was bought by the late Henri Martin in 1904 and here, between 1911 and 1920, he made a whole series of Neanderthaloid finds. He considered indeed that he had recovered the remains of twenty individuals. It now seems probable that there were not quite so many. In any case, however, the La Quina discoveries must rank with the most significant we have. Only specimen V and specimen XVIII are, however, sufficiently preserved for an estimate to be made of the age of the subjects at death. Specimen V is apparently that of a woman aged about thirty years since all the sutures of the vault were unfused even upon the internal face. Hrdlička, on the other hand, who studied all the La Quina material, was of the opinion that the state of the skull indicated a slightly greater age, say, about thirty-five. Specimen XVIII is that of a child, perhaps eight years old. The latter specimen was dug up by Mme. Henri Martin in 1915.[1] A publication dealing with the finds in general was issued in 1923. The infant's skeleton was presented to the Laboratory of Palaeontology of the Museum of Natural History in Paris. The remains are those of Neanderthaloids of the 'classical' type.

(9) *Krapina.* In 1906 Gorganovič-Kramberger studied the series of Neanderthaloid remains that had been found (in 1899) at Krapina, near Agram (Zagreb), in Croatia. The bones are, on the whole, in a poor condition. The skulls are, for the most part, fragmentary and bear traces of charring. The long bones have been split lengthwise (presumably for the extraction of the marrow) and the remains are probably those of cannibal feasts.

At least twenty individuals of both sexes were represented in this rich Krapina site, but no single cranium is in a really satis-

[1] See : *L'Enfant Fossile de La Quina* (Paris), 1927.

factory condition. Gorganovič-Kramberger sorted out the whole mass of bones into three groups thus:

(*a*) Children, aged from six to thirteen.
(*b*) Adults of ages varying from twenty to thirty.
(*c*) Some 'very old' adults.

As classified, much later, by Hrdlička, the remains can be arranged thus:

(1) Three crania—two of children and one of a young adult.
(2) Six upper jaws, five of them belonging to individuals aged less than twenty years and one to a subject of more than twenty years of age.
(3) Ten lower jaws—
  (*a*) Three, of children aged approximately seven, eight and thirteen.
  (*b*) One, of an adolescent of, say, sixteen or eighteen.
  (*c*) One, of a woman of about twenty years of age.
  (*d*) Four (one male and three female), of adults.
  (*e*) One, of a man perhaps 'advanced in age.'

The Krapina men fall, apparently, into the 'Ehringsdorf' (*vide infra*) group of Neanderthaloids of more 'generalized' type, but the hitherto undescribed Krapina fragments in the Zagreb Museum should, upon close and expert examination, throw more light upon the affinities of the Krapina men. With this Croatian material should also be compared the (very incomplete) mandible of a child (aged apparently between eight and ten) found at Šipka, Moravia, and described by Maška as long ago as 1886. With the Krapina remains were recovered artefacts of a crude Mousterian type and the date of the 'Krapina Men' may be set at some time in the Riss-Würm Interglacial.

(10) *Le Moustier.* The Le Moustier cave gives on to the right bank of the Vézère River above Les Eyzies in the Department of the Dordogne in south-western France. The site is famous since it has given the name to the 'industry' of Neanderthaloid Man. In the lower strata of the cavern were found some 'late' and (apparently) 'degenerate' types of hand-axes of Acheulian tradition—that, as we have seen, is more ancient in Europe than 'Mousterian'—but the original Le Moustier cranium was not unearthed in association with these Acheulian tools but at a higher level and in company with definitely 'Mousterian' artefacts although of Acheulian 'tradition.' Typical Mousterian tools were recovered from still higher strata and at one of these levels was discovered the now famous Mousterian skeleton of a Neanderthaloid boy. On the face

of it, the Le Moustier site seems to point to a mingling and intermixture of cultures.[1]

It was in 1909 that Otto Hauser dug up at Le Moustier the very much deteriorated skeletal remains described by Klaatsch as those of 'an adolescent male aged probably about sixteen years.' Hauser deserves a word of comment since he it was who by his acts moved the French to protect, in some measures, their incomparable heritage of prehistoric sites and remains. Otto Hauser, although a German, called himself a 'Swiss prehistorian.' He was as little a prehistorian as he was a Swiss. He had already conducted a slashing series of excavations at Vindonissa and at La Micoque before he descended upon Le Moustier. He worked on commercial lines and was backed by the 'Linea' company which levied a fat percentage upon all the profits of Hauser's misdeeds. The pseudo-Swiss sold the Le Moustier and the La Combe-Capelle specimens out of France for 125,000 francs gold (or £5,000 gold). Digging up the past has been a profitable job for some 'explorers.' The Le Moustier remains—of an apparently 'classical' Neanderthaloid—are now—or were until 1939—in the Berlin Museum.

(11) *La Chapelle-aux Saints.* Under the middle of the passage in a low-roofed cave near the village of La Chapelle-aux-Saints (Corrèze) were in 1908 recovered the remains of a Neanderthaloid that have been the subject of a classical study by the late Marcellin Boule. The skull (found crushed into several fragments and repaired probably so as to exhibit a certain mount of unnatural distortion) is the best preserved of all the 'classical' Neanderthaloid crania (except that of Monte Circeo), the basal portion is intact and the lower jaw was also recovered. The skull is exceptionally massive, rugged and impressive, with immense brow-ridges and jutting nasal bones. The skeleton was found in a position which indicates intentional burial.

(12) *La Ferrassie.*[2] La Ferrassie lies about three miles to the west of the prehistoric station of Les Eyzies in the Dordogne on the Vézère River and some two miles from Le Bugue. The site was explored from 1909 to 1912 by L. Capitan and D. Peyrony. Two skeletons were found. They are, apparently, those of a young but adult man (1910) and of a woman (1912) of about the same age. No monograph has been published on the find although the

[1] 'Mousterian' was the name given to this industry by the French archaeologist G. de Mortillet, but he also applied the designation to a division of the Pleistocene Period. Indeed, as late as 1912, some anthropologists were defining geological epochs by designations properly applicable only to types of industry.

[2] The La Ferrassie specimens were evidently intentionally buried and the site may, indeed, be that of a 'family vault.'

specimens have been studied by several anthropologists. In 1912 and in 1921 the remains of four other individuals—in a very bad state of preservation—were recovered at La Ferrassie. Two of these remains are of young children (aged, perhaps, from three to five years) and the bones were found associated with Mousterian flints and those of bison, reindeer and horse—typical fauna of the Würm I glaciation. All the La Ferrassie human remains are—as far as can be seen—of the 'classical' Neanderthaloid type. The cranial capacity of the adult male La Ferrassie skull is greater than that of the La Chapelle-aux-Saints specimen.

(13) *Pech de l'Aze.* Here, between the years 1909 and 1910, Capitan and Peyrony unearthed the Neanderthaloid cranium of a child (aged, it would seem, five or six) but of this find no detailed study has yet been published.

(14) *Ehringsdorf.* At Ehringsdorf, near Weimar, in Germany, were discovered in 1914 and in 1916, respectively, two lower jaws of Neanderthaloids. The remains were first studied by Hans Virchow (the son of Rudolf Virchow who was so obtuse as to the significance of the Neanderthal find); he found the former of the two jaws 'not senile' and the latter 'that of a child of ten years of age.'[1] At Taubach (also near Weimar) were also found some rather ape-like molars that are difficult to place.

In 1925 a much more important discovery was announced from Ehringsdorf. It was that of a skull-cap described by Franz Weidenreich in 1928 as that of a female 'aged from eighteen to thirty years' (see Franz Weidenreich, *Der Schädelfund von Weimar-Ehringsdorf*, Jena, 1928). The cranium was recovered quite near the site of the two mandibles of 1914 and 1916. However, these jaws appear to have belonged to individuals of the 'classical' Neanderthaloids, whereas the 1925 Ehringsdorf skull (which seems to be one of the oldest of Neanderthaloid relics) is one of the least 'primitive' and most 'generalized.' Weidenreich is of the opinion that with this Ehringsdorf specimen we are 'getting back to the common parent of Neanthropic and Neanderthaloid man.' The Ehringsdorf cranium may be usefully compared with the Galilee fragment (see p. 160) or, as Weidenreich puts it, 'The Ehringsdorf together with the Galilee skull, occupies an intermediate position between *homo-primigenius*' (i.e., Neanderthaloid Man) 'and recent Man.' In his opinion, the Skhūl skulls fit in between the 'classical' Neanderthaloid type of Europe and 'the general type of *homo sapiens*.' The Taubach-Ehringsdorf 'Weimar' culture is, generally speaking, Levalloisian.

[1] *Vide* H. Virchow, *Die Menschliche Skeletreste aus dem Kämpfischen Bruch im Travertin von Ehringsdorf bei Weimar*, Jena: 1920.

(15) *Gibraltar (b)*. In 1926 parts of another Neanderthaloid skull were discovered at Gibraltar and the specimen is, apparently, that of a child aged about five years. The frontal and left occipital bones together with the lower jaw have been preserved. Buxton described the remains in 1927 and they fall distinctly into the class of the more 'generalized' Neanderthaloids, and may be classed with Saccopastore (I and II).

(16) *Steinheim*. On 20th July, 1933, at Steinheim-am-Murr, just where the Murr stream falls into the Neckar River, was discovered a fossil skull which, from many points of view, is one of the most interesting yet brought to light. No lower mandibular or other bones than those of the cranium were found. The surface is corroded and the greater part of the left orbital and temporal region is missing together with the anterior maxillary area, i.e., the front part of the upper jaw. As in the 'classical' Neanderthaloids, the skull vault is low and the supraorbital ridge even more prominent than in the specimens of most 'classical' Neanderthaloids. The orbits are markedly spacious and the mastoid tubercle (see p. 34) much reduced or slightly developed. The frontal profile angle is 66 deg. (as against 65 deg. in the La Chapelle specimen) and the index of the cranial cap is 47.2. The cephalic index may be calculated at 70. The length of the skull is not very great—about 182 mm., but the profile angle is identical with that of some modern Europeans. There is no 'snout' and *no occipital fold or 'bun'* that are characteristics of the Neanderthaloids as a whole and are particularly marked in the pithecanthropoids (Trinil and Peking men). In a word, the Steinheim cranium is smaller and less specialized than those of the 'classical' Neanderthaloids and it shows more tendencies in a 'modern' Man direction than do the crania of the other 'generalized' Neanderthaloids. As far as we can judge from the small portion recovered, the Swanscombe skull (see p. 210) might fall into the Steinheim class.

The Steinheim relic was the subject of a preliminary study by Berckhemer ('Ein Menschenschädel aus den diluvialen Schottern von Steinheim a.d. Murr,' *Anatomisches Anzeiger*, 10; 1933). Although the Steinheim skull is rather smaller than either of those of Galilee or Ehringsdorf, it may be provisionally classed in a general way with them. H. Weinert holds that Steinheim dates from the Riss-Würm Interglacial, but unfortunately we have not, as yet, a really detailed study of this important piece of evidence. There is, apparently, a canine fossa (a specifically *sapiens* feature, as we may remember, although traces of it may be found in some Neanderthaloid skulls) and it may be that some of the peculiar features of the Steinheim specimen may be due to its being that of a female, and thus showing

possibly more 'foetalization' than would a male skull of the same group.

'Modern' Man in Europe

The Neanderthaloids appear to have survived for possibly several millennia after the ice of the Würmian glaciations began to retreat. Then, at some date that may perhaps be set at between 25,000 and 20,000 years ago, the Neanderthaloids in central and western Europe seem to have disappeared *as a distinct type.*

'Modern' Man and Neanderthaloids Contemporaneous

Now, we have really fewer pointers to indicate the general centre of 'modern' men's evolution than we have in the case of the Neanderthaloids. We have seen, however, that there is a plausible line of descent from the *Pithecanthropus* type through Solo Man and Wadjak Man to the Australoid type. And everything we know indicates that the first 'modern' men of Europe (that is the first after the Neanderthaloids, it may be said, with no prejudice to the theory that 'modern' Man *may* possibly have existed in Europe in more remote times) arrived here from Asia or Africa bringing with them a characteristic stone-implement culture—that known as 'Chatelperronian.' Burins or gravers and chisels of general 'Upper Palaeolithic type' are indeed known from deposits apparently of Riss-Würmian Interglacial date and in Palestine and East Africa such blades and gravers appear mixed with late Acheulian tools. There is no apparent time-interval between the later Mousterian objects and those of the Chatelperronian type. Later Mousterian (i.e., 'Neanderthaloid-made') artefacts are found intermingled with forms that are, at least, precursors of the Chatelperronian 'point.' The Mid Palaeolithic instruments merged, therefore, into the Upper Palaeolithic. The two cultures seem to have been (possibly for a long period) contemporaneous and it thus appears certain that Neanderthaloid and 'modern' men (the latter makers of the Chatelperronian tools) lived side by side. The indications are that 'modern' Man (in Europe) replaced the Neanderthaloids slowly during the period between the first and the second peaks of the Wurmian glaciations when the climate of Europe (or of western Europe) was milder than it had been—or was to become.[1]

'Home' of 'Modern' Man

If—as seems certain—the 'modern' men were immigrants

[1] The Upper Palaeolithic (i.e., the period when 'modern' Man made and used 'Old Stone Age' tools) must have lasted considerably longer than the lapse of time from its end to our days.

into our continent, they must have existed, somewhere out of Europe, for long ages—at least from the times of the Riss-Würm Interglacial.

'*Modern*' *Man of Upper Palaeolithic Essentially the Same as Existing Europeans*

The 'modern' men of the Würmian Interstadial already represent a fully-developed 'white' stock (although, of course, we do not know and probably never will know what their skin-colour really was) and no *essential* change in the physical characteristics of the European populations has been recorded since this invasion. Among the 'white' stock of the Upper Palaeolithic we must, of course, count the so-called 'negroids' of Grimaldi (see p. 230). But even if we agree that these skeletons display definite (though not *very* marked) negroid features we are by no means justified in thinking that the Grimaldi men were necessarily men of 'black' skin-colour. Most of the so-called 'racial' features (such as those of the negro's skin colour) are not adaptional. There has been, it would seem, a more or less random fixation of random variations of colour and details of shape.[1]

It is true that the much later immigrations into Europe of the 'Mediterranean' type of men presented this continent with a new stock but it is not *essentially* different from its predecessors in Upper Palaeolithic times. That is to say that there has been no intrusion of a sort of men as different from ourselves as were the Neanderthaloids.

'*Modern*' *Man Possibly a Southern Type*

We may take it as a working hypothesis that 'modern' men represent a southern type or at least a type whose differentiation-centre must be looked for south of the Eurasiatic mountain barrier. Such men seem to have moved westwards (probably in a series of waves) and to have encountered upon their way other types less 'modern' and, perhaps (in some areas), the descendants of 'Acheulian' Man, and, almost certainly (in others, e.g., Palestine), Neanderthaloids. So what appear to be the representatives of the first wave of 'modern' Man immigrants into western Europe (e.g., the Cro-Magnon men bearing a resemblance to the contemporary—or earlier—men of Mechta in Algeria) were possibly hybridized before their arrival in Europe—and they most probably were further

[1] These random variations may, of course, in some cases, have proved of value to their possessors (as does, e.g., the thick coat of the Siberian tiger as opposed to the short one of the Bengal variety)—the fixation of these random variations appears to have occurred in different groups of 'modern' men living in relative isolation—by mutation, selection and evolution.

hybridized by interbreeding with Neanderthaloids after their arrival in western Europe.

Again, the physical evidence (such as it is) for hybridism between 'modern' men and Neanderthaloids *in Europe* begins eastwards and extends westwards.[1] The Předmost people (*vide infra*) from Czechoslovakia probably owe something to Neanderthaloid ancestry and moreover they do suggest in many features the Australoid type. Again, the Podkumok skull (found in the Caucasus in 1918) and that of Chwalynak on the Volga might well be those of individuals of partly Neanderthaloid ancestry.

If we adopt an hypothesis of the 'southern' origin of 'modern' Man we may imagine that the Anstraloids (who were perhaps the earliest form of 'modern' Man) not only spread west as well as east but represent the modern edition of a type ancestral to 'white' Man.

As far as we can see along a very dark road, the most probable region for the differentiation-area of 'modern' men, *ancestral to the Europeans of the Upper Palaeolithic* would be a region of which Palestine, possibly, was on the periphery—perhaps the mountainous region of upper Mesopotamia and the Iranian plateau.

During the Interstadial warm period between Würm glaciations I and II, we may take it that the human population of Europe increased—probably owing, as much as anything else, to the perfection of new methods of hunting and to the invention of means of protection against cold and wet. Even during these times it looks as though there were numerous cross-migrations between east and west.

In later Upper Palaeolithic and in Mesolithic times the cross-currents and the invasions, migrations and immigrations became more complex. One of the latest waves of immigration is represented by that of the Mediterraneans (probably in several closely allied forms and at different periods) and this type is one we may look on as specifically *homo sapiens* owing in its 'pure' form (i.e. apparently 'pure') no apparent derivation from any type but 'modern' Man.

The Evidence of Laussel

The very important prehistoric site of Laussel in the Dordogne was for many years carefully studied by the late Dr. Gaston Lalanne.

[1] The evidence *in Europe* is not, of course, as cogent as that of *Sapiens*-Neander thaloid hybridism from Palestine (*vide supra*). The Brno (partially preserved) skeleton discovered in 1891 and, possibly, the Brüx (Bohemia) skull and the Combe-Capelle-Man (Dordogne, 1909) all seem to show (especially the first) some degree of Neanderthaloid 'ancestry.' The much more abundant material from Předmost (Moravia) is even more suggestive. These crania are long-skulled, they have a low vault, rather prominent superciliary ridges, a slight chin-prominence and considerable alveolar prognathism. Though plainly 'modern' in general appearance the 'Předmost type' does look as though it bore some strain not wholly 'sapiens.'

An exhaustive paper dealing with Laussel has recently been published.[1] The Laussel evidence extends from early 'Acheulian-Mousterian' to Upper Solutrean cultures and beyond.

In brief, the over-all picture afforded by this site is as follows:

The invasion of men with Acheulian-Mousterian culture coincided, perhaps, with a more clement climate permitting of living in the open air. The 'typical' Mousterian is undoubtedly contemporaneous with a period of increased cold (with presence of reindeer) but Acheulian influence is still present—in waves. Then comes Mid Mousterian, Upper Mousterian and Later Mousterian (this latter with 'Audi Points') showing forms which are precursors of the Chatelperronian point.

Evidence for Neanderthaloid and Sapiens Intermingling

In this Later Mousterian (at Laussel) there are traces of Aurignacian industry 'tinged' with Mousterian, indicating, perhaps, a first, fugitive invasion of 'Aurignacians' ('Cro-Magnons'?) passing through the country and being in contact with the 'Mousterians' (Neanderthaloids). Afterwards comes another wave of invaders with 'Lower Aurignacian' industry (the 'Old Perigordian' of Peyrony). This is superseded by Middle Aurignacian ('Typical Aurignacian') which merges, with mixed forms of instruments, into 'Upper Aurignacian.' Above the latter are Lower and then Upper Solutrean. At Laussel the strata containing artefacts are, for the most part, separated from one another by thick 'sterile' layers with no evidences of men's handiwork at all. In the Later Mousterian layer the Aurignacian-type artefacts are found intermingled with those of Mousterian-type, indicating contact between the two types of tool-makers that we may identify as Neanderthaloids and 'modern' Man.

Few sites offer such a clear and connected story as does Laussel and the evidence from this site is, of course, only valid for one part of south-western France, but what Laussel reveals is illuminating.

Upper Palaeolithic Techniques

The main Later Old Stone Age or Upper Palaeolithic stone industries of Europe may be grouped thus:

(*a*) Chatelperronian
(*b*) Aurignacian
(*c*) Gravettian
(*d*) Solutrean
(*e*) Magdalenian

Chatelperronian

At the beginning of the Upper Palaeolithic the old Clactonian,

[1] In *L'Anthropologie*, Vol. L, June, August and October, 1946, by the late Dr. Lalanne and his collaborator, Canon Bouyssonie, with an introduction by the *abbé* Breuil.

Levalloisian and Mousterian core-techniques are found mingling with the new blade-techniques. Indeed, the so-called 'Audi Points' which are among the earliest of Chatelperronian tools seem to be a development of Mousterian points into thick blades.[1] It is clear that the Upper Palaeolithic blade-cultures owe something to the techniques of the European Middle Palaeolithic. However, the Chatelperronian itself is a technique possibly of Asiatic, and almost certainly of non-European, origin. And, as we have seen, Mousterian artefacts and Chatelperronian are found in closely contiguous levels in some rock-shelters and caverns of France.

The 'pure' blade-cultures of Europe, however, display narrow blades instead of the broad flakes of the Mousterian though both types show a steep, abrupt chipping. The main 'blade' tool was a curved knife with a blunt back—and it is this tool which looks like a derivative of the 'Audi Point.' Other Upper Palaeolithic blade-tools are of chisel form.

A few Chatelperronian tools have been unearthed in Poland and in Rumania, Bulgaria, Hungary and Austria. On the other hand, rather surprisingly, the quite characteristic Chatelperronian of Palestine is found tucked in between Micoquian (late Acheulian) and Mousterian industries. Chatelperronian is, indeed, found in places from Palestine to Kenya but no traces of it have been, as yet, noted from Arabia.

Sapiens Migrations

Thus, it would seem possible that 'modern' men were moving westwards at the same time as the Neanderthaloids.

If, as seems probable, *sapiens* men were in Europe by the end of the Riss-Würm Interglacial, some of them may have arrived in our continent soon after (or even possibly at the same time as) the Neanderthaloids. In this case, the onset of the Würm glaciations may have chased away the 'modern' men for a time (a very long time) or, put in another way, 'modern' men, as a distinct type, may have died out in Europe by the time of the Würm glaciation and other waves of 'modern' men come here again (from probably more clement climes) after the peak of Würm I glaciation was passed.

Aurignacian Industry

The earliest known types of the Aurignacian technique, properly speaking, are those succeeding the initial blade-cultures of Palestine and opening the Upper Palaeolithic of the Crimean caves. The Aurignacian technique is spread across Europe only in a developed

[1] What looks rather like an 'Audi Point' was recovered from the Teshiktash cave (see p. 152).

form and the dispersal centre may not have been very far to the East.[1] The Aurignacian mode runs through the Crimea, Asia Minor, Bulgaria, Rumania, Hungary and Austria to France, where it impinged upon the still developing Chatelperronian and ousted it. The typical Aurignacian site may be taken to be Cro-Magnon and the Cro-Magnon men formed at least one of the leading human stocks responsible for the manufacture and use of Aurignacian tools.[2]

From an archaeological point of view the Upper Palaeolithic blade-cultures demand that one should find for them a main centre of origin. We may count out a North African origin. The North African Capsian blade-culture belongs to the end—almost the very end—of the Upper Palaeolithic and, moreover, the Capsian technique cannot have passed from Barbary into Spain since that technique was divided from the Strait of Gibraltar by, first, the Oranian technique area and secondly by the Aterian survivor of the old North African 'Mousterian' complex. We are driven, therefore, to conclude that the Aurignacian was an importation from (Hither) Asia or from, say, East Africa.[3]

'Gravettian'

What was formerly called 'Upper Aurignacian' (as Chatelperronian was called 'Lower Aurignacian') is by some now dubbed 'Gravettian.' The typical Gravettian knife-blade suggests evolution rather from Chatelperronian than from 'typical' Aurignacian forms. The technique is recorded from the Russian plains, through Poland to Moravia where the Brno (Brünn) site may be taken as typical Gravettian. The Gravettian tools extend further through Austria (e.g., Willendorf) to Germany and to Italy. In Russia, Aurignacian-tool men seem to have kept to the mountains while Gravettian-tool men hunted the plains. In France, the Gravettian was apparently derived (with the exception of the tanged point) from the Chatelperronian. However, the tanged point appears towards the close of the French Gravettian-technique period (e.g., Font-Robert and also Pin Hole Cave in Derbyshire) and may have been brought from the East by 'Gravettians' of a second wave.

[1] Possibly the Iranian or Caspian tableland.

[2] But as 'Aurignacian' is found in Palestine, Anatolia, the Caucasus, the Crimea, western Rumania, Bulgaria, Central Europe, Switzerland, South Germany, France and northern Spain it can hardly everywhere be attributed to 'Cro-Magnon' men. It may be if the Aurignacian technique originated in, say, Iran, one stream may have passed to Palestine and the other to western Europe.

[3] The Upper Palaeolithic presents us with the two essential tools of Man—the knife and the chisel ('blade' and 'graver'), although these forms are occasionally found in mixed-culture periods of late Acheulian and Mid Levalloisian (Riss-Würm interglacial) not only in Europe but in Palestine and in East Africa.

Gravettian is the first blade-culture we know from the steppe corridor out of Asia since it is found in the South Russian plains. 'True' Aurignacian is never found far from the mountain-spine of Europe, whereas the Gravettian seems to be an industry of the plains from Kostienki and Gagarino in Russia to Vistonice and to Willendorf in Austria 'Modern' men, it would appear, with Aurignacian and then with Gravettian industry gradually replaced the Neanderthaloids in Russia. The Russian Gravettian shows some affinities with that of Palestine, e.g., bone tools, harpoons, long 'communal' houses or round huts (in the storehouses of which have been unearthed not only tools but a few decorated slate pendants, slate chisels, disks and bars with *polished* edges, although stone polishing has, hitherto, been regarded as the hall-mark of the Neolithic or New Stone Age).[1]

Solutrean

The Gravettian technique gave way before the advance of the Solutrean in most parts of Europe (except Italy). The Solutrean technique is found at first in contact with Gravettian from the Caucasus to France and the technique may be of European origin—an apparent prototype of Solutrean tools has been recovered from Hungarian sites—and it may even, eventually, be traceable to the Acheulian tradition. The typical Solutrean tool (e.g., at Solutré itself and at Laugerie-Haute) is the so-called 'laurel-leaf' point—an artefact of the most beautiful and finished workmanship and unrivalled in execution until Neolithic times. The Solutrean tools, in western Europe, were tools used for the chase on the vast grassy plains. When, with a change in temperature, the pine forests came back again, the Solutrean tools vanish.

Magdalenian

They give way before the Magdalenian. Solutrean and Magdalenian tools are, indeed, found together in the earliest strata of the transition period. There are Solutrean 'arrow-heads' and bone artefacts together with Magdalenian implements which look as though they were derived from the Gravettian type. While, however, Magdalenian reigned in France, Italy retained its old Gravettian techniques ('Grimaldian' Gravettian) and central Europe was also true to the Gravettian tradition (with minor infiltrations of Magdalenian), while a rather 'degenerate' sort of Gravettian tech-

[1] In Russia only the three last glaciations have left traces and not until the last are there clear signs of men. The Russian Neanderthaloids lived in the caves and rock-shelters of the valleys and the earliest sites yield flints comparable with the 'pre-Mousterian' found across Europe from Russia to Germany. The later techniques are finer and resemble those of Palestine.

nique survived in South Russia. Most of Spain was dominated by the 'Capsian' type of artefact showing such a puzzling resemblance to those of the South Tunisian region of North Africa.[1]

There was a gradual rise of temperature in later Aurignacian times followed by another glacial advance, and it was during this colder weather that the 'Magdalenians' lived in south-western France. Six successive stages of Magdalenian culture have been traced. The first three flourished while the climate was still of glacial severity. In the fourth phase appear the harpoon and a foretaste of the rich gear which is characteristic of Magdalenian 5 and 6. After the sixth phase the fine Magdalenian technique and the magnificent Magdalenian art begin to fade. The paintings dribble away into scratches and diagrammatic drawings. The statuettes are no longer found.

Azilo-Tardenoisian

The later phase of the Capsian in Spain drifts into 'Azilian-Tardenoisian' without a definite break. Capsian technique is transformed and appears in an industry of microlithic flints adapted for use in composite tools—that is, sickles, knives and the like with wooden blades set with small stone artefacts. 'Typical' Tardenoisian spreads northwards and mingles with 'Azilian' in the Cantabrian mountainous region of northern Spain. This Spanish Azilian-Tardenoisian (with smaller flints than any found until the Microlithic culture-period) may have owed much to a current from Africa but in France the Spanish techniques encountered another current—'typical' Azilian that is, perhaps a mixture of Capsian from Spain with a 'degenerate' French Magdalenian.[2]

What these currents and cross-currents may exactly signify in terms of human migrations can only be guessed at. As Breuil has said:

'It becomes more and more apparent that each of our Upper Palaeolithic civilizations of the West had complex roots whose growths

[1] There was no Solutrean in Moravia. When the mammoth hunters ceased to hunt mammoth they shifted their dwellings from open-site camps to caves which yield a 'degenerate' Gravettian industry. Reindeer and herds of wild horses replaced the mammoths. A slowly percolating Magdalenian influence is perceptible. Bone tools make their appearance—harpoons, *bâtons de commandement*, spears in sections, flint tools set in bone handles, hammers and clubs of reindeer horn, pickaxe and shovel of reindeer shoulder-blades, ivory hairpins, lamps from reindeer skulls and . . . decorated pebbles.

[2] 'Tardenoisian' is so called from the site at Fère-en-Tardenois in the Aisne department of France, and 'Azilian' takes its name from the Mas d'Azil near Saint-Girons in the Ariege department. The Azilian stagtine harpoons and the characteristic pebbles painted with geometrical patterns in red may derive from Capsian techniques and art-motifs. The Azilian patterned pebbles, representatives of the geometrical and symbolical art into which the great naturalistic art of Magdalenian times evolved, are curiously comparable with the *churinga* or painted 'magic' stones of the present-day Australian aborigines (see p. 64).

converged and then merged into one or more branches which, in their turn, slit up. For instance, the succession of levels, although generally homogeneous, undergoes, here and there, acceleration or retardment . . . so that, for instance, although it is true that Magdalenian I to VI are successive guides, all the same Magdalenian III "Cantabirian" and Magdalenian IV "Pyrenean" are probably contemporary with Magdalenian I and II of the Charentes and this, most probably, is a prolongation of Solutrean sites.'

Men of the Upper Stone Age in Europe

The oldest Chatelperronian artefacts have been found associated with two types of 'modern' men, (*a*) those of Grimaldi—who well may be the older, and (*b*) that of Combe-Capelle.

Then come two main groups for which our material is more abundant. They are (*a*) 'Cro-Magnon' of long-headed types mixed with those showing a tendency to brachycephaly or short-headedness, and (*b*) the 'Moravian hunters' known from Brünn, Lautsch and Předmost.

These latter show what seem to be traces of Neanderthaloid admixture and one of the skulls (apparently the oldest) known as 'Předmost No. III' bears affinities to the Skhūl types from Palestine and especially to Skhūl No. V, which would, however, seem to be earlier in date than Předmost No. III.

We have at our disposal more than one hundred Upper Palaeolithic human skulls from Europe and these do seem to fall into well-defined groups, so that we are inclined to think that the existing complexity of the present-day European population may be more due to the complexity of the Upper Palaeolithic populations than is often maintained.[1]

However, we must not overrate the diversity of the Upper Palaeolithic Europeans. Morant (after a careful examination of twenty-seven skulls from the Upper Palaeolithic of Europe) is of the opinion that the series was rather less variable than some taken from modern European populations sometimes stated to be 'racially' homogeneous.

If we consider the Grimaldi and Chancelade types as of rather secondary importance (for their influence upon the composition of later European peoples) and Cro-Magnon and Combe-Capelle (and possibly Předmost) as being the main groups of European Upper Palaeolithic men, we shall not, perhaps, go far wrong. But, although we can identify in 'Aurignacian' times (i.e., the western European Upper Palaeolithic up to the onset of the Solutrean

[1] Europe has always been, it would seem, a meeting-place and a dead-end for migrations. If the small 'Mediterraneans' of Sardinia were as black as negroes, if the tall 'Nordics' were yellow and the 'Alpines' quite brown-skinned we should hardly avoid seeing Europeans for what they are.

industry-phase) three distinct 'cultures,' we cannot, at least as yet, refer any of these to any one distinct physical type.

But we can say, with some confidence, that despite later streams of immigration (one of the most important of which was the 'Mediterranean' in late Mesolithic and early Neolithic times)[1] the basis of the European population to-day is made up of stocks whose ancestors have been here since the end of the Pleistocene Period.

Grimaldi 'Negroids'

The first 'Aurignacian' (using this word in its widest sense) level in western Europe is represented by the two 'negroids' from Grimaldi and by the Combe-Capelle skeleton. And of these remains those of the Grimaldi 'negroids' are, perhaps, the earlier. With these three skeletons were found artefacts of 'Chatelperronian' type.

The Grimaldi 'negroids' were recovered from the *Grotte des Enfants*, one of the (now) partially destroyed caves known as the *Baoussé Roussé* or *Rocher Rouge* down near the water's edge below the railway line where it passes the village of Grimaldi almost at the Franco-Italian frontier on the Mediterranean. The 'negroids' remains consist of those of a youth aged about sixteen years at the time of his death and of a woman. When the 'Grimaldi' people occupied the cave the sea-level was lower and a marshy plain set with lagoons extended some way out—a plain now covered by the sea. The *Grotte des Enfants* was a hyaenas' den before it was occupied by Mousterians and the 'negroid' remains were unearthed from a stratum yielding Mousterian artefacts, but it is clear that a grave had been dug down into this lower layer by the Chatelperronian-using men of the Upper Palaeolithic.

The skulls of the 'negroids' are long (dolichocephalic) but higher and larger than those of many existing negroids. There is some degree of prognathism, the chin-protuberance is only slightly developed, the teeth are large and the incisors protruding. The nasal bones are rather flat. The lower limbs are long compared with the upper (i.e., the humeri are long). The woman's height was about 5 ft. 2 in. and that of the boy slightly less—about 5 ft. The legs and arms of both skeletons were flexed up and stained with red ochre, the bones adorned with pierced shells and surrounded by 'protecting' stones.

This 'Grimaldi' people apparently antedated the 'Cro-Magnons' (see *infra*) possibly by a long period of time. The Grimaldi 'negroids' have been equated with both Bushmen and Australoids by some imaginative anthropologists. But the Grimaldi people may be related both to the Combe-Capelle and Předmost peoples and would represent, as far as we know, the first wave of 'modern'

[1] And, of course, the "Alpines" or brachycephalics.

men into Europe. These 'negroids' may indeed date from late Riss-Würm interglacial times.

Chancelade

The Chancelade skeleton (unearthed near Périgeux (Dordogne) in 1888) was, for long, supposed to show 'Eskimoid' traits and to have been that of 'a typical Magdalenian'.[1] The Chancelade skeleton may be, roughly, contemporaneous with the Cro-Magnon specimens and be considerably later in date than the Grimaldi relics.

The identification of Grimaldi type with 'negroid' and that of Chancelade with 'Eskimo' has been due to, in part, wishful thinking inspired by a desire to push back as far as possible the differentiation of existing human varieties.

Combe-Capelle

The Combe-Capelle skeleton (found with Chatelperronian type of artefacts) seems to be earlier than Chancelade and to be roughly contemporaneous with the Grimaldi specimens.[2] The Combe-Capelle cranium bears some resemblance to that of Afalou No. 28 (from Algeria, see p. 184), whereas the general 'Mechta' type is not unlike the 'classical' Cro-Magnon type of south-western Europe.

Cro-Magnon

The 'classical' Cro-Magnon type has been so extensively publicized that, in general public opinion, 'Cro-Magnon' men were a sort of supermen, more noble-looking—that of course is possible—better-developed and better-built than any people now living and, in addition, to have been the sole 'race' of Upper Palaeolithic Europe.

The French anthropologists Hamy and J. de Quatrefages de Bréau called 'Cro-Magnon' the five skeletons Louis Lartet found in 1868 in the Cro-Magnon rock-shelter near Les Eyzies on the Vézère in south-western France. Other specimens of the same 'Cro-Magnon' men have been recovered along the Mediterranean coast and at various localities in Europe.

The famous 'Old Man' of Cro-Magnon may, when alive, have measured over six feet. A man's skeleton in the *Grotte des Enfants*

[1] Whose bone (e.g., 'harpoon') artefacts were supposed to have been ancestral to those of the extant Eskimos.

[2] See Mendes-Correa's monograph on the 'Aurignacian Skeleton of Combe-Capelle.' The Combe-Capelle type (with which may be equated or classed those of Brünn and Brüx in Czechoslovakia) were men, generally shorter than the Cro-Magnons and with deep-set eyes, prominent cheek-bones and brows, rather broad noses, some upper mandibular prognathism and narrower faces than the Cro-Magnons.

at the Rochers Rouges (in a higher layer than that of the Grimaldi 'negroids') of the same type would give a living height of about 6 ft. 3 in. But the Cro-Magnon women seem to have been considerably shorter than their mates and by no means all the male skeletons of this type give evidence of high stature.

The Cro-Magnon burials from the Red Rocks of Grimaldi (for all the Cro-Magnon remains from this site seem to have been intentionally interred) afford interesting evidence of Upper Palaeolithic funerary rites. The tall man in the *Grotte des Enfants* had his head resting upon a flat stone reddened with ochre and over both the head and the thorax had been placed a sort of covering of pierced shells (reminding one of the bead network on Egyptian mummies), while the body was partially protected with large stones and a deerhorn implement with perforated deer's teeth was lying near the head. The remains of a woman higher up in the same cave were also surrounded by multitudinous shells, while a red-painted pebble was placed under the head. In the nearby *Grotte du Cavillon* was the skeleton of a man (about 6 ft. 1 in. high) interred in a crouching position with over two hundred pierced shells and twenty-two perforated teeth about the head, two flint knives at the back of the neck and an implement of stag's horn across the forehead. The remains were stained from the application of a red ochreous powder and so had presumably been interred without the flesh or had been disinterred when the flesh had rotted away and had been ceremonially stained red. In the fifth or *Barma Grande* cave lay a skeleton (recovered in 1884) in a stone-lined grave. The head was stained with ochre. In the same cave also were recovered the remains of other 'Cro-Magnons' from a pit lined with red ochre. The bones were surrounded with perforated shells, teeth and the vertebrae of fish and an ivory object (which Breuil holds to be a cloak fastener —a sort of primitive morse) lay on the chestbones of two of the skeletons.

The original Cro-Magnon skeletons from near Les Eyzies were revealed by excavations undertaken for the construction of the railway.[1] The remains first found were those of an 'old' man, a woman and a prematurely born infant. On the woman's forehead is the mark of a deep wound and the bones are surrounded with *marine* shells (Les Eyzies is well over a hundred miles from the nearest point on the sea-coast to-day), perforated beasts' teeth and ivory pendants.

The Cro-Magnon men were strongly built and long-headed with rather short square-faces.[2]

[1] The site is now inside the grounds of the *Hôtel de la Gare*.

[2] It is often said that the 'Cro-Magnon' type may be seen in the inhabitants of the Dordogne to this day. I lived for several years in this part of France but I very rarely saw anything that I thought looked like a 'Cro-Magnon.'

The Cro-Magnon was perhaps, as had been said, 'a median type around which others gravitate.'

Western European Upper Palaeolithic Men All 'Modern' Men

In any case the western European Upper Palaeolithic men, whether Cro-Magnon, Chancelade, Grimaldi, Combe-Capelle or of 'aberrant' types such as Obercassel (man and woman 1914) and others,[1] are all quite 'modern' and do not differ any more from each other than do the skeletons of different sorts of extant Europeans.

Central and Eastern Europeans of the Upper Palaeolithic

For those of the eastern (or central) European Upper Palaeolithic we are mostly indebted for our knowledge to what has been discovered in (the present-day) Czechoslovakia. During his excavations of Moravian sites in the years from 1890 to 1894 the late J. K. Maška recovered human remains accompanied by numerous mammoth tusks—indicating, probably, 'protective' burial to be paralleled from many places from early times.[2] The men whose remains were thus recovered have since been known as the 'Mammoth Hunters of Moravia.' A full description of these human bones was made available by Matiega's studies published from 1934 to 1937.

Předmost

Absolon, continuing work on the sites first indicated by Maška's researches, recovered a series of human remains now referred to as the 'Předmost' type.[3] (1928.)

The worked flints from the Předmost site resemble those of the same culture-stage from Combe-Capelle in the Dordogne. Other objects of great variety have been unearthed at the Moravian site—horn 'buckles,' horn needles, daggers, mammoth bones shaped rather like spades and forks, human figurines in clay and mammoth models in mammoth ivory.

The Předmost human remains were recovered from what appear to be intentional burials. One grave, lined with stones, was set on one side with mammoths' shoulder-blades and on the other with mammoths' jaws, while in the centre of the tomb was the skull of a fox.

[1] These latter characterized by short stature, heavy build and large skulls.

[2] Cf., the horns of Teshiktash (p. 155).

[3] Předmost is about two miles from the town of Prerov (Perau), while Vistoničе (Wisternitz)—whence come the statuettes of such curious and interesting types and workmanship—lies on the eastern flank of the Palava Hills to the south of Brno (Brünn). The Předmost human remains and the Vistoničе objects were entirely and purposely destroyed by the Germans a short time before they evacuated Czechoslovakia in 1945.

Předmost skull No. III is perhaps the most important of this collection since both morphologically and metrically it much resembles Skhūl skull No. V from Mount Carmel while neither deviates very considerably from the Upper Palaeolithic *metrical* mean. And these two crania appear to be intermediate between the Combe-Capelle type and that of some European Neanderthaloids. Moreover Předmost No. III is almost certainly older than the rest of the Předmost human material—and of that of the western European Cro-Magnons.

So it seems possible that while the 'Aurignacian' hunter-peoples may have absorbed some Neanderthaloid elements after arrival in Europe, it also looks as though some of them, at least, may have entered our continent as Neanderthaloid-*sapiens* hybrids.

CHAPTER EIGHT

ART AND LIFE

Upper Palaeolithic Art

THE men of the European Palaeolithic were, as far as we know, the first artists in the sense that they made things having no immediate, material 'use,' in fact these men were the creators of art. 'Art' in its beginnings is clearly a magico-religious technique and one that has had so incalculable an influence upon the spiritual and material evolution of Man that some notice of Upper Palaeolithic art is essential for the understanding of the story of Man's origins. And Upper Palaeolithic art, as far as we can see, developed, and indeed possibly originated, in south-western France.

The Neanderthaloids, as far as we know, produced no works of art but their artefacts. The fashioning of images and the painting of pictures seem to have been the achievements only of 'modern' Man.

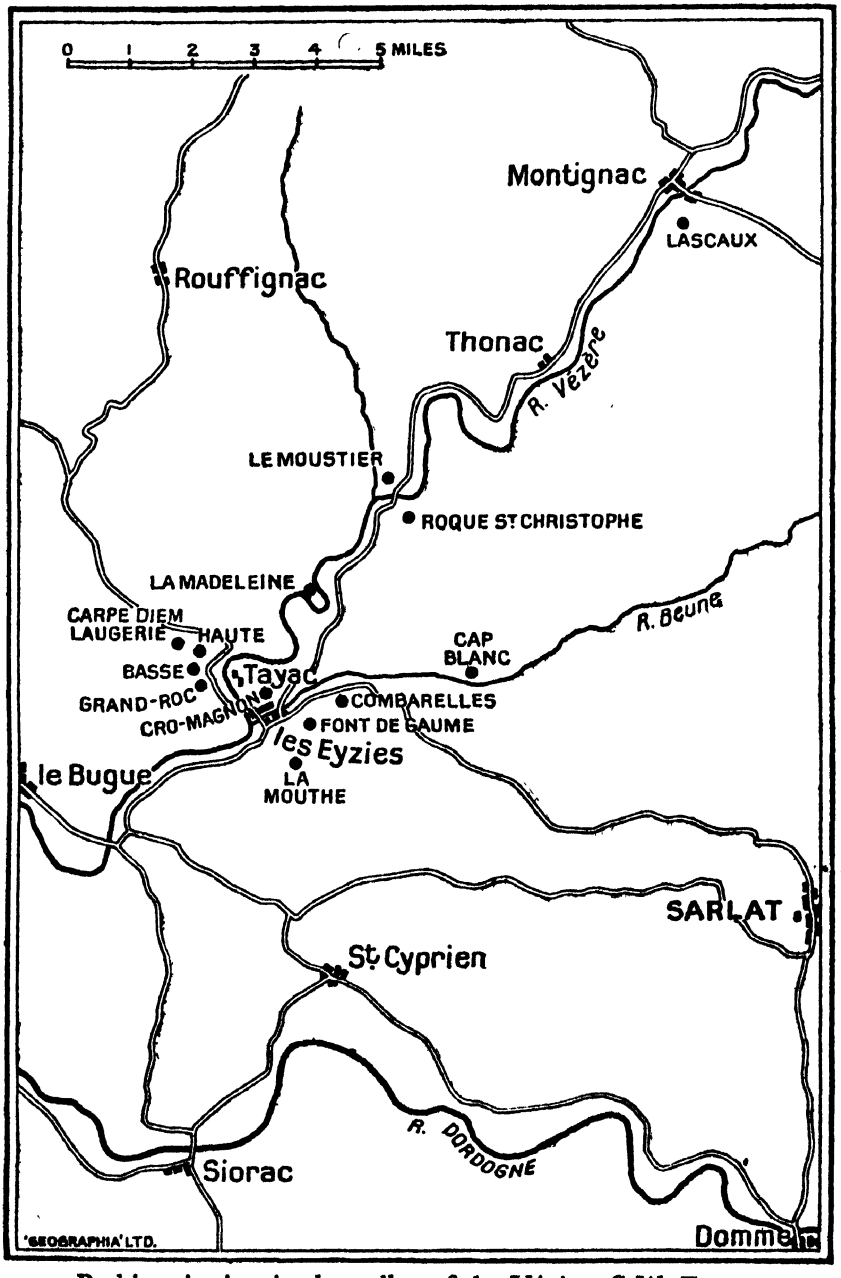
The First Draftsmen

It may well be that the first draftsmen traced shadows upon the rocks. Dr. Julian Huxley has reported that 'Meng,' a young mountain gorilla (at the London Zoological Gardens), in February 1939 when at the age of approximately one and a half years, traced with his forefinger upon the wall of his cage the outline of his shadow. He performed this trick three times and was never observed to do it again although he lived another eighteen months in the Gardens.

The shadows cast on cliff-faces by a sun low down upon the horizon must always have attracted men's attention. And the urge for 'magical' purposes to make the shadow permanent and to give it 'substance' may well have led to the first pictures. In the Greek legend Butades of Sicyon, the first modeller in clay, fashioned a mask after the outline of her lover's shadow which his daughter had traced upon a wall.

Although painted caves may be seen in several parts of the world—they are most numerous in south-western France, in northern and eastern Spain and in regions of Africa—the rock-paintings of south-western Europe surpass all other ancient pictures in splendour and in variety.

There are Aurignacian profile outlines traced by fingers dipped in mud, scratched with a flint upon the rocks or sketched in charcoal.



Prehistoric sites in the valley of the Vézère, S.W. France.

One can hardly doubt that these—or some of them—were drawn as Meng the chimpanzee traced his shadow or as Butades' daughter is fabled to have limned her lover's image. These 'shadow-pictures' must be—with the imprints of hands—almost the earliest evidences of men's pictorial art.

Of these outlines of hands there are no less than 138 on the cave-walls of one cavern at Gargas (near Montréjeau in the department of the Haute-Garonne) and many of these outlines show one or more fingers missing and are, therefore, presumably those of mutilated hands. The ablation of a digit or of one of its joints is a commonly observed sacrificial rite. The Bushmen to this day so mutilate themselves and paintings of mutilated hands are known from Australia. The Plains Indian in yesterday's United States would chop off a joint of his finger and exclaim, 'Old Woman Grandson, I give you this. Give me good pay for it.'[1]

With the stencillings of hands come wavy lines, dots and scratches —scratches, indeed, very like those left by the impact of bears' paws.[2] These wavy and often parallel lines, rows of dots and spirals, these apparently symbolic signs, persist all through the most glorious period of Upper Palaeolithic art and, indeed, such signs seem to be an inevitable and perhaps indispensable accompaniment of the realistic animal and figure paintings.

Trial Pieces

At Limeuil in the Dordogne are what look like trial pieces—sketches for finished drawings—scrawled on slabs of rock. The representations are, of course, of certain individual beasts in specific conditions. The idea of generalizing a type must have come very much later. Indeed, the need for generalization could hardly be felt at a time when art had a very definite material purpose.[3] But the keenness of perception of the Upper Palaeolithic artists was remarkable. They seized upon the essentials necessary to give distinctive character to their images in a way that bespeaks a highly developed visual memory.

[1] As Ruth Benedict has well written, 'Religion was used. Its function was to accomplish something, and it was, first and foremost, a technique for success.'

[2] There is ample evidence for some sort of Aurignacian bear-cult that may possibly have been inherited or borrowed at first from Neanderthaloid neighbours. It is tempting to think that as the Neanderthaloids were dying out as a 'pure' stock some of the members of this antique, different (and therefore possibly mysterious) people may have been wizards and sorcerers just as in historical times the Lapps were among their Scandinavian neighbours.

[3] The intellectual and spiritual effort involved in representing a three-dimensional object in two dimensions and then of reinterpreting the drawing in three dimensions is very considerable—as we all know from the reactions of modern children.

The Object of Art

We can hardly doubt that their art and the cult it served were devoted to two main ends: (*a*) fecundity and (*b*) luck in the chase.[1] In addition to these two objectives it seems probable that the signs and symbols appearing from the earliest times may some of them be what Obermaier has called 'magic symbols of death' as well as sexual symbols—which Breuil sees as 'often masked by a sort of graphic pun (or *double-entendre*),' although, again, many of the symbols (as, e.g., the checkered squares, 'combs' and 'traps' at Lascaux) may have been tribal marks—a sort of primitive 'heraldry' —and perhaps some of them were almost 'commercial' signs. The *abbé* Breuil has remarked:

'The stratigraphic distribution of the ornaments is very regular and, geographically, more limited than that of the fine figured art. The grouping of certain complexes, confined to relatively small districts, suggests conclusions concerning the area of seasonal migrations' extension or the area of a tribe's bartering possibilities.'

and, indeed, in Upper Palaeolithic times (as we have seen in the case of the Upper Cave at Choukoutien) there must have been brisk interchange of commodities over quite large areas. The vulva-like (and obviously 'magical') cowrie-shells are found far from their shores.

Painted Caves

The mysteries of prehistoric migrations are much greater than even those postulated by the 'Diffusionists' who would derive minute details of ceremony and custom in remote parts of the world from dynastic (or predynastic) Egypt.

As late as 1902 there were still many sceptics who refused to accept the authenticity of the painted caverns—then, it must be admitted, relatively few were known. The pictures were attributed to the most fantastic origins. They were the work of deserters from the conscription of Imperial times. The engraved horses at Combarelles were identified as cavalry mounts with their number-brands complete. The more daring observers ventured to attribute the cave-paintings to Neolithic artists. But then, not twenty years before the Jesuits had been accused of having faked the magnificent pictures of Altamira (in northern Spain) in order to 'discredit the study of prehistory.'

[1] Many of the animal pictures and sculptures or models are represented with arrows or other weapons piercing them. By 'sympathic' magic the beast's death was to be encompassed. So, Leo Frobenius watched the pygmies of the Congo draw an antelope upon the ground before sunrise and as the rising sun's rays touched the picture an arrow was fixed in the drawing.

Inaccessibility of Caves

The inaccessibility of some of these painted and decorated caves is almost unbelievable. At Pasiega, for instance, in the Spanish province of Santander, the entrance to the grotto is five hundred feet above the bed of the river. In the floor of the grotto is a limestone shaft almost vertical and hardly large enough for a man to slither down. Yet, at the bottom is a labyrinth of chambers decorated with more than two hundred admirable paintings and designs.

At Niaux (near Tarascon in the French department of the Ariège) the images of bisons transpierced with arrows are over a half a mile from the entrance and to reach them you must cross an icy pool. The explorer of the cavern of Montéspan (near Aurignac in the Ariège) had to swim part of the way and at one point to dive through the waters where they touched the cave's roof. Then he reached a cavern set with clay models of beasts.

And even in those caves whose entrance and penetration are easy the decorations are hidden in the innermost recesses. There is Combarelles in a valley leading from that of the Vézère. The limestone cliffs rise sheer from rank tobacco plantations. The fissure in the rocks is seven hundred and fifty feet long and not more than six wide but the engravings do not begin until three hundred and fifty feet from the entrance. They are numerous but where they are preserved is, and must always have been, bathed in Stygian darkness.

Ritual Dances

The men of the Upper Palaeolithic sought mysterious remoteness for their magic art and ritual. The Tuc d'Audubert (near Saint-Girons in south-western France) demands a boat for its visit. From an outer chamber you pass through a narrow passage to a remote chamber where are models in clay both of male and of female bisons, while all round imprinted in the floor are marks of naked feet—human feet. They may well be witnesses to some ritual dance. In the *Abri Mège* (Dordogne) are paintings of dancing men wearing animal masks. Ceremonial dances had evidently already in Upper Palaeolithic times begun to assume some, at least, of the importance they have borne right through Man's recorded history.

And as Marrett put it in a lapidary phrase, 'the rite is danced out, not thought out.'

Masked Men

The European engravings and paintings of masked personages are French or Spanish (with the exception of the pictures at Klause and at the Pin Hole cave in Derbyshire). Except in eastern Spain the few

Upper Palaeolithic paintings of human figures without masks seem to be caricatures. Some of the French scenes are most striking. In addition to the famous 'masked sorcerer' of the *Trois-Frères* cave (see p. 243) there is at a Magdalenian site near Lourdes a manlike figure with a horse's head.[1]

Lascaux

The time is September 1940. The German grip had fastened upon the French. Half of France was heavily occupied. However, in the unreal atmosphere of Vichy France, the day-to-day life of the villages went on and at first but little changed.

So, in that September 1940 when the first air-raiders were attacking London, two or three lads from the small village of Montignac on the Vézère set off one afternoon to see what fun they could get out of life.

The Vézère's valley in the golden autumn days of southern France is a region of endlessly attractive views. Whether from the road by the water's edge or high up and looking through the lattice of trees across the river to the limestone cliffs and the lateral dales, at every turn of the highway there is something to remind you that this stream and its tributaries were the highways 20,000 years ago of men like ourselves.

From the great prehistoric site of Les Eyzies in an afternoon you can visit, or at least pass, grottoes, caverns, rock-shelters and caves which have taught us more of Upper Palaeolithic men's lives than the sites in any other region of like area anywhere. The names are classical—Le Moustier, Combarelles, La Laugerie-Haute, Cro-Magnon, and many others.[2]

Our boys from Montignac, and their small dog, climbed up the hill-sides overlooking the Vézère Valley and on to the sparsely-wooded plateau towards a half-ruined house dignified by the name

[1] Decorated caves are now known from an extensive region in south-western France and from northern and eastern Spain. Of the latter the best-known is the great classical site of Altamira, but there are numerous others in the north. The 'oriental' cave-series from the eastern and southern sea-board region of Spain belongs to a different art-complex. Some of the finest animal-paintings in France are to be seen at the Font-de-Gaume grotto (on a turning off the Sarlat road near Les Eyzies); here are not less than eighty polychrome pictures of beasts, including the well-known rhinoceros. In the gallery extending or ledge extending in front and at the base of the wall where is painted the 'Trois-Frères' sorcerer, the *abbé* Breuil found bones of mammoth, rhinoceros, horse, bison, reindeer, ibex, bear, lion, wolf and other animals. Were these the relics of feasts or were they placed in a 'sacred' spot to ensure magical efficacy of rites performed? The mammoth, it may be noted, became rather rare during the 'reindeer age' so that the Magdalenians came to prize certain of his parts, e.g., the tail. Mammoths' tails are reported by Zamyatnin from Gagarino in Russia. Elephants' tails are still used ceremonially by the Abyssinians and other Africans to this day.

[2] After the Vézère region (in the Dordogne department) the richest French area in prehistoric sites lies in the Ariège department of the Pyrenean country.

of *château de Lascaux*. Towards the end of the afternoon, the lads' dog, chasing a winged bird, disappeared and did not respond to their whistling. Running up to where they had seen him last they noticed a small hole in the ground whence issued the muffled barks of the terrier. The boys chucked a stone down the hole. It rattled away and then rebounded before it plopped with a hollow echo.

The lads did not want to lose their dog, so they set to work to enlarge the hole until it was big enough for them to squeeze in down a not too steeply sloping passage. At the bottom they found themselves in a sort of (roughly circular) antechamber out of which led a much larger oval hall. By the light of matches they could see that this hall's sides were covered with colours and contours and outlines of great pictures. But they had no light and made their way home to Montignac there to fabricate, with typical French ingenuity, a torch out of a bicycle-pump filled with petrol and fitted with a length of rope as a wick.

Then they went back to the cavern and for five days they kept secret what they had discovered.[1]

The painted caverns of Lascaux are not deep in the bowels of the earth, indeed, the roof of the main hall cannot be more than a few feet below the surface of the plateau since, in one place, the roots of trees are visible through the roof of one of the lateral passages.

At the end of the main hall and opposite the entrance a narrow passage leads winding and narrowing into the rock until no man can pass, but the walls and ceiling are all decorated.

From about the median point in the right-hand side of the main hall leads off another passage—rather wider than the first—and veering to the left bellies out into a broad corridor ending in a winding and tortuous tunnel losing itself in the bowels of the mountain.

Out of the broad corridor—which the *abbé* Breuil calls the 'great nave'—on the right there is a drop of about twenty-two feet down into another narrow cleft and here is the most curious and intriguing painting of all the wonderful series.

All the pictures are—with an exception—images of beasts. One, at least, is a mysterious composite monster with bull's legs, a pregnant bellying body spotted like a panther's, a deer's tail and an earless head horned and resembling that of the saiga antelope. But the mass of the animals is made up of horses, small, shaggy-coated and large-headed, some, indeed, as small as Shetland ponies and some

[1] The site of Lascaux has been taken over by the administration of the Ministry of Fine Arts. A massive stone wall has been built dividing the 'ante-chamber' from the main hall. When electric light has been fitted, the place will be open to the public.

looking for all the world like the horses of Chinese Han sculptures. There are bulls, some as spiritedly sprawling as at Knossos, there are buffalo and there are deer.

On one wall is what seems like a double-buffalo splitting as it were in two. One beast had a reddish and one a blackish coat, so the scene re-enacted for us may have impressed itself upon the hunter-artist when the animals were changing to their winter coats.

On the curved almost barrel-roof of the end passage from the great hall is a set of three deer's heads and one horse's painted at the four angles of a rectangle.

There is one great lunging bull of which a local Dordogne peasant exlaimed: '*ah! la belle bête elle vaut au moins trente mille francs.*'

The paintings are of different epochs and styles—evidently Lascaux was a magical and holy place for generations of men. Some of the pictures may be the work of 'Aurignacian' men and others of their successors. And in places a coating of lime-crystals has preserved the paintings and indeed enhances their pictorial effect.

A long monograph could be written on Lascaux but one of the scenes is worthy of a detailed description. It is that painted on the walls of the crypt leading out of the 'great nave.'

A Prehistoric Tragedy

An ithyphallic human figure—indicated only by lines making it look like a wire-model—lies supine, the head, merging into bird-mask, flexed backwards for (as indicated by the ithyphallism)—the neck has been broken. Nearby is the figure of a bird upon a pole. Some distance away a ferocious-looking buffalo still lowers his head to charge the prostrate form, although the beast staggers and from a wide wound in his belly his guts sag bloodily downwards. Beyond the man's body and to the left a wicked-horned rhinoceros ambles away. Scattered over the whole picture are designs that Breuil does not hesitate, tentatively, to call primitive 'blasons' or perhaps 'totemistic' signs. None is identical with another. There are arrangements of spots, dots, criss-crosses, spirals and other designs within rectangles.

What does the bird-mask mean? What is the significance of the bird on the pole? The sequence of the tragedy is easy to follow. The hunter wounded the bison (for his flank is transpierced with a spear) but not mortally. The bison gores his tormentor to death but is in his turn ripped open by a rhinoceros.

Breuil is inclined to hope that if the earth at the base of this

most intriguing of all Upper Palaeolithic paintings were excavated, we might there discover the remains of the hunter's skeleton.

Perhaps the man set out hunting wearing his magic mask.

In any case, masked dancers and possibly masked shamans played their part in the ritual life of Old Stone Age men.

At a cave called *Les Trois Frères,* in the Ariège department, is a representation, executed partly by painting and partly by engraving, of a masked man apparently dancing. He wears the branching head of a stag, seems covered by its skin and has the beast's tail dangling down between his legs. . . .

A Great Centre of Upper Palaeolithic Art

Apart from its extraordinary interest as the finest collection of Upper Palaeolithic paintings in existence (only those of Altamira in Spain are comparable), the pictures of Lascaux are, at least in part, among the oldest rock-paintings yet discovered in Europe. And, moreover, in style, the Lascaux paintings offer comparisons not only with the (mainly Magdalenian) paintings of Altamira but also with the (in type greatly differing) paintings of the eastern Spanish coast.

In fact, it is possible that at Lascaux we have one of the French art-centres of Upper Palaeolithic times whence spread art-impulses far to the west. Indeed, at Lascaux, we may be getting very near to the beginnings of Man's art, although the pictures of Lascaux by their superb technique and their movement and significance must have had a long history of art-achievement behind them.

Human Figurines

The 'Aurignacians' also fabricated human figurines. Nearly all of these noted for the European Upper Palaeolithic are of Aurignacian workmanship. Only four 'Magdalenian' figurines are known and they are all French. With the exception of the relief of a woman holding in her hands a bison's horn (from Laussel near Les Eyzies) all the statuettes and representations of females show them strongly steatopygous.

Archaeologists, as we have said before, are like 'savages' rather inclined to attribute a religious or magical significance to anything they do not understand. But the Aurignacian statuettes of women probably were fertility-cult objects.

The 'Gravettian' works of art are different. In the east they show conventionalized and rhythmic designs while in the west they consist mostly of bone and stone statuettes. The Gravettian sculpture from Předmost, from Vistoniče and from Brünn is of startling quality. The Vistoniče decoration recalls 'Maori' or other

Polynesian designs. The male ivory figure from Brno, the Willendorf 'Venus' and the female ivory figurines from Kostienki are remarkable. From Kostienki, in South Russia, alone have been recovered more statuettes than H. Kühn attributed to all the 'Aurignacian' period in his book (1936–7). The late Palaeolithic art from Russia is indeed illuminating. From Kiev and Mezin have been recovered, *i.a.*, grinding bowls, stones with traces of colour, and an ivory toilet box. The Mezin decorative art is exercised on bone and ivory plaques, pendants, bracelets, beads and highly stylized figures. There are beautiful conventional designs—zigzag, chevron and key.

Art Styles

The cave-cults and cave-decorations seem to have continued right through the Upper Palaeolithic from early Aurignacian to late Azilian times. For the Solutrean culture-phase no paintings are recorded but there are models and sculptures of beasts and sometimes of composite monsters (cf. Lascaux) such as an ox with the head of a bear.

But the pictorial art-styles must be more complex than was thought only a little while ago. There is, it is true, the 'typical' Aurignacian with rather stiff outlines, a flat wash over the whole and applications of darker colour to indicate shading, and there are the Magdalenian styles (sometimes with a combination of painting and engraving conveying an almost impressionist image) on the whole more vigorous, more life-like and more finished than the Aurignacian.[1] The Magdalenian 'artistic' phase is evidenced not only by the painting and engraving but also by the carving and by the tools and instruments, but we are beginning to recognize different 'schools' and 'styles' although as yet only in a rather confused way.

The Magdalenian itself is subdivided into a number of phases and styles both on this side and on the Spanish side of the Pyrenees. The style of the Font de Gaume (Dordogne) is not quite that of Altamira in Spain.

The pictorial art stretches right from Aurignacian times to the Azilian which merges into the Mesolithic.

Magic and Art Fade

As the open steppes with their herds of reindeer were transmuted into forests the magic of the Magdalenian hunters faded away. The sorcerer's cunning failed and with it his art—for art is in its

[1] In all the styles the representation of the human figure is almost always poor (even when the subjects wear masks) or reduced to symbolic lines as at Lascaux.

origin religious and perhaps needs religion for its maintenance—though throughout the remainder of the Upper Palaeolithic the art tradition of the older hunters survived as one of a symbolical art. The Magdalenian tradition passed into the Azilian (with striped and mottled and dotted pebbles) and, as magic decoration, continued for long ages.

Azilian

Azilian culture is the final phase of Magdalenian in Cantabria and is in southern France (Mas d'Azil in the Ariège) found in a layer separated by a thick seam of flood-clay from late Magdalenian floor beneath. The Azilian floor contained many hearths and bones, no longer of reindeer or other arctic animals of the Pleistocene, but of red deer and wild boar of the forest which, with the waning of the old glacial climate, had come to clothe the western European scene.

The strange series of smooth round pebbles simply designed in flat red paint are the conventional symbols into which the magic art of the Palaeolithic had merged. The Azilian signs have no prototypes among the Magdalenian objects but are paralleled among the conventions which had been evolved from the distinctive art of eastern Spain whose progress may be studied in the widespread Spanish rock-paintings. The Cantabrian caves show that microburin technique and painted pebbles were introductions from the south where rock-painting populations lingered later.

The Azilian was long-lived and is found near Basle, in Hohenzollern and in Bavaria and in those regions where the Magdalenian had been excluded by the persistence of Gravettian techniques, which apparently on their own account developed into Mesolithic cultures with an abundant microlithic industry. The rise of these microlithic industries was probably hastened by immigrations from the south-west. Tardenoisian is the non-Magdalenian derived microlithic culture of north-eastern France, but as time goes on it becomes more and more difficult to distinguish what is and is not ultimately derived from Magdalenian.

'Magdalenian Man'

The flourishing 'cold' fauna which inhabited western Europe during the glacial retreat of Magdalenian times presupposes a climate more clement than that of the tundra—that is the mossy and marsh-flecked plains still existing in Siberia. There was, indeed, an intrusion of 'cold' fauna into Europe before Würmian times but the reign of the 'cold' species—mammoth, reindeer, horse, etc.—dates from the Würmian.

'Magdalenian' skeletons are rare. One found at Saint-Germain-

la-Rivière (near Fronsac in the Gironde) in 1934 was that of an individual buried under a sort of dolmen and dyed strongly with red ochre. There was around evidence of a regular massacre of bisons. Four skulls and mandibles of horses and the antlers of deer and reindeer had been placed near the human remains, next to which were recovered a portion of a necklace (consisting of seventy fangs of reindeer or deer) as well as two deer-bone daggers and some chipped flints.

The principal human remains from Europe of the Magdalenian period are those from Duruthy (Landes), Placard (Charente), where were found skulls clustered together and one with perforated snail-shells set upon it, Laugerie-Basse, Chancelade (burial of the head only) and Cap-Blanc—all in the Dordogne, the above-mentioned Saint-Germain-la-Rivière specimen and the two Obercassel skeletons from Germany.[1]

The European Mesolithic

Until the end of the Upper Palaeolithic culture-phases the inhabitants of western Europe were exclusively hunters and food-gatherers. As, however, the ice-cap of the Würmian (2nd phase) retreated, the climate changed. The great herds of 'cold' beasts—bisons, horses, mammoths and reindeer—died off or migrated. It was long thought that there was such a break in continuity that men themselves, for a time, quite disappeared from western Europe. Now, however, it is admitted on all hands that a 'Mesolithic' culture-phase of thousands of years' duration covered the time from the end of the last glaciation until the beginning of the European Neolithic or New Stone Age.

The close of the Palaeolithic or Old Stone Age marks the close also of the Pleistocene Period and the Mesolithic (or Middle Stone Age) marks the beginning of what is called, in geological terminology, the 'Recent' or 'Holocene' period. On the threshold of modern times our story of Man's origins ends, but in the following pages is set forth succinctly an outline of the Mesolithic and Neolithic in order to round off our tale and to indicate the unbroken continuity of Man's prehistory with his history, since it may be borne in mind that when the European Neolithic ends, developed civilizations had been for ages flourishing in the Near East.

[1] Of course, when an adjective such as 'Magdalenian' (that refers to a culture-phase) is used to designate men, the word is only employed as shorthand for 'men who lived in the times of Magdalenian culture' and 'Magdalenian' as applied to men must not be held to indicate any physical type special to the period. The 'Cap-Blanc' specimen (in poor condition and now in the Field Museum of Natural History in Chicago) is perhaps doubtfully of Magdalenian age. In 1920 Bonnet published a critical study of the Obercassel crania.

In Mesolithic times Man continued to hunt but now, perhaps, he used dogs not for food—or not mainly for food—but to aid him in the chase. This first domestication of animals marks a significant step in man's social evolution.

But Mesolithic cultures are all connected with those of the Upper Palaeolithic though with some new features such as microliths (smaller than those noted before), *dug-out canoes* and the prototypes of the textile crafts. The gap, such as it is, is that between the Mesolithic and the Neolithic when the arts basic to civilized life appear. And the Neolithic is an importation into Europe from the Near East where it is associated mainly with 'Mediterranean' type of men. Flocks of sheep and seeds of grain were, indeed, the prerequisites of Neolithic men's way of life.

The Shrinking of the Ice

As the ice shrank back northwards, trees began to spread over the formerly naked plains. First came beeches and willows, then pines, later hazels and afterwards elms, limes and oaks with birches —now trees flourishing to the extreme north of forest vegetation— as the last-comers.[1]

The typical tool of Mesolithic times is the small (microlithic) blade used in composite wooden-framed tools (e.g., scythes) together with a wood-chopping axe.

Mesolithic Populations

During the Mesolithic, a population which, in its general features, suggests clear affinities with the early 'Aurignacian' and 'Magdalenian' populations of south-western France, penetrated, it would seem, northwards from Spain to western France, Germany and, perhaps, farther east. In the vanguard of this advance moved a large, broad-faced, short-headed type of men whose general appearance is reminiscent of a human stock resident at a later date in Algeria. Some authorities (e.g., Coon) hold that this type of men was the result of Neanderthaloid and 'modern' men hybridization.

It is possible that in eastern Europe the older Palaeolithic human types were reinforced in early post-glacial times by elements coming from the Near East. In any case, it seems clear that Upper Palaeolithic sorts of men lingered on in Scandinavia and in England

[1] Hazel (*corylus*) is a tree noticeably resistant to the effects of fire and it has been suggested that the abundance of hazel remains in Mesolithic times may indicate growth after the forest had been fired for clearings. One must be a little hesitant about drawing conclusions as to the physiological behaviour of trees and plants in very remote times. Varieties whose remains are indistinguishable from those now existing may have displayed different reactions to weather conditions.

throughout the Mesolithic and near the fringe of the retreating glaciers.

Fossil men from the Mesolithic are few and far between. There are, as far as we can see at the present time, just these: the specimens from Ofnet in Bavaria, from Kaufertsberg and from Schmöckwitz.

Muge Men

Until lately the human remains from Muge on the lower course of the Tagus were unhesitatingly classed as Mesolithic.[1] It is now thought that they are just pre-Neolithic or Neolithic and that their date is not much earlier than the third millennium B.C. The Muge people are basically of 'Mediterranean' type (with no 'negroid' affinities and no brachycephaly or short-headedness); indeed, the mass of them (although there are some mesocephals) is distinctly long-headed (dolichocephalic) but owing to the crushed state of the crania there has been a good deal of difficulty in determining the cephalic index of some of the specimens. The Muge people probably represent a wave of invaders from somewhere in south-western Asia or East Africa—or both places.

Ofnet Men

The Ofnet specimens offer some curious problems. The skulls are short-headed (brachycephalic) and suggest those of the 'Alpine' type of modern Europe. The Ofnet people represent indeed the first trace we have in Europe of that short-headed stock which was to become such an important element in the population of our continent.[2]

The only human bones found in the Ofnet interment—that does appear from the associated industry to be mesolithic—were those of skulls (some with their cervical vertebrae). The state and condition of these vertebrae indicates that they were severed *after* the death of the individuals. So there is evidence for separate head-burial—that is recorded from many lands and times (e.g., China, see pp. 119, and Mexico, see pp. 149)—and there is among the Ofnet collection a marked predominance of women's crania together with those of children from five to eight years of age. It has been suggested that the Ofnet burial is evidence of a clan attack made on a settlement, an attack that allowed of the men and older children escaping—the 'women and children first' convention does not go far back in

[1] *Vide* H. V. Vallois, 'Recherches sur les ossements mésolithiques de Mugem,' *L'Anthropologie*, vol. xl, 1930. The Muge people display a rather marked resemblance with the Natufians (later) of Palestine (see p. 165).

[2] Though by the form of their occiput the Ofnet people suggest the 'Dinaric' type.

time—and then, permitted the survivors (perhaps) to bury the heads of the victims in what seems a predetermined orientation.[1]

Moreover, the Ofnet victims seem to have been killed with heavy stone *axes* and such axes are unknown in Mesolithic times. So, have we evidence not of a 'clan attack' but of ritual sacrifice with the use of antique instruments? Or is Ofnet misdated? Because of these questions, the Ofnet material is now less unhesitatingly attributed to the Mesolithic.

Beginning of Farming

A period of desiccation must have set in for the western world soon after the retreat of the Würmian glaciers to Northern Scania and, as we have seen (p. 56), we can fix a date for this retreat at about 12,000 B.C. But there are nowhere, as far as we know, any traces of farming life until 6,000 or 7,000 years later[2]

And it is noted for some few regions of the Near East where, later on, in Mesopotamia and in Egypt, we find the first civilizations on the banks of Euphrates and Nile.

Neolithic in Europe

By the dawn of Neolithic times the make-up of Europe's population cannot have been very different from what it is to-day.[3]

And throughout the changes and migrations and invasions characterizing the history of Europe's population to the end of the Bronze Age some customs remained almost unchanged. For instance, all through Neolithic times to the end of the Bronze Age in northern France, burials were effected in the same manner and with the same funerary gear and possibly with similar rites. The dead man was buried in his hut and near his fire, and, indeed, sometimes under his hearth. And in this burial in a dwelling and by a fire we have a custom of remote antiquity reaching back far into Old Stone Age times.

[1] Such a rite may be analogous to (but possibly practised for a different reason) some recorded for the Palaeolithic. Then we have the examples of animal heads apparently ritually interred (e.g., Drachenloch and Predmost). See Mollison: *Anthropolischer Anzeiger*, 1936. The Ofnet skulls are dyed with red ochre.

[2] It may be that the gloss on the edges of the Natufian sickles (from Palestine, cf. p. 166) is proof of their use for harvesting of grass or even grain. Grinding-stones appear in North Africa some time between 6,000 and 5,000 B.C. and by the latter date small communities of primitive farmers may have been scattered over some of the more favoured areas of the Near East. Mesolithic cultures persisted where they could as witness the Oranian and Upper Capsian in Barbary, the Sebilian and Natufian of Palestine possibly deriving from some area of the south-west Asiatic highlands.

[3] The earlier waves of 'Mediterraneans' were already here. A people 'possibly of Nordic affinities' is known only by the Maglemose industry. And the broad-headed 'Alpines' had already appeared. Of the origins of this type we know as little as we do of that of the Mediterraneans. But some skulls from the Solutré (that is, Upper Palaeolithic) are quite broad.

The Foundations of Civilization

Still, the foundations of civilization in western Europe were laid by those immigrants bringing new arts and ways of life from the Near East and thus effecting the Neolithic revolution[1] in ways of living but almost certainly leaving untouched many ways of thinking and feeling and reasoning that had their origins in the remote past both of Europe and of the Near East—and elsewhere over this earth.

[1] Tools with surfaces ground to a polish are not found before the Neolithic (although some aberrant specimens have been reported) but the technique of artefact-making remained the same in the Neolithic as it had been in the Mesolithic—there was no violent break. It is the presence of pottery, evidence of domestic animals and early husbandry that really distinguish the Neolithic pre-civilization phase of human culture from all those going before it.

CONCLUSION

THE more we learn the more probable it seems that the ancestors of Man diverged from the Primate stem a very long time ago—certainly in Tertiary times.

The existing great apes—our nearest kin—are probably rather more specialized (e.g., for tree-climbing) than their Tertiary forebears. Man, on the other hand, is, physically speaking, rather an unspecialized mammal. His specialization, such as it is, lies in three main directions: (*a*) his upright posture, freeing the fore-limbs, (*b*) his opposable thumb enabling him to fashion artefacts, (*c*) his great pre-frontal brain-development securing for him a high degree of stereoscopic sight and the faculty of articulate speech.[1]

It is possible that several groups of anthropoids evolved, at one time and another, in a general 'human' direction but that, for a variety of reasons, they died out.

As the evidence accumulates, it does look as though in Pleistocene times several varieties of hominids were in existence. Whether all became extinct except one line we cannot say.

The earliest, the most 'primitive' types of hominid of which we have knowledge, are the *Pithecanthropus* from Java and the *Sinanthropus* from north-eastern China.

Morphologically (that is to say in physical type) there is a plausible line of descent from *Pithecanthropus* through Solo Man, to Wadjak Man, to the Australoids and present-day Australian natives. And we may assume, as a hypothesis, that 'modern' Man—*homo sapiens*—is a variety of hominid, differentiated somewhere south of the great mountain-barrier of Eurasia.

Morphologically, also, there is a plausible line of descent from the *Sinanthropus* type to the Neanderthaloids, and we may be tempted to assume, also as a working hypothesis, that the Neanderthaloid type of Man is a form differentiated to the north of the Eurasiatic mountain-barrier.

Several other sorts of mammals show a 'northern' and a 'southern' form, e.g., dogs (a northern form probably derived from a wolf stock and a southern form probably descended from a jackal stock) and horses. All existing horses are descended directly or by interbreeding from (*a*) a 'northern' type of horse of which the existing representatives may be taken to be the 'Mongolian,' and a southern type 'Barb' or 'Arab'. These two sorts may have diverged com-

[1] We share, it is true, stereoscopic vision (i.e., the ability to see objects as solid, *en rond* and in perspective) with the higher monkeys and the anthropoids, though their stereoscopic vision may not be so acute as ours. Our upright posture is maintained by a co-ordination between hind and fore brain.

paratively early. The profusion of different equine 'breeds' is due to the hybridism between the two main strains.

It is possible that an analogous evolution took place in human stocks.

The Mediterranean area—in its widest extent—is the region for which we have the most suggestive evidence for interbreeding between Neanderthaloids and 'modern' men. It is improbable that 'modern' men rapidly supplanted the Neanderthaloids anywhere. The mingling of different techniques alone suggests a lengthy contact.

As far as we can see the Neanderthaloids' habits and customs —and probably beliefs, however vague they may have been—were characteristically 'human' and some of them either were borrowed by or were already similar to those displayed by 'modern' men.

The Neanderthaloid of Europe probably did not take to the caves until the great cold of the last glaciation forced him to find shelter. Neanderthaloid men were buried in caves and they were buried 'ritually' with gear and artefacts and they were often interred under or near the hearth. The evidence for the Neanderthaloids' 'hunting magic' or 'fertility rites' or whatever ceremonies they performed is less clear than that for the rites of the European 'modern men' of the Upper Palaeolithic. Still, ritual burials, skull-magic, cannibalism, 'protecting' horns of beasts, all reveal the immense antiquity of some human activities and customs.

Not only the bones of the Neanderthaloids induce us to believe that they possessed articulate language but their manner of life as revealed by what they have left behind them. Indeed, it may not be too much to say that the fashioning and the using of tools, artefacts and stone instruments are impossible unless the makers and users can communicate with their fellows.

Men think because they can talk. Language creates thought, not thought language. Language supplies men with those essential images which are more real to them than what they imagine they see. Man's is a word-made world and Man is a myth-making animal. Language gives him hopes—and fears.

When we come to the men of the Upper Palaeolithic, to 'modern' men, we are face to face with beings who developed many of the essential attitudes since retained by mankind. And the men of the Upper Palaeolithic must have possessed quite complicated languages. The intricate and conventionalized pictographic signs (to take only one instance) painted on cave-wall and stones would be meaningless without a rather elaborate explanation in words.

History, the story of men and their achievements, is not intelligible until we realize that it is a part of prehistory—and of the natural history—of Man. And unless our history is intelligible to us not much else will be.

SYNOPSIS OF CHAPTERS

Introduction

IT is only about one hundred years ago that the existence of 'Fossil Man' was established mainly by the discoveries of Boucher de Perthes in the gravels of the Somme Valley and the importance of Boucher's finds was confirmed by British men of science.

During the last twenty-five years the material available (consisting both of men's fossil bones and of their artefacts or industry) has accumulated fast and much of it comes from regions outside Europe.

The theme of this survey is that of Man's physical origins although other closely related problems are touched upon and, in a few instances, lines of inquiry are sketched out that may lead to linking the remote historic past with the later prehistoric past.

Chapter One

During the Miocene epoch of the Tertiary Period vast earth-movements occurred. Mountain-ranges were extruded and the surface of the earth took on much the face it bears to-day. The Miocene epoch and the following Pliocene were periods of great evolutionary activity among mammals. And Man's immediate ancestors must have been differentiated by the Pliocene—if not earlier.

Ice Ages

The great feature of the Pleistocene Period, which followed the Pliocene (the last of the Tertiary Period's subdivisions) was the succession of Ice Ages, at least in western Europe (and North America); elsewhere they are not clearly indicated, although there is evidence from many parts of the world of climate-change.

The four main 'Ice Ages' are known as the Günz (possibly the least severe and lengthy), the Mindel, the Riss and the Würm with two 'peaks' divided by a warm Interstadial, and each Glaciation or 'Ice Age' was divided from its successor by a warm 'Interglacial.' The piling-up of great masses of ice as vast glaciers provoked a fall in the general sea-level and thus, to a certain extent, modified the contour and area of land-masses.

Nothing is really known as to the causes of the Ice Ages. Many theories have been put forward, the best worked-out of which is the solar radiation hypothesis associated chiefly with the name of Milankovitch. But Milankovitch's theory demands a succession of

Ice Ages stretching back into the remote past and there is no *clear* evidence of such glaciations before the beginning of the Pleistocene Period.

Chronology

The equating of the relative chronology afforded by the evidence of the Ice Ages' successions with an absolute chronology is a task of the greatest complexity and difficulty.

'Historic' dates take us no farther back than about 3,500 B.C.—the beginning of dynastic times in Sumeria and Egypt. The observations of glaciation's traces in Scandinavia (correlated with the count of the 'varves' or annual alluvium deposits) would indicate that by about 12,000 B.C. the edge of the ice-sheet had retreated to the north of Scania (the most southerly province of Sweden) and we may assume that this date is also that for the heyday of 'Magdalenian' culture in south-western France. Assuming that the ice-sheet of the last (Würmian II) glaciation moved at the same pace from its most southerly extension (in the North German plain) to southern Scandinavia as it did to creep back over Scandinavia, we may calculate that the Würmian ice-sheet began its retreat about 17,000 B.C. Thus we may guess that the Würmian glaciation (II) was at its maximum at least as early as 25,000 B.C. if not earlier. Farther back in terms of years we can hardly dare to go unless we accept the all-too-precise datings of the 'radiation' theorists. But if the peak of the Würmian (II) glaciation occurred about 25,000 B.C. we may, perhaps, also guess that its onset happened about 30,000 B.C., which date would mark the end of the comparatively clement 'Interstadial' or warm interval between the two phases (I and II) of the Würmian glaciation.

Estimates of the Pleistocene's length vary greatly. We may, perhaps, for the sake of argument strike a mean term between a million years and 300,000 years (two extremes each having their protagonists) and say that the Pleistocene may have lasted some 650,000 years.

Moreover, although in most of Europe the Pleistocene Period is also the Old Stone Age (Palaeolithic) of men's tools and instruments, we must beware of extending this correlation. The Palaeolithic in western Europe *may* have ended about 12,000 years ago. It *certainly* ended for the Tasmanian natives in A.D. 1871.

The Caves of Monte Circeo

The remains of animals recovered from the caves pitting the seaward face of Monte Circeo indicate that a cold period followed on a warm one and these two periods can be identified with the warm Riss-Würm Interglacial and the cold glaciation of Würm (I).

With the remains of the 'hot' fauna were found artefacts of 'Mousterian' technique (and so far as we know these tools were made and used only by Neanderthaloid Man) and stone tools of Aurignacian type were recovered from layers containing bones of 'cold' fauna as well as tools of Mousterian type. And Aurignacian-type tools were, as far as we know, made only by 'modern' men of our own sort.

The Guattari Cave

In the first of the Guattari caves was disclosed a 'Mousterian' floor (that is, one that with remains of animal bones yielded Mousterian type tools); it was, in fact, the floor of a Neanderthaloids' living-room untouched for many thousands of years because of the landslide that had sealed the entrance to the cave.

Men took to cave-dwelling when a 'cold' fauna followed a 'hot' one on the coasts of the Tyrrhenian Sea, but the Neanderthaloids may have been a variety of men especially well fitted to resist the cold.

Artefacts: The notes on stone tools are so summarized in the text that the reader must be referred to pp. 43 to 51.

Neanderthaloids

Within the Guattari Cave were found (*a*) a marvellously well-preserved Neanderthaloid skull and (*b*) a fragment of a lower jaw of the same type but not belonging to the skull. Both remains are of the more rugged or 'specialized' Neanderthaloid type.

The Neanderthaloids, a type of Man quite distinct from any now living, first appear in Europe during the Riss-Würm Interglacial. But the characteristic Neanderthaloid 'Mousterian' industry is found, for long, mingled with elements of 'Acheulian' industry suggesting that the Neanderthaloids were in contact if not with another type of Man at least with a type of Man possessing markedly different techniques of stone-tool fabrication.

The Neanderthaloids do not form a homogeneous group. They must be divided into two main types. One more 'generalized' (and, indeed, from some points of view less unlike 'modern' Man) and one more 'specialized' and rugged (and less like 'modern' Man than the 'generalized' group). And the more specialized Neanderthaloids are not the older but the more recent. The Neanderthaloids of the Riss-Würm Interglacial seem to have been of the 'generalized' type that is recorded not only from Central Europe but from the Mediterranean lands. The Neanderthaloids who braved the rigours of the first Würmian glaciation seem to have been of the rugged, heavy type. This is the type of the 'classical' Neanderthaloids first to be discovered and described.

Pages 31 to 35 give a description of the 'classical' Neanderthaloid type.

The two Neanderthaloid skulls recovered from the Aniene gravels near Rome are of the more generalized Neanderthaloid type and are more ancient in date as well as different in form from the type represented by the Monte Circeo skull.

The existence of these two types and their place in the time-scale raises interesting but puzzling questions. Are the earlier and generalized Neanderthaloids a product of hybridism between a 'heavy' Neanderthaloid type and, say, 'Acheulian' Man encountered in Europe? Or are these generalized Neanderthaloids a transition form moving towards a *sapiens* or 'modern Man' direction? Or are they 'typical' Neanderthaloids representing a stage in that human form's evolution of which the later and heavy, rugged Neanderthaloids are a specialized type well fitted to stand the cold of a glacial climate?

Morphologically (that is to say by comparison of forms) there is a convincing series of types (however, it may not be in the strict sense of the term an *evolutionary* series) leading from the pithecanthropoids through the Neanderthaloids to 'modern' Man.

Chapter Two

Although the Australians represent what is undoubtedly an archaic type of Man, they are fully *sapiens*—that is, men like ourselves.

The Australoid type must at one time have been widely spread and it may be traced (either in existing populations or by fossil remains) in Indo-China, in Indonesia, in the Malay Peninsula, in Ceylon, southern India and southern Arabia. The Australoid may, indeed, be one of the earliest of 'modern' Man types and possibly one from which other types of 'modern' men are derived.

The 'Cohuna' skull (and the 'Talgai') seem to be more 'primitive' than the skulls of any existing Australian natives. But the 'Keilor' skull (that has been by some given a remote antiquity) is so close in form to the 'Wadjak' material from Java, that we may take it as proved that the 'Wadjak' form is ancestral to that of the present-day aborigines.

From the soil of Java, also, have been recovered the remains of Ngandoeng or 'Solo' Man (from a stratum above that yielding *Pithecanthropus* remains) and these 'Solo' men's skulls have all the appearance of being 'enlarged' or 'filled-out' editions of *Pithecanthropus* crania and of representing therefore a (morphologically) more 'advanced' type probably derived from pithecanthropoid ancestors. The 'Solo' type may represent a stage in the evolution of *homo sapiens* and the 'Solo' type seems to be (morphologically)

intermediate between *Pithecanthropus* and Wadjak Man, though closer to the former than to the latter.

We have thus a tentative pedigree for (at least one type of) *homo sapiens*—the Australoid type that certainly appears to be one of the most archaic not only in form but also as having been in ancient times widespread but now preserved in the isolation of the Island-Continent and in some other out-of-the-way places.

Throughout the 'Karst' region of eastern Java is found an abundant industry of a coarse sort with choppers and scrapers very like those recovered in the *Sinanthropus* deposits of Choukoutien near Peking. We may suppose that this industry was produced by men of pithecanthropoid type.

Because we say that *morphologically* there is a satisfactory series *Pithecanthropus*—Solo Man—Wadjak Man—the Australoids, we do not necessarily claim that the remains of these types as we have found them form a *chronological* series, that is to say that *our Pithecanthropus* is the ancestor of *our* Solo Man and so forth. It is quite possible that in Pleistocene Java (and elsewhere) several types of hominids lived side by side. And this point of view is strengthened by v. Königswald's discovery during the late War of a jaw-fragment (very considerably larger than the Mauer jaw-fragment until lately the heaviest and largest, not excepting those of the *Sinanthropus*, known of any hominid) of a Man he calls *Meganthropus* who must have had a head and jaw as large as those of a full-grown male gorilla.

Weidenreich thinks that the teeth recovered by v. Königswald from South China and attributed by the latter to a gigantic anthropoid (*Gigantopithecus*) are really of a Man he would call *Giganthropus* whose teeth are six times as large as those of a 'modern' Man.

Chapter Three

Among the rich anthropoid fossil fauna recovered from the Siwālik Hills formations in north-west India is the ape *Sivapithecus* (which Pilgrim long ago suggested might be a form ancestral to Man) known to have existed in a giant form. And (as far as can be judged from their worn condition) the *Sivapithecus* teeth show a resemblance to those of the *Gigantopithecus* or *Giganthropus* of South China.

H. de Terra considers that the late Tertiary anthropoids of north-west India (under the stress of climate-change) migrated south and eastwards towards the Indo-Chinese peninsula and there underwent, in a new environment, considerable evolutionary change.

There is evidence of human settlement in the latest Siwālik strata. Indeed from the north-western Indian region two types of early tools are known: (*a*) the 'Soan' or coarse chopper industry, and (*b*) an Abbevillian-Acheulian hand-axe industry. There is

therefore evidence for the existence of a type of men who made and used coarse choppers and for these makers of coarse choppers having been influenced by hand-axe makers and users. Do these two industries indicate the existence side by side of two distinct types of men?

The choppers are essentially like those found in the *Sinanthropus* layers at Choukoutien in China and resemble those from the lower levels of eastern Java. In Burma an analogous industry has been named 'Anyathian' and it is possible that the Soan came into India from Burma. And, moreover, when this Soan-Anyathian type of artefact was being made from north-west India to Java and up to Peking, in other parts of Asia, in Europe and in Africa men were using quite other types of tools. Are we to conclude from this evidence that two distinct types of men were in existence in Mid Pleistocene times? But although we can provisionally identify the makers of the 'choppers' with the pithecanthropoids, we cannot, as yet, guess at the type of the Abbevillian-Acheulian hand-axe makers.

The record of Man's early history is complex.

South China

North and South China are two separate natural entities and the archaeological exploration of southern China has hardly begun. We can say there is, as yet, no trace of Chellean-Abbevillian industry but an abundant Mesolithic and Neolithic in the caves, the former comparable with the 'Bacsonian' industry from Upper Tongking. The *Gigantopithecus* or *Giganthropus* teeth probably came from southern Chinese caves or deposits and *Sinanthropus*-type teeth have been discovered in Indo-China.

Peking Man

A primitive human tooth (possibly from Choukoutien, where later were found the remains of *Sinanthropus*) was described as long ago as 1903. In 1937 Bohlin recovered the first tooth from Choukoutien and it was ascribed by Davidson Black to a new type of Man, *Sinanthropus*. Now, the *Sinanthropus* material is much more abundant than that of *Pithecanthropus*, but the latter's specimens are enough to enable us to note that the remains of the latter type are more uniform than those of the former. There is in *Sinanthropus* a difference in size and build as between the bones of males and females. The Peking Man teeth exhibit a combination of features some 'advanced' and some 'primitive.' The *Sinanthropus* looks like a type that was evolving—perhaps in a general Neanderthaloid direction. The average cranial capacity of the *Sinanthropus* skulls is superior to that of the average for *Pithecanthropus*, but the smallest *Sinanthropus*

skull has a cranial capacity little if any above that of the larger *Pithecanthropus*, whereas the largest *Sinanthropus* skull is comparable in capacity with (if it does not exceed) some Neanderthaloid skulls.

In fact, the Neanderthaloid looks like an enlarged *Sinanthropus* form and it is possible that the Neanderthaloids arose somewhere north of the Eurasiatic mountain-barrier as a 'northern' form of men derived perhaps from a general *Sinanthropus*-type ancestor.

Ordos

In the Ordos district of northern China has been recovered a flake-industry of general 'Mousterian' appearance but no human bones other than one well-worn tooth which, from its bad state of preservation, tells us little. We may, however, infer that Neanderthaloids once lived in this region.

Upper Palaeolithic Man at Choukoutien

But no bones of Neanderthaloids have been found farther east than Uzbekistan in Soviet Central Asia and we pass at a jump from the antique *Sinanthropus* at Choukoutien to the 'modern' Upper Palaeolithic men of the Upper Cave in the same hill-site.

There were found the remains of five individuals, one, an 'old man,' has been described as having a skull of 'Ainu' type though it much more recalls some of the skulls of the western European Upper Palaeolithic (e.g., the 'old man' of Cro-Magnon) and even more than those skulls suggests Neanderthaloid affinities or admixture while at the same time exhibiting a sort of 'family resemblance' to the prehistoric 'Chinese' skulls from Kansu in north-western China.

One of the women's skulls seems definitely Melanesoid, i.e., like the skulls of the existing Melanesians of Oceania (whose type is also traceable in remains from Indo-China that was doubtless the dispersal centre if not the differentiation centre of the Melanesoids), another woman's skull, that has been described as 'Eskimoid,' is more like the famous Chancelade skull from south-western France.

So the Upper Palaeolithic population of at least one corner of north-eastern China was very mixed. Doubtless in Upper Palaeolithic times migrations and cross-migrations wandered back and forth over the northern Eurasiatic mainland.

Later China

A sketch is given of what we know of the populations of Neolithic and Eneolithic China where the physical type of the people seems not to have varied essentially for many millennia. Weidenreich would derive the Mongoloids directly from the *Sinanthropus* form.

Japan

There is no Palaeolithic in Japan and the ancestors of the Japanese seem to have been comparatively recent immigrants. There are traceable, however, two culture-currents among the early Japanese. One current has southern and insular affinities and the other recalls some of the features of the 'Arctic' cultures.

Nothing has been discovered on the Kurile Islands to suggest that they ever were used as stepping-stones for immigration towards the north.

Siberia

Most of the existing Siberian populations seem to be comparatively late-comers. The Baikal region is the one in which we may most fruitfully search for the 'ancestral phases of Amerindian cultures.' The earliest finds in this area are of what seems to be a general 'Magdalenian' type but with Neolithic elements intermixed. Mousterian-type tools but interspersed with artefacts of Aurignacian workmanship have been found at various places in Siberia, but what human remains have been recovered from such sites have all been of a general Upper Palaeolithic 'Cro-Magnon' type.

The portal to the New World lies north of the Lake Baikal area and within the Arctic Circle. Some recent discoveries along the Lena's course may throw light upon prehistoric movements in this region. Some authorities (e.g., Spinden) hold that the 'American complex' was not 'ready' in Siberia until about 2,500–2,000 B.C. and that the earliest Amerindian immigrations into the New World did not take place more than 4,000 years ago. In any case, nothing has been found in the Americas older than Neolithic and it is already an advanced and developed Neolithic.

Chapter Four.

The Bering Sea route into America is the only one possible as a highway of immigration for early Man. From geological indications *alone* a date of about 20,000 B.C. would be the earliest for the invasion of the Americas by men. The evidence from Alaska's shores and islands is disappointing, for no sites have been there found later than the Recent period.

The Eskimo may be late-comers into America. In any case, the modern Eskimo do not represent the 'men of the Upper Palaeolithic' and the Eskimos' early history must be sought in north-eastern Siberia.

The artefacts found in American soil are all of Neolithic type, so presumably Man arrived in America with Neolithic traditions.

The early stone instruments found in America fall into three

types: (*a*) Sandia, (*b*) Folsom and (*c*) Yuma, and they may *probably* be arranged thus chronologically.

The supposedly very ancient human remains from America are all misdated and it is possible that Man's residence in the Americas has not exceeded 4,500 to 5,000 years in duration. The two points often made to substantiate claims for great antiquity of Man in the New World, namely, the differentiation of food-plants under cultivation and the extraordinary diversity of Amerindian languages, do not necessarily prove that Man has inhabited America for tens of thousands of years. Indeed, the production of new sorts of cultivated plants and the multiplication of languages and dialects may proceed very rapidly.

Chapter Five.

The Teshiktash cave in the Hissar Mountains of Soviet Central Asia has yielded the skeleton of a boy whose remains lay quite near the surface and associated with a fauna that supports a *possible* date of late Pleistocene.

It is difficult to determine the exact type of a child (the remains are those of a subject about eight years of age) and although the discoverers and the Russian anthropologists were unanimous in declaring the bones to be those of a Neanderthaloid, there are some reasons for thinking that he was not one of the 'classical' Neanderthaloids of western Europe. We may have in the Teshiktash evidence proof of a survival of 'generalized' Neanderthaloids until later than had hitherto been thought possible. In any case, the Teshiktash boy does have a general 'Neanderthaloid look' and the finding of his remains so much farther east than that of any other type of intermediate between *Sinanthropus* and 'modern' Man, raises a multitude of problems.

At the Kiik-Koba cave in the Crimea near Simferopol were recovered the fragmentary remains of an adult and an infant. The industry associated with the bones has been called 'Acheulian' but seems rather to be Levalloisian-Mousterian. These Kiik-Koba men appear to have been (as far as can be judged from the slight material) of general Neanderthaloid type and to have been intentionally buried down into a layer yielding artefacts of the remote Palaeolithic type known as 'Tayacian.' As, above the layer that held the human bones, comes an Acheulian layer immediately followed by a surface layer with recent objects, dating is impossible.

Palestine

Tayacian and Chelleo-Acheulian artefacts have been recovered from many places in Palestine, indicating very ancient human settlement. In 1925 was found the 'Galilee skull' of 'generalized' Neander-

thaloid type together with Mousterian artefacts nearby. And the Mousterian of Palestine seems to be more or less contemporary with the western European Mousterian, but when the Mousterian industry flourished in Palestine that land was a well-watered country rich in game.

The caves of Mount Carmel have yielded material of the highest importance. The human remains fall into two classes: (*a*) Tabūn represented by the skeleton of one woman of Neanderthaloid type with some features (e.g., structure of the foot) more 'modern' than those found in other Neanderthaloids; and (*b*) Skhūl of which there are several types ranging from what looks like Neanderthaloid-*sapiens* hybrids to 'modern' Man. Here is evidence that Neanderthaloids and 'modern' man lived side by side and also that there was inter-breeding between the two sorts of men.

But with the 'modern' men of Palestine, the so-called 'Natufians' (who are of a general Mediterranean type), we come in contact with a sort of men physically akin to those who played a capital part in the development of civilization in the Near East.

Mesopotamia

In the south the first dynasty of Ur may be set at about 3,000–3,500 B.C. But, in the drier north, the Hassuna strata showing Neolithic pottery and tools may go back well into the sixth millennium B.C.

The Sumerians were apparently newcomers in the land and what indications we have point to their immigration from the hill-country of the north-east or, roughly, the Iranian plateau.

Chapter Six.
Egypt

River terraces can be traced along the Nile's banks that were laid down when the river was wider than now. From Upper Palaeolithic times the cultures of Egypt developed in a peculiar way without much observable foreign influence.

No 'ancient' Man's remains have been found in Egypt, though Mousterian artefacts are common enough. The earliest human skeletal remains found associated with the 'Sebilian' or 'pre-Neolithic' culture are the remains of men of general Mediterranean type and it is this type which has dominated throughout Egyptian history.

It was, no doubt, increasing desiccation that drove men into the river valley from the adjoining uplands (where we should probably seek for the remains of the earliest Egyptians) and two pre-dynastic civilizations can be traced. One of predominantly African inspiration and another, and more northern, of Asiatic

affinities. The latter to a great extent absorbed the former and the land was united. Then again it split and remained divided until it was reunited in the time of the First Dynasty under the mythical 'Menes'—whose name doubtless covers the identity of several rulers or even of a whole caste or stock of conquerors.

Sahara

The Sahara has been, at various times during the Pleistocene, well-watered and a fine field for man as hunter and food-gatherer.

About the only human bones of considerable antiquity known from the Sahara are those of 'Asselar Man' of a generalized negroid type.

North-West Africa

The sequence of industries runs from Abbevillian to a rather special sort of 'Mousterian' merging into a peculiarly North-African culture 'Aterian' that is also recorded from one site in Egypt. Aterian lingered on into Morocco until the end of the Palaeolithic, whereas in western Algeria it was superseded by 'Oranian' and in eastern Algeria and Tunisia by 'Capsian' that was probably an importation from the south-east. This geographical disposition indicates that there was no contact with Iberia until at least Mesolithic times since the North African Capsian was separated from Iberia by vast areas where no Capsian has been found.

Early Man in Barbary

The only two Neanderthaloid relics are the El-Hank mandible (and fragments of a second skull) from a site near Rabat and the fragment of a Neanderthaloid child's lower jaw from one of the 'Caves of Hercules' near Tangier. The 'modern' Man fossil remains come almost exclusively from Algeria, notably from Afalou-er-Rummel and Mechta-el-Arbi. They fall into two types—an earlier and general 'Mediterranean' type and a later and coarser type suggesting the Cro-Magnon of south-western Europe and possibly due to *sapiens*-Neanderthaloid crossing.

South Africa

The Miocene fossil apes from Kenya suggest an evolution in the general human direction earlier than the later Tertiary anthropoids of the Siwālik site in north-west India. In South Africa the australopithecoids (of two or three varieties) are, apparently, of dates varying from Late Tertiary to possibly lower Pleistocene. But all of the specimens of fossil anthropoids discovered up to now in Africa

are still, morphologically, far removed from the pithecanthropoid type.

Rhodesian Man offers a puzzling problem as to dating and type. The skull looks very 'primitive' and it is not typically Neanderthaloid.

South African 'modern men' ranging from the Florisbad and Boskop skeletons to ones which are hardly distinguishable from extant Bushmen fall into two types: (1) suggesting the Australoids, and (2) those that are more or less varieties of 'proto-Bushmen.' The 'Kaffirs' are quite late-comers to South Africa.

South African Industries

The succession of South African industries is well-worked-out but it is difficult to equate them with any degree of exactitude with European culture-phases. However, the South African industries are such that the picture we get of the world they reveal is one seemingly an integral part of a vast area 'of which Europe is the western extension and north-west India the eastern boundary.'

Early Man in East Africa

The reported finds of Pleistocene Man (e.g., Oldoway, Kanam, Kanjera, etc.) are misdated. No remains of 'primitive' form except that of the *Africanthropus* have been, as yet, reported from the East African area although the succession of industries indicates clearly that the vast region must have been occupied by Man from very early times and was, perhaps, indeed, an important area for the history of prehistoric cultures. Farther north there are traces of Neanderthaloid Man in Abyssinia.

Chapter Seven.
Europe

The Mauer or Heidelberg jaw still remains the oldest human relic recovered from European soil. It is certainly very ancient and, possibly of mid-Pleistocene date. It was, until recently, the heaviest and most robust human jaw-bone known, but it would not be out of place as a *Pithecanthropus* or even a *Sinanthropus* mandible (although the dentition of Mauer is less 'primitive' than that of either of the pithecanthropoid types) and Mauer seems, when compared with the great fragment of *Meganthropus* mandible from Java, almost delicate.

Four other human remains which have been assigned to Europe of before the Neanderthaloids' invasions are (*a*) Galley Hill, (*b*) Piltdown, (*c*) Lloyds, (*d*) Swanscombe.

All four were recovered from the soil of southern England. All,

except Swanscombe, are subject to many objections and cannot be held as being of proved 'pre-Neanderthaloid' date.

Swanscombe presents many problems. As only a posterior portion of the skull has been recovered, it is impossible to determine the exact type to which it belongs, but it shows affinities with the puzzling Steinheim skull from Germany that is of 'generalized,' if rather aberrant, Neanderthaloid character.

Then follows a summary of our knowledge concerning the main Neanderthaloid remains from Europe, including notes on the Steinheim and Ehringsdorf specimens. The European Neanderthaloids fall into at least two main groups (as we saw when reviewing the Italian material in Chapter One) of which the earlier is rather less 'Neanderthaloid' than the later.

Modern Man in Europe

From the evidence of the industries it looks, at first sight, as though 'modern' Man (i.e., *homo sapiens*) replaced the Neanderthaloids 'suddenly' and as though the latter died out leaving no descendants. But the juxtaposition (and in some cases the intermingling) of Mousterian and Chatelperronian industries leads us to suppose that the substitution of 'modern' Man for Neanderthaloid Man took perhaps a very long time to accomplish. 'Modern' Man seems to have arrived in Europe from some region in the Near East (although such a region is by no means necessarily the differentiation-area of the 'modern' type) and if, as appears probable, 'modern' Man is a southern type of hominid, then we may suppose that he came eventually from some region to the south of the great Eurasiatic mountain-barrier.

A note is given of the important Laussel site in south-western France as indicating the succession of cultures in that region.

There follows a description of Upper Palaeolithic (i.e., later Old Stone Age) artefact-techniques, that is, the mode of instrument-production employed by the first 'modern' men of late Pleistocene Europe.

Chatelperronian (that is, the first phase of what used to be dubbed 'Aurignacian,' a name now reserved for a later phase) and 'typical' Aurignacian may have had an Asiatic origin although they are also noted for Africa.

Upper Palaeolithic cultures are most complex. They converge and mingle. They diverge and develop. They re-converge and show re-combinations. These varied changes correspond, doubtless, in some way, to human migrations but their exact course is not clear.

The Men of the European Upper Palaeolithic

The men of the European Upper Palaeolithic fall into two main

physical types which we may call (*a*) 'Cro-Magnon' and (*b*) 'Combe-Capelle'—to which should probably be classed the central and eastern Upper Palaeolithic Europeans of the general 'Předmost' type. It has been held that both these groups (and especially the 'Předmost' type) show Neanderthaloid-*sapiens* hybridism occurring either before or after (or both before and after) the arrival of 'modern' Man in Europe. With the exception of the intrusive 'Mediterranean' type (which makes its appearance in Europe in late Mesolithic and was the bearer of Neolithic culture) the basis of Eūrope's present-day population was established in Upper Palaeolithic times, for even a tendency to brachycephaly is noticeable, although the main invasion of short-headed 'Alpines' apparently comes later than the Upper Palaeolithic.

Chapter Eight.
Upper Palaeolithic Art

A description is given of the lately-discovered cavern of Lascaux in south-western France together with a summary of the pictorial and glyptic arts of Upper Palaeolithic men.

Notes on the Magdalenian culture-phase, on the Mesolithic and on the beginnings of the European Neolithic round off our story, whose main theme of Man's physical evolution is, however, finished with the men of the later Old Stone Age when we meet human beings essentially similar in all physical respects to ourselves.

GLOSSARY

Explanations are not offered (*a*) for designations of extinct fauna, e.g., *elephas namadicus*, nor (*b*) for terms, designations or words explained at length in the text, except those, e.g., *Pithecanthropus*, which occur very frequently.

ABBEVILLIAN: the earliest recognizable European core-industry, formerly called 'Chellean.'

ACHEULIAN: a core-culture following on the Abbevillian in Europe and flourishing in one form or another from the Mindel-Riss to the Riss-Würm Interglacial.

ALVEOLAR PROGNATHISM: a projection of the teeth-sockets and teeth, as distinguished from that of the jaws themselves.

AMERINDIANS: the autochthonous peoples of the Americas.

ANTHROPOID: pertaining to the Anthropoid Apes (Gorilla, Chimpanzee, Orang-Utan and Gibbon), or to the extinct ape-forms.

ARTEFACTS: objects manufactured by Man, especially his stone tools.

ATERIAN: a blade-culture of North Africa known from Egypt to Morocco.

AURIGNACIAN: pertaining to the culture of (western European). Upper Palaeolithic or to the men having made the objects of that culture type.

AUSTRALOPITHECOID: relating to the fossil apes of South Africa of the *Australopithecus* type.

BICONDYLIAN WIDTH: the width measured between the mandibular condyles or hinges of the jaw. Condyles are the paired articulating surfaces of a bone at a movable joint.

BIFACES: artefacts chipped or 'worked' on both sides.

BIGLENOIDIAN WIDTH: the width measured between the glenoid cavities (lying at the root of the zygomatic processes) where the condyle of the lower jaw articulates.

BRACHYCEPHALIC: 'broad-headed,' i.e., possessing a cephalic index (that is, ratio of head-length to head-breadth) of 81.0 to 85.4.

CALOTTE: the 'brain-pan' or upper part of the cranium.

CALVARIA: the bones of the calvarium or entire skull without the mandible or lower jaw.

CANINE FOSSA: a depression in the maxillary bone immediately under the infra-orbital foramen of the cranium.

CANINE TEETH: the 'eye-teeth' between the incisors and the premolars.

CAPSIAN BLADE CULTURE: the latest in date of the three Upper Palaeolithic cultures of North Africa, so called from the typical site at Gafsa (anciently Capsa) in southern Tunisia.

CEPHALIC INDEX: $\frac{\text{Head length} \times 100}{\text{Head breadth}}$ i.e., ratio of head length to head breadth.

CHALCOLITHIC: of the Copper Age when both copper and stone tools were used.

CHATELPERRONIAN: the earliest of the western European Upper Palaeolithic blade-cultures, formerly 'Lower Aurignacian.'

CHERT: a flint-like quartz.

CHELLEAN: the earliest core-culture of Europe, now generally called 'Abbevillian.'

CLACTONIAN: an early flake-industry of western Europe—in some measure a development of the antique 'Cromerian.'

CONDYLE: condyles are paired articulating surfaces of a bone at a movable joint, e.g., occipital and mandibular condyles.

CORONAL SUTURE: the nearly transverse serrated suture serving to articulate the frontal bone with the two parietals.

CRANIAL CAPACITY: volume of the cranium that would be filled by the brain in a living subject.

CRANIUM: strictly all the skull except the lower jaw.

CRO-MAGNON: See p. 231.

CULTURE: in the restricted sense as used in prehistory, the material culture of men as evidenced by their artefacts.

CYNODONT REPTILES: Triassic age primitive reptiles with dog-like teeth. The retention of the quadrate bone between the skull and the jaw and the latter's composition of several different bones show the cynodonts not to have been mammals.

DENTAL ARCH: the arch made by the teeth of the upper or lower jaw in the jaw when regarded from below or above.

DIASTEMA: a 'gap,' especially that between the lateral incisors and the canine teeth, an anthropoid condition recorded, e.g., for the *Pithecanthropus robustus* jaw.

DILUVIAL: a now out-moded term (still retained in German scientific phraseology) for animals or artefacts dating from 'Deluge' or 'cataclysm' times.

DOLICHOCEPHALIC: 'long-headed,' possessing a cephalic index of 75.9 and under.

EOCENE: the first of the four divisions of the Tertiary Period.

ENDOCRANIAL CAVITY: the cavity formed by the inner surface of the cranial vault and filled, in a living subject, by the brain.

EPEIROGENIC: 'continent-forming' earth-movements resulting in the formation of continents.

EPIPALAEOLITHIC: 'on the fringe of the Palaeolithic,' that is, of a culture following on a Palaeolithic culture though not definitely of another type, usually applied to early Mesolithic cultures of Palaeolithic inspiration.

EPIPHYSIS: a cartilaginous process which ossifies and later joins up with the main bone. 'Epiphysis' is also a name for the pineal body.

EUSTATISM: the world-wide phenomenon of general change in sea-level due, in glacial times, to the withdrawal of water and its piling up in the form of ice on the continents.

FEMUR: the thigh-bone, the single long-bone from the thigh to the knee.

FONTANELLES: the six gaps (covered by membrane) in the infantile skull.

FORAMEN MAGNUM: the orifice in the base of the skull through which passes the spinal cord.

FOSSIL: animal remains are said to be fossilized when they have been metamorphosed by prolonged enclosure in the earth or rocks. In a 'fossil' the organic matter is entirely—or to a greater or less degree—replaced by non-organic so that the specimen is said to be 'mineralized.'

FRONTAL LOBE: that portion of the brain lying in front of the fissure of Rolando and consisting essentially of the pre-central convolution and of the superior, middle and inferior frontal gyri.

GLABELLA: the area of the frontal bone—usually projecting—lying immediately above the root of the nose and forming the central portion of the brow-region.

GLENOID FOSSA: or glenoid cavity at the root of the zygomatic process where the condyle of the mandible articulates.

GÜNZ: the first Glaciation of the Pleistocene.

HAEMATITE: red, brown or blackish iron ore.

HAND-AXES: the generic (and rather ill-chosen) name for the pear-shaped coarse tools of the Lower Palaeolithic.

HOLOCENE: or Recent, in geology, applied to all formations since the end of the Pleistocene Period.

HOMINID: as opposed to anthropoid is applied to all those man-like forms from the pithecanthropoid to *sapiens*, but especially to those forms (e.g., *Pithecanthropus* and *Sinanthropus*) which may be 'man-like' without being 'human,' if we restrict the use of that term to more evolved forms (e.g., Neanderthaloid and *sapiens*).

INCISORS: the eight 'front' or 'single' teeth, four on the upper and four on the lower jaw.

INDUSTRY: in the archaeological sense the *ensemble* formed by one complex of artefacts.

INTERGLACIAL: the mild intervals between two glacial periods.

INTERSTADIAL: the milder periods between two phases of the same glacial period.

ITHYPHALLIC: showing an erect penis.

LAMBDOID SUTURE: or lambdoidal suture, the inverted V-shaped suture at the occiput or rear of the skull and forming with the sagitta (the point of junction is known as the 'lambda') an inverted Y-shaped suture.

LEVALLOISIAN: a long-lasting flake-culture appearing before the onset of the Riss glaciation and apparently derived from the Clactonian. The Levalloisian survives into the Mousterian.

LOESS: a loam-like soil laid down during the dry cold preceding and following a glacial period.

MAGDALENIAN: in most of Europe the long and complicated culture-phase of the later Upper Palaeolithic and lasting through the cold of the second maximum of the Würmian glaciation. The Magdalenian culture-period is still often called the 'Reindeer Age.'

MAGLEMOSIAN: a Mesolithic forest-culture of Northern Europe during 'Boreal' times (6th and 5th millennia B.C.).

MANDIBLE: the lower jaw.

MANDIBULAR TORUS: a ridge or fold on the inner face of the mandible found in some extant human types (e.g., the Mongoloids) and also, e.g., in *Sinanthropus*.

MASTOID PROCESS OR REGION: the protuberance or tubercle of the skull-bones behind the ear, a strong development of the mastoid process is a characteristic of *sapiens* Man.

MESOCEPHALIC: possessing a cephalic index of 76.0 to 80.9 and, therefore, of intermediate head-form between 'long-headed' and 'short-headed.'

MESOLITHIC: a culture-period which is essentially a prolongation o the Palaeolithic and coming between that culture and the New Stone Age or Neolithic cultures.

METACARPAL BONES: the five bones forming the metacarpus or palm of the hand.

MICROLITHIC: said of the small flint-blade culture characteristic of the European Mesolithic.

MICOQUIAN: a late phase of Acheulian culture.

MINDEL: the second Glacial Period in Europe.

MIOCENE: the third division of the Tertiary Period.

'MODERN': as used in inverted commas in this book and applied to Man is to be taken as the equivalent of *sapiens*, that is to say men of the same physical type as those now extant.

MOLARS: the 'double' or grinding teeth divided into premolars (8) and true molars (12).

MOUSTERIAN: the culture associated with Neanderthaloid Man.

NATUFIAN: (*a*) a culture peculiar to Palestine uniting Mesolithic and Neolithic features; (*b*) the people (of general 'Mediterranean' type) practising this culture.

NEANDERTHALOID: those men (differing considerably from any now extant) who make their appearance in Europe during the Riss-Würm Interglacial and disappear as a separate type during the first Würmian Interstadial. The Neanderthaloids are divided into at least two main types: (*a*) a 'generalized' and earlier and (*b*) a 'classical' or more rugged and later.

NEOLITHIC: the New Stone Age characterized by 'polished' (or rather ground) tools and the beginning of the arts and crafts basic to civilization. The New Stone Age of the Near East (i.e., Egypt and Mesopotamia) merges into the early 'dynastic' civilizations.

OCCIPITAL REGION: that of the occiput or 'back' of the skull consisting of the bones below the lambdoid suture.

OCCLUSAL SURFACE: those surfaces of the teeth that are occluded or covered by those of other teeth when the two jaws are clenched.

OLIGOCENE: the second of the four divisions of the Tertiary Period.

ORANIAN BLADE-CULTURE: a special form of North-African blade-culture confined to an area now included in Algeria.

OROGENIC: 'mountain-forming,' said of earth-movements resulting in the upheaval of mountains such as those during the Miocene when the mountain-spines of Eurasia and America were formed.

OSTEOLOGY: the science and technique of bone study.

OSTEOMETRY: the measurement and comparison of the bony structures.

PALAEOLITHIC: the Old Stone Age, divided into Lower, Middle and Upper, the latter phase of which is associated with *homo sapiens*.

PALAEONTOLOGY: the science and study of extinct and fossil animal types.

PARIETAL BONES: the parietal bones lie on either side of the sagittal suture. When looked at from above, the frontal bone is seen forming the anterior part of the vertex and articulating with the two parietals posteriorly with the coronal suture. Running back from it is the median sagittal suture extending to the lambda and dividing the two parietals, which form the sides of the skull.

PELVIS: the basin-shaped cavity formed by the haunch-bones with the sacrum and other vertebrae.

PHALANGEAL BONES: the fourteen bones or phalanges of the fingers and thumb.

PITHECANTHROPOID: said of hominids falling into the general class of the *Pithecanthropus* and *Sinanthropus*.

PITHECANTHROPUS: the most 'primitive' form of hominid yet known with many anthropoid features but undoubtedly an early form of Man.

PITUITARY GLAND: one of the endocrine glands and situated at the base of the brain. Its secretion influences the growth of the face and limbs. The hormone (i.e., activating secretion) of the posterior lobe raises blood-pressure, contracts the smooth muscles of intestines, uterus and arteries and increases sugar-content in body-fluids.

PLEISTOCENE: the geological period sometimes called the Quaternary, following the Tertiary, marked by glaciation and the beginnings of modern forms of life, including human.

PLIOCENE: the latest of the four divisions of the geological Tertiary Period.

PROGNATHISM: a forward projection of the jaws' bones.

RAMUS: e.g., the 'branch' or ascending part of the lower jaw or mandible.

RECENT: in geological phraseology the equivalent of Holocene.

REGRESSION: in geological vocabulary the phenomenon of retreat (e.g., of a glacier or of the sea).

RISS: the third glaciation of the Pleistocene.

SAGITTAL SUTURE: the suture extending at the top of the skull from the coronal suture to the lambda.

SINANTHROPUS: the primitive hominid recovered from the calcareous formations of Choukoutien near Peking, of a type comparable with *Pithecanthropus* but from some points of view more 'evolved.'

SOLIFLUXION: or soil-flow, the movement of soggy soil on a slope provoked by alternations of freezing and thaw.

SOLUTREAN: a culture-phase noted for Western Europe between the Upper Aurignacian and the Magdalenian. The Solutrean culture is characterized by beautifully made 'laurel' shaped artefacts and by sculpture.

STEATOPYGOUS: said of the great development of fat in the buttocks characteristic of Hottentots and noticeable in some Upper Palaeolithic statuettes.

SUBORBITARY REGION: that part of the face below the orbits.

SUPERCILIARY RIDGES: the projections of the bony forehead above the orbits.

SUPRAGLABELLAR: relating to the region of the forehead above the glabella.

SUPRAORBITAL TORUS: the continuous bony ridge barring the whole base of the forehead as in the Neanderthaloid and pithecanthropoid types.

SYMPHYSIAL AREA OF THE JAW: that region in the anterior portion of the lower jaw below the two median incisors.

TAURODONT: relating to teeth with an exceptionally large pulp cavity—the condition is normal in the Neanderthaloids and pithecanthropoids.

TAYACIAN: an ancient Palaeolithic industry that is a phase of Acheulian.

TEMPORAL REGION: the region of the squamous-temporal bone above and immediately in front of the external ears.

TERTIARY: the Tertiary Period (divided into Eocene, Oligocene, Miocene and Pliocene), the third of the four great ages and that immediately preceding the Pleistocene.

TIBIA: the inner bone of the lower leg (i.e., between knee and ankle).

TORUS: a bony ridge of which the three in the skull are (*a*) the supraorbital; (*b*) the occipital; (*c*) the mandibular on the interior side of the lower jaw. (*a*) and (*b*) are 'primitive' features noticeable in the pithecanthropoids and the Neanderthaloids (although some forms of the latter have either no or a poorly developed occipital torus), (*c*) is a characteristic of many of the existing Mongoloids.

TRANSGRESSION: in geological terminology is used of the advance and spread of a glacier or of a sheet of water.

VARVES: accumulations of alluvium laid down year by year—fine black clay in the winter and light sand in the summer—permitting of the calculation, in Scandinavia, of the time-count since the glacial retreat.

VERTEX OF THE SKULL: the crown of the head.

WÜRM: the fourth and last of the Pleistocene glaciations, consisting of two phases with a relatively mild Interstadial dividing them.

ZYGOMATIC ARCHES: the bony arches formed of portions of the malar and temporal bones which enclose the temporal muscles and serve as the upper attachment of the masseter. The 'cheek bones.'

SUPPLEMENTARY NOTES

Supplementary Note, No. 1

Cf. p. 132, line 17 and Note 3. Dr. Larsen of the Copenhagen Museum and one of the leaders of the expedition which identified the Ipiutak culture is of the opinion that this culture ante-dated that known as 'Old Bering Sea.' This view is not universally adopted. However, the Ipiutak culture is undoubtedly ancient, at least for the Bering Sea area, and it may be provisionally dated at some time early in our era. Dr. Larsen made a full report on his discoveries to the Congress of Americanists held in Paris in August, 1947. Significant points of the Ipiutak material are (1) burials in log coffins in an area where no wood grows; (2) remains of bark-canoes, showing that the Ipiutak people were navigators and that they imported the material for their canoes, which were quite fitted to traverse the Bering Straits; (3) the occurrence of elaborate masks used to cover the faces of the dead. Of one of these masks Dr. Osvald Sirén, the sinologist, exclaimed, 'Here we have the link between ancient China and the cultures of the North American North-West coast.' (4) ivory plugs used to stop the orifices of the corpse; (5) statuettes of bears scored with tattoo-markings and suggesting a bear-cult; (6) a most elaborate and varied collection of utensils, weapons and tools indicating an advanced material culture.

Supplementary Note, No. 2

Note to pp. 188–194 on the South African australopithecoids. On May 17th, 1947, Dr. R. Broom reported that on the resumption of excavations at Sterkfontein the remains of a number of *Plesianthropus* individuals (including a perfect skull of an 'elderly female') were recovered. (See p. 190).

On August 1st, 1947, Dr. Broom and his assistant, Mr. J. T. Robinson, unearthed part of a (possibly female) skeleton and consisting of a 'perfect pelvis, much of a femur, a tibia, some ribs and vertebrae, and parts of the skull very badly crushed and broken.'

The ilium of the pelvis appears to be almost typically human (and very like that of existing Bushmen), while the ischium is less human in shape. The pubis 'agrees fairly well with that of man.'

It now seems quite clear that the long bones attributed to *Plesianthropus* must be allowed to him. The femur of the latest Sterkfontein discovery is 'much crushed. . . . It is rather slender. and has a few characters not quite human. . . .'

Judging from the latest material the height of the female *Plesianthropus* when alive, and erect, could not have exceeded four feet, while 'The male must have been much taller—perhaps even 5 ft.' Considerable difference in body size as between males and females is a characteristic of anthropoid apes and, also (*vide* p. 108), as far as we can see, of such a primitive type of man as *Sinanthropus*.

Dr. Broom finds in his latest discoveries support for the conclusion which he, and a number of other anthropologists, have adopted, namely, that 'man has evolved from an Australopithecine of Pliocene times.' Although not all authorities will be able, at the present time, to adopt fully Dr. Broom's views, as he states them, still, there can be no question as to the revolutionary interest and importance of the Sterkfontein discoveries.

That we should have proved for us the existence, presumably in fairly late Tertiary times, of a group of 'higher Primates closely allied to man, who had practically human teeth, and who walked on their hind limbs' is enough to make us revise many of the hypotheses and tentative conclusions hitherto largely held concerning the evolution of Man. Indeed, in the Sterkfontein material, we have something uncommonly like the elusive 'Tertiary Man' we have heard so much of. For the Australopithecoids, if their brains were small, appear to have been more human than anthropoid in their structure. And, as we have pointed out, in the body of the text, the big-brain mutation in Man's ancestors must have followed, rather than have preceded, those adaptations of bodily structure which enabled those ancestors to assume an upright posture and to 'make,' however clumsily, with their hands.

Professor Le Gros Clark stated at Nairobi in 1947: "I am afraid there is no escape. from the fact that these specimens are very closely related to Man and are survivors of the group that gave origin to Man."

EARLIER MAN IN EUROPE

In the late summer of 1947 excavations at a site some eight miles from La Rochefoucauld (in the French department of the Charente) and in the region of the famous La Quina Neanderthaloid site, resulted in the discovery of a considerable portion of a human skull, which is of definitely 'modern' or *homo sapiens* type. If, as from the degree of fossilization and from the situation of the cranium in the deposit, seems probable, the bones are of the same age as the artefacts found associated with the skull, we have here what must be the most ancient relic of *homo sapiens* in western Europe. The associated industry is 'old' Mousterian, that is the so-called 'warm' Mousterian of the end of the Riss-Würm Interglacial, and not the 'cold' Mousterian of the first phase of the Würmian glaciation.

Of course, further examination of the site and of the bones may lead to some modification of a first judgment, but the discovery is obviously one of importance and may indicate that 'modern' men were established in western Europe a good deal earlier than has hitherto been supposed. And the discovery cannot fail to attract still more attention to the oldest Neanderthaloid relics which, as we have seen, present a type of Neanderthaloids less rugged and different from 'modern' Man than do the later 'classical' Neanderthaloids.

Is it possible that the Neanderthaloids, on their arrival in Europe, found here a type of 'modern' men with whom there was interbreeding, while the 'modern' men, as such, left Europe during the rigours of the Würmian glaciation, and returned (from Africa?) after them to find here, and eventually to assimilate or to exterminate, the 'classical' Neanderthaloids during the mild Interstadial between the two peaks of the Würmian glaciation? There can be no doubt that further discoveries are awaiting us in the soil of our Continent, discoveries which may induce us to modify, considerably, our present views on the sequence of events leading up to the occupation of western Europe by our direct ancestors.

Note for page 77

Map of Eastern Java. Modjokerto lies 15 miles almost due south of Surabaya.

Note for page 169, map of Mesopotamia

Hassuna is about fifty miles south of Mosul and on the Tigris.

Note for page 236, map of Vézère Valley.

Lascaux should be shown to the east and not to the south of Montignac but, approximately, at the same distance from the town as depicted on the map.

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SHORT LIST OF PERIODICAL PUBLICATIONS

IT is to the periodical publications that we must refer if we would keep abreast of what is being done in the field of anthropological research. The devastation and paralysis of the war years have hampered and diminished the activities of anthropologists in Europe and especially in Great Britain, in France and in Germany. It will be noticed in the bibliography given above how many of the more recent works on anthropology have seen the light in the United States. This tendency towards a primacy in exposition, in illustration and in original research of the United States is not likely to be reversed in the near future. Such field work as is being done, outside the national boundaries of various States, is being carried on by Americans.

However, the leading review dealing with the whole range of anthropological studies, is still published in Europe. It is *L'Anthropologie* issued in Paris and edited by Professor H. V. Vallois, Director of the Museum of Human Palaeontology. This valuable publication is quite indispensable to all those seeking to keep themselves well-informed of developments in anthropological science. We have nothing like it in Great Britain and even in the United States there is no one periodical covering exactly the same ground. Moreover *L'Anthropologie*, by its admirable synopses of other periodical publications is, in some measure, an index to and a summary of all other anthropological reviews. It has not been thought necessary, therefore, to give below more than a very short title-list of some of the more outstanding periodicals.

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