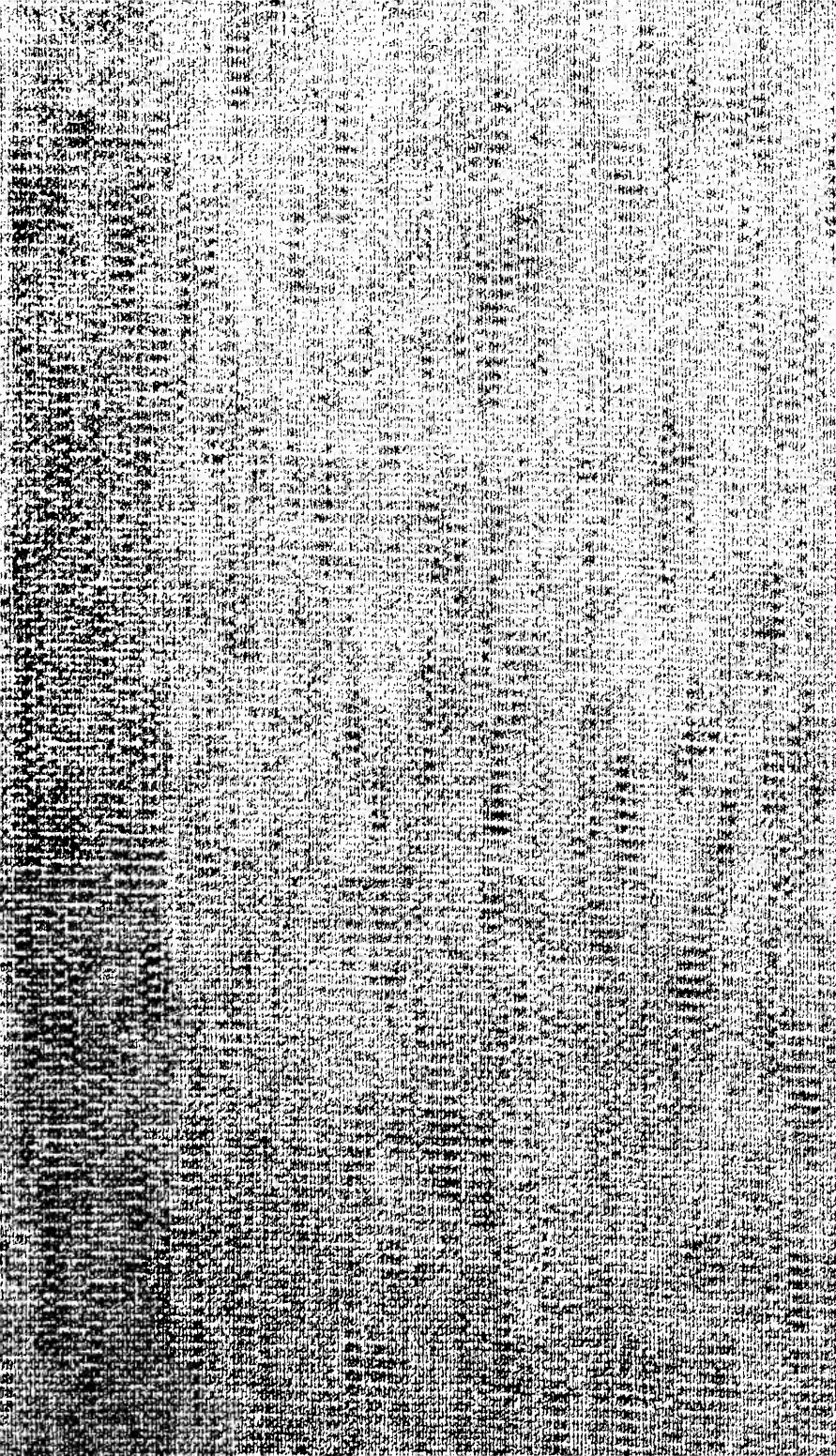

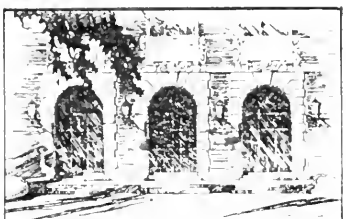

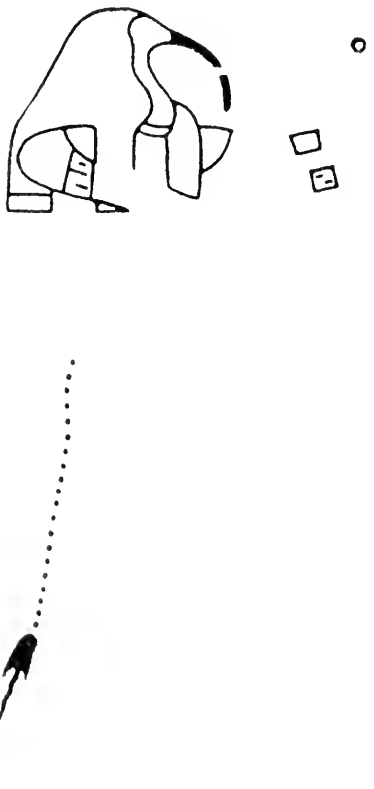

Prehistoric Men

Prehistoric Men

BY

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CHICAGO NATURAL HISTORY MUSEUM

POPULAR SERIES

ANTHROPOLOGY, NUMBER 37

PRINTED IN THE UNITED STATES OF AMERICA
BY CHICAGO NATURAL HISTORY MUSEUM PRESS

Preface

Like the writing of most professional archaeologists, mine has been confined to so-called learned papers. Good, bad, or indifferent, these papers were in a jargon that only my colleagues and a few advanced students could understand. Hence, when I was asked to do this little book, I soon found it extremely difficult to say what I meant in simple fashion. The style is new to me, but I hope the reader will not find it forced or pedantic; at least I have done my very best to tell the story simply and clearly.

I have taken a middle road in matters of dating. There is no certain way of fixing a direct chronology, either for the Pleistocene Ice Age generally or for most of the later prehistoric materials. My dates fall between the extremes currently offered. In any case, since the "periods" are all named, new dates may be written in if new and better dating systems appear.

Many friends have aided in the preparation of the book. The whimsical charm of Miss Susan Richert's illustrations add enormously to the spirit I wanted. She gave freely of her own time on the drawings and in planning the book with me. My colleagues at the University of Chicago, especially Professor Wilton M. Krogman (now of the University of Pennsylvania), and also Mrs. Linda Braidwood, Associate of the Oriental Institute, and Professors Fay-Cooper Cole and Sol Tax, of the Department of Anthropology, gave me counsel in matters bearing on their special fields, and the Department of Anthropology bore some of the expense of the illustrations. From Mrs. Irma Hunter and Mr. Arnold Maremont, who are

not archaeologists at all and have only an intelligent layman's notion of archaeology, I had sound advice on how best to tell the story. I am deeply indebted to all these friends.

I wish to thank Colonel Clifford C. Gregg, Director of Chicago Natural History Museum, for the opportunity to publish this book. My old friend, Dr. Paul S. Martin, Chief Curator in the Department of Anthropology, asked me to undertake the job and inspired me to complete it. I am also indebted to Miss Lillian A. Ross, Associate Editor of Scientific Publications, and to Mr. George I. Quimby, Curator of Exhibits in Anthropology, for all the time they have given me in getting the manuscript in proper shape.

On pages 46 and 98, I have added notes concerning pertinent materials which appeared after the manuscript was in press.

ROBERT J. BRAIDWOOD

September 12, 1948

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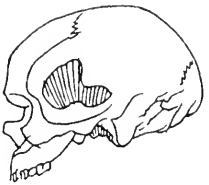


HOW WE LEARN about Prehistoric Men

Prehistory means the time before written history began. Actually, more than 99 per cent of man's story is prehistory. Man is at least half a million years old, but he did not begin to write history (or to write anything) until about 5,000 years ago.

The men who lived in prehistoric times left us no history books, but they did leave unintentionally a record of their presence and their way of life. This record is studied and interpreted by different kinds of scientists.

SCIENTISTS WHO FIND OUT ABOUT PREHISTORIC MEN

The scientists who study the bones and teeth and any other parts they find of the bodies of prehistoric men, are called *physical anthropologists.* Physical anthropologists are trained, much like doctors, to know all about the human body. They study living people, too; they know more about the biological facts of human "races" than anybody else. If the police find a badly decayed body in a trunk, they ask a physical anthropologist to tell them what the person originally looked like.

The physical anthropologists who specialize in prehistoric men work with fossils, so they are sometimes called *human paleontologists*.

ARCHAEOLOGISTS

There is a kind of scientist who studies the things that prehistoric men made and did. Such a scientist is called an *archaeologist*. It is the archaeologist's business to look for the stone and metal tools, the pottery, the graves, and the caves or huts of the men who lived before history began.

But there is more to archaeology than just looking for things. In Professor V. Gordon Childe's words, archaeology "furnishes a sort of history of human activity, provided always that the actions have produced concrete results and left recognizable material traces." You will see that there are at least three points in what Childe says:

1. The archaeologists have to find the traces of things left behind by ancient man, and
2. Only a few objects may be found, for most of these were probably too soft or too breakable to last through the years. However,
3. The archaeologist must use whatever he can find to tell a story—to make a "sort of history"—from the objects and living-places and graves that have escaped destruction.

What I mean is this: Let us say you are walking through a dump yard, and you find a rusty old spark plug. If you want to think about what the spark plug means, you quickly remember that it is a part of an automobile motor. This tells you something about the man who threw the spark plug on the dump. He either had an automobile, or knew or lived near someone who did. He can't have lived so very long ago, you'll remember, because spark plugs and automobiles are only about fifty years old.

When you think about the old spark plug in this way you have just been making the beginnings of what we call an archaeological *interpretation;* you have been making the spark

plug tell a story. It is the same way with the man-made things we archaeologists find and put in museums. Usually, only a few of these objects are pretty to look at; but each of them has some sort of story to tell. Making the interpretation of his finds is the most important part of the archaeologist's job. It is the way he gets at the sort of "history of human activity" which is expected of archaeology.

SOME OTHER SCIENTISTS

There are many other scientists who help the archaeologist and the physical anthropologist find out about prehistoric men. The geologists help us tell the age of the rocks or caves or gravel beds in which human bones or man-made objects are found. There are other scientists with names which all begin with "paleo" (the Greek word for "old"). The *paleontologists* study fossil animals. There are also, for example, such scientists as *paleobotanists*, and *paleoclimatologists*, who study ancient plants and climates. These scientists help us to know the kinds of animals and plants that were living in prehistoric times and so could be used for food by ancient man; and what the weather was like; and whether there were glaciers. Also when I tell you that prehistoric men did not appear until long after the great dinosaurs had disappeared, I go on the say-so of the paleontologists. They know that fossils of men and of dinosaurs are not found in the same geological period. The dinosaur fossils come in early periods, the fossils of men much later.

HOW THE SCIENTISTS FIND OUT

So far, this chapter has been mainly about the people who find out about prehistoric men. We also need a word about *how* they find out.

All our finds came by accident until about a hundred years ago. Men digging wells, or digging in caves for fertilizer, often turned up ancient swords or pots or stone arrowheads. People also found some odd pieces of stone that didn't look like natural forms, but they also didn't look like any known tool. As a result, the people who found them gave them

queer names: for example, "thunderbolts." The people thought the strange stones came to earth as bolts of lightning. We know now that these strange stones were prehistoric stone tools.

Many important finds still come to us by accident. In 1935, a British dentist, A. T. Marston, found the first of two fragments of a very important fossil human skull, in a gravel pit at Swanscombe, England. He had to wait nine months, until the face of the gravel-pit had been dug eight yards farther back, before the second fragment appeared. They fitted! In 1928 workmen who were blasting out rock for the breakwater in the port of Haifa began to notice flint tools. Thus the story of cave men on Mount Carmel, in Palestine, began to be known.

Planned archaeological digging is only about a century old. Even before this, however, a few men realized the significance of objects they dug from the ground; one of these early archaeologists was our own Thomas Jefferson. The first real mound-digger was a German grocer's clerk, Heinrich Schliemann. Schliemann made a fortune as a merchant, first in Europe and then in the California gold-rush of 1849. He became an American citizen. Then he retired, and had both money and time to test an old idea of his. He believed that the heroes of ancient Troy and Mycenae were once real Trojans and Greeks. He proved it by going to Turkey and Greece and digging up the remains of both cities.

Schliemann had the great good fortune to find rich and spectacular treasures, and he also had the common sense to keep notes and make descriptions of what he found. He proved beyond doubt that many ancient city mounds can be *stratified*. This means that there may be the remains of many towns in a mound, one above another, like layers in a cake.

You might like to have an idea of how mounds come to be in layers. The original settlers probably chose the spot because it had a good spring and there were good fertile lands nearby, or perhaps because it was close to some road or river or harbor. These settlers probably built their town of stone and mud-brick. Finally, something would have happened

to the town—a flood, or a burning, or a raid by enemies—and the walls of the houses would have fallen in, or would have melted down as mud in the rain. Nothing would have remained but a low mound of *one* layer.

The second settlers would have wanted the spot for the same reasons the first settlers did—good water, land, and roads. Also, the second settlers would have found a nice low mound to build their houses on, a protection from floods. But again, something would finally have happened to the second town, and the walls of *its* houses would have come tumbling down. This makes the *second* layer. And so on. . . .

In Syria I once had the good fortune to dig on a large mound which had no less than fifteen layers. Also, most of the layers were thick, and there were signs of rebuildings and repairs within each layer. The mound was more than a hundred feet high. In each layer, the building material used had been a soft, unbaked mud-brick, and most of the debris consisted of fallen or rain-melted mud from these mud-bricks.

This idea of *stratification*, like the cake layers, was already a familiar one to the geologists by Schliemann's time. They could show that their lowest layer of rock was oldest or earliest, and that the overlying layers became more recent as one moved upward. Schliemann's digging proved the same thing at Troy. His first (lowest and earliest) city had at least nine layers above it; he thought that the second layer contained the remains of Homer's Troy. We now know Homeric Troy was layer VIIa; also we count eleven layers or sub-layers in total.

Schliemann's work marks the beginnings of modern archaeology. Scholars soon set out to dig on ancient sites, from Egypt to Central America.

ARCHAEOLOGICAL INFORMATION

As time went on, the study of archaeological materials—found either by accident or by digging on purpose—began to show certain things. Archaeologists began to get ideas as to the kinds of objects that belonged together. If you compared a mail-order catalogue of 1900 with one of today, you would

see a lot of differences. If you really studied the two catalogues hard, you would also begin to see that certain objects "go together." Horseshoes and metal buggy tires and pieces of harness would begin to fit into a picture with certain kinds of coal stoves and furniture and china dishes and kerosene lamps. Our friend the spark plug, and radios and electric refrigerators and light bulbs would fit into a picture with different kinds of furniture and dishes and tools. You probably won't be old enough to remember the kind of hats that women wore in 1900, but you've probably seen pictures of them, and you know very well they couldn't be worn with the fashions of today.

This is one of the ways that archaeologists study their materials. The various tools and weapons and jewelry, the pottery, the kinds of houses, and even the ways of burying the dead tend to fit into pictures. Some archaeologists call all of the things that go together to make such a picture an *assemblage*. The assemblage of the first layer of Schliemann's Troy was as different from that of the seventh layer as our 1900 mail-order catalogue is from the one of today.

The archaeologists who came after Schliemann began to notice other things, and to compare them with occurrences in modern times. The idea that people will buy better mousetraps goes back into very ancient times. Today, if we make good automobiles or radios, we can sell some of them in China or even in Timbuktu. This means that a few present-day types of American automobiles and radios form part of present-day "assemblages" in both China and Timbuktu. The total present-day "assemblage" of China is quite different from both that of Timbuktu and that of America, but they have at least some automobiles and some radios in common.

Now these automobiles and radios will eventually wear out. Let us suppose we could go to China or Timbuktu in a dream. We don't know what the date is, in our dream, but we see all sorts of strange things and ways of living in both places. Nobody tells us what the date is. But suddenly we see a 1926 Ford; so we know that in our dream it has to be at least the year 1926, and only as many years after that as we could reasonably expect a Ford to keep in running order. The

Ford would probably break down in twenty years' time; so the Chinese or Timbuktu "assemblage" we're seeing in our dream has to date at about A.D. 1926–46.

Archaeologists not only "date" their ancient materials in this way; they also see over what distances and between which peoples trading was done. It turns out that there was a good deal of trading in ancient times, probably all on a barter and exchange basis.

EVERYTHING BEGINS TO FIT TOGETHER

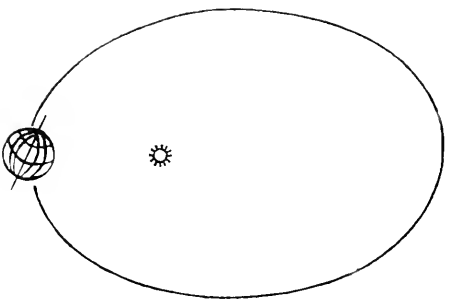
Now we need to pull these ideas all together, and see the complicated structure the archaeologists can build with their materials. With any luck, they do their digging in a layered, stratified site. They find the remains of everything that would last through time, in several different layers. They know that the assemblage in the bottom layer was laid down earlier than the assemblage in the next layer above, and so on up to the topmost layer, which is the latest. They look at the results of other "digs," and find that some other archaeologist 200 miles away has found ax-heads in his lowest layer, exactly like the ax-heads of their fifth layer. This means that their fifth layer must have been lived in at about the same time as was the first layer in the site 200 miles away. It also means that the people who lived in the two layers may have known and traded with each other. Or it could mean that they didn't necessarily know each other, but simply that both traded with a third group at about the same time.

You can see that the more we dig and find, the more clearly the main facts begin to stand out. We begin to be more sure of which people lived at the same time, which earlier and which later. We begin to know who traded with whom, and which people seemed to live off by itself. We begin to find enough skeletons in burials so that the physical anthropologists can tell us what the people looked like. We get animal bones, and a paleontologist may tell us they are all bones of wild animals; or he may tell us that some or most of the bones are those of domesticated animals, for instance, sheep or cattle, and therefore the people must have kept herds.

More important than anything else — as our structure grows more complicated and our materials increase — is the fact that "a sort of history of human activity" does begin to appear. The habits or traditions that men formed in the making of their tools and in the ways they did things, begin to stand out for us. How characteristic were these habits and traditions? What areas did they spread over? How long did they last? We watch the different tools and the traces of the way things were done — how the burials were arranged, what the living-places were like, and so on. We wonder about the people themselves, for the traces of habits and traditions are useful to us only as clues to the men who once had them. So we ask the physical anthropologists about the skeletons that we found in the burials. Were the skeletons all from exactly the same type of people? Was there a "pure race" here? In ninety-nine cases out of a hundred, we are told that there was not a "pure race." And in the cases where the skeletons do show close resemblance, it is only because we have found so few that we cannot compare them for differences. The physical anthropologists show us differences in the skeletons from our burials, and tell us that the people were not all of exactly the same type.

We become particularly interested in any signs of change — when new materials and tool types and ways of doing things replace old ones. We watch for signs of social change and progress in one way or another.

We must do all this without one word of written history to aid us. Everything we are concerned with goes back to the time *before* men learned to write. That is the prehistorian's job — to find out what happened before history began.



THE CHANGING WORLD in which Prehistoric Men Lived

Mankind is at least a half million years old. It is very hard to understand how long a time half a million years really is. If we were to compare this whole length of time to one day, we'd get something like this: The present time is midnight, and Jesus was born just five minutes and thirty-six seconds ago. Earliest history began less than fifteen minutes ago. Everything before 11:45 was in prehistoric time.

Or maybe we can grasp the length of time better in terms of generations. As you know, primitive peoples tend to marry and have children rather early in life. So suppose we say twenty years will make an average generation. At this rate there would be 25,000 generations in a half-million years. But our United States is much less than ten generations old, twenty-five generations take us back before the time of Columbus, Julius Caesar was alive just 100 generations ago, David was king of Israel less than 150 generations ago, 250 generations take us back to the beginning of written history. And there were *22,500* generations of men before written history began.

CHANGES IN ENVIRONMENT

The earth probably hasn't changed much in the last 5,000 years (250 generations). Men have built things on its surface and dug into it and drawn boundaries on maps of it, but the places where rivers, lakes, seas, and mountains now stand have changed very little.

In earlier times the earth looked very different. Geologists call the last great geological period the *Pleistocene*. It began somewhere between a million and a half million years ago, and was a time of great changes. Sometimes we call it the Ice Age, for in the Pleistocene there were at least four times when large areas of the earth were covered with glaciers.

Glaciers are great sheets of ice, sometimes over a thousand feet thick, which are now known only in Greenland and Antarctica and in high mountains. During several of the four glacial periods in the Ice Age, the glaciers covered all of Canada and the northern United States and reached down to southern England and France in Europe. Smaller ice sheets sat like caps on the Rockies, the Alps, and the Himalayas.

As you know, the amount of water on and about the earth does not vary. These large glaciers contained millions of tons of water frozen into ice. Because so much water was frozen and contained in the glaciers, the water level of lakes and oceans was lowered. Flooded areas were drained and appeared as dry land. There were times in the Ice Age when there was no English Channel, so that England was not an island, and land bridges probably divided the Mediterranean.

GLACIERS CHANGE THE WEATHER

Great sheets of ice also change the weather. When the front of a glacier stood at Milwaukee, the weather must have been bitterly cold in Chicago. The climate of the whole world would have been different, and you can see how animals and men would have been forced to move from one place to another in search of food and warmth.

On the other hand, it looks as if only about 13 per cent of the whole Ice Age was really taken up by times of glaciation.

In between came the *interglacial* periods. During these times the climate around Chicago was as warm as it is now, and sometimes even warmer. It may interest you to know that the last great glacier melted away less than 10,000 years ago. Professor Ernst Antevs thinks we may be living in an interglacial period, and that the Ice Age may not be over yet. So if you want to make a killing in real estate for your several hundred times great-grandchildren, you might buy some land in the Arizona desert or the Sahara.

The reason I tell you about the glaciers is simply to remind you of the changing world in which prehistoric men lived. Their surroundings—the animals and plants they used for food, and the weather they had to protect themselves from—were always changing. On the other hand, this change happened over so long a period of time and was so slow that people could not have noticed it. Glaciers, about which they themselves probably knew nothing, moved in hundreds of miles to the north of them. The people must simply have wandered ever more southward in search of the plants and animals on which they lived. Or some men may have stayed where they were and learned to hunt different animals and eat different foods. The scientists would say that prehistoric men had to keep readapting themselves to new environments and those who were most adaptive were most successful.

OTHER CHANGES

Changes also took place in the men themselves and in the ways they lived. As time went on, they made better tools and weapons. Then, too, we begin to find signs of how they started thinking of other things than food and the tools to get it with. We find that they painted on the walls of caves, and decorated their tools; we find that they buried their dead.

At about the time when the last great glacier was finally melting away, men in the Near East made the first basic change in human economy. They began to plant grain and they learned to raise and herd certain animals. This meant that they could store food in granaries and "on the hoof" against the bad times of the year. This first really basic change

in men's way of living has been called the "food-producing revolution." By the time it happened, a modern kind of climate was beginning. Men had already grown to look as they do now. Know-how in ways of living had developed and progressed, slowly but surely, up to a point. It was impossible for men to go beyond that point if they only hunted and fished and gathered wild foods. Once the basic change was made—once the food-producing revolution became effective technology leaped ahead and civilization and history soon began.

Prehistoric Men THEMSELVES

DO WE KNOW WHERE MAN ORIGINATED?

For a long time some scientists thought the "cradle of mankind" was in central Asia. Other scientists insisted it was in Africa, and still others said it might have been in Europe. Actually, we don't know where it was. We don't even know that there was only *one* "cradle." It seems most likely that the creatures who were the ancestors of men were spread all over Europe, Africa, and Asia before the Ice Age began. It is pretty certain they weren't in North or South America, or we would have found some trace of them by now. The earliest fossil bones of men we've yet found are only about half a million years old. The bones come from the Far East—from China and Java. In western Europe and in Africa we have tools made by man half a million years ago, but not the bones of the men who made them.

Let me say it another way. How old are the earliest traces of men we now have? About 500,000 years old. What have we found so far? In China we have found the bones of men and the tools they made; in Java we have found only the bones; in Europe and Africa, we have found only the tools.

So this is the situation. The earliest traces of man are all about the same age, as nearly as we can tell. They come from the far corners of the Old World—Europe, Africa, and eastern Asia. There are also traces in the middle ground—no earlier in date, either. Many great areas have not yet been well explored (for example, the Sahara, Arabia, central Asia), but there is no really good reason to suspect that these areas had *earlier men* than did the flanks of the Eurafrasian continents.

Professor Franz Weidenreich believes that creatures who were immediate ancestors of men had already spread out over Europe, Africa, and Asia by the time the Ice Age began. It's sure that mankind is older than a half million years, but no fortunate accident of discovery has yet given us evidence to prove it.

BRAINS, HANDS, AND TOOLS

We don't yet know what forces determined the development of these early creatures into men. Three important things are probably involved. These are:

1. The increasing size and development of the brain.
2. The increasing usefulness (specialization) of the thumb and hand.
3. The use of tools.

Nobody knows which of these three is most important, or which came first. Most probably the growth of all three things was very much blended together. If you think about each of the things, you will see what I mean. Unless your hand is more flexible than a paw, and your thumb will work against (or oppose) your fingers, you can't hold a tool very well. But you wouldn't get the idea of using a tool unless you had enough brain to help you see cause and effect. And it is rather hard to see how your hand and brain would develop unless they had something to practice on—like using tools. In Professor Krogman's words, "the hand must become the obedient servant of the eye and the brain." It is the *coordination* of these things that counts.

Many other things must have been happening to the bodies of the creatures who were the ancestors of men. Our ancestors had to develop organs of speech. More than that, they had to get the idea of letting *certain sounds* made with these speech organs have *certain meanings*. They had to develop special kinds of feet, and legs, and a different sense of balance, and many other things before they really became men.

All this must have gone very slowly. Probably everything was developing little by little, all together. Men became men very slowly.

WHEN SHALL WE CALL MEN MEN?

What do I mean when I say "men"? People who looked pretty much as we do, and who used different tools to do different things, are men to me. We'll probably never know whether the earliest ones talked or not. They probably had vocal cords, so they could make sounds, but did they know how to make sounds work as symbols to carry meanings? But if the fossil bones look like our skeletons, and if we find tools which we'll agree couldn't have been made by nature or by animals, then I'd say we had traces of *men*.

THE EARLIEST MEN WE KNOW

At the moment, we can't be any more accurate than to say we have two lots of bones of the earliest known men, from about the same time. The time is a half million years ago or slightly less. One lot comes from China, the other from Java. The Chinese lot comes from near Peking, and is called "Peking man" or *Sinanthropus pekinensis*. The Javanese lot is called "Java man" or *Pithecanthropus erectus*. Let's call them Peking man and Java man. Recently, some physical anthropologists have decided that both Peking and Java "man" should be lumped together as two parts of one group, *Homo erectus*.

Java man was found first, and there are now bones enough to account for four skulls. There are also four jaws and some odd teeth and legbones. All these bits quite clearly belong to only one species. Java man was about five feet six inches tall, and didn't hold his head very erect. His skull was very

thick and heavy and had room for little more than two-thirds as large a brain as we have. He had big teeth and a big jaw and enormous eyebrow ridges of bone.

No tools were found in the river terraces where the bones of Java man appeared. There are some tools in the same general area, but they come a bit later in time. One reason we accept the Java man as man is because he looks so much like the tool-using Peking man.

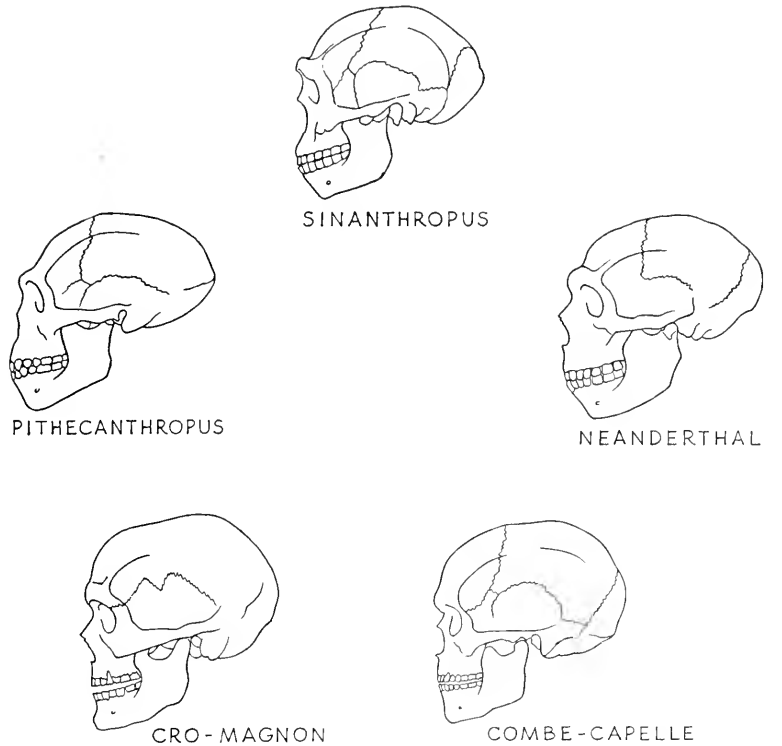
Peking man lived in a cave, made tools, cracked animal bones to get the marrow out, and used fire. Incidentally, the bones of Peking man were found because Chinese dig for what they call "dragon bones" and "dragon teeth." Uneducated Chinese buy these things in their drug stores, and grind them into powder for medicine. The "dragon teeth" and "bones" are really fossils of ancient animals, and sometimes of men. The people who supply the drug stores have learned where to dig for strange bones and teeth. Paleontologists who get to China go to the drug stores to buy fossils. In a roundabout way, this is how the fallen-in cave of Peking man was discovered.

Peking man was not quite as tall as Java man but he probably stood straighter. His skull looked very much like that of the Java skull except that it had room for a slightly larger brain. His face was less brutish than was Java man's face, which isn't saying much.

ANCESTORS FOR PITHECANTHROPUS ERECTUS AND SINANTHROPUS PEKINENSIS?

These two types of men were closely related, and probably had common ancestors. We don't know who the ancestors were, but Professor Weidenreich has hints of some strange things from the area, and from the same general geological layers. One of the skulls in the Java lot was very large. An even larger jaw was found nearby in Java. Largest of all, so far, are three molar teeth, which Professor Weidenreich insists are human. Professor G. H. R. von Koenigswald found the teeth in a drug store in Hong Kong just before World War II. The top of these teeth—the grinding area—has six times the

area of our molars. Professor Weidenreich insists that men who were gigantic in size lived in those days. He also thinks this "gigantism," as he calls it, tended to "breed out" or disappear with time. If he is right, the "breeding out" had



PRINCIPAL KNOWN TYPES OF FOSSIL MEN

already been completed by the time of Java and Peking man, for they were not big people.

The physical anthropologists don't all agree on the reasons for the disappearance of these giants. Perhaps they came to a dead end, like the dinosaurs, and left no descendants. There are also several fossil finds from Africa that puzzle us; we have few details about them yet. What everyone does agree on is that the Java and Peking skeletons are man-like, and the oldest examples of human skeletons that we have.

WHAT HAPPENED TO JAVA AND PEKING MEN

Professor Weidenreich thinks there are at least a dozen ways in which the Peking man resembled the modern Mongoloids. This would seem to indicate that Peking man was really just a very early Chinese.

Several later fossil men have been found in the Java–Australian area. It looks as if we can be pretty certain of the line of evolution from Java man to the modern Australian natives. He probably had other descendants, too.

A POSSIBLY EARLY ENGLISHMAN

The next "man" to look at is "Piltdown man" (*Eoanthropus dawsoni*). He is England's best claim to the possession of bones of early prehistoric men, but he's a pretty shaky claim. The find contains a number of fragments of a skull, some teeth, and half a lower jaw. Most people think the skull is that of a woman; hence, Piltdown "man" isn't really a man. The jaw, however, seems to belong to a fossil ape. Piltdown man was found very near the surface, in a shallow gravel pit, and so the geologists are not able to give us an accurate date for the bones.

While the Piltdown skull does not look exactly like our modern skulls, it is much more like ours than are those of Java and Peking. Sir Arthur Keith, one great authority, believes Piltdown was an early man. Professor Weidenreich wants to remove Piltdown from "the list of human fossils," because he thinks the find is too recent and too questionable to count. Beyond this, we needn't go. You can see how much chance there is for argument about Piltdown. Since there is an even chance that either scientist may be right, I thought this English find should be mentioned.

TYPICAL "CAVE MEN"

The next men we have to talk about are all members of a related group. These are the *Neanderthaloids*. "Neanderthal man" himself was found in the Neander Valley, near Dusseldorf, Germany, in 1856. He was the first human fossil to be recognized as such.

A large number of remains of Neanderthal-type men have been found in Europe and elsewhere. Some are earlier than the main group. One example is a jaw found near Heidelberg, Germany. It dates to the second glaciation of the Ice Age (about 450,000 years ago). A skull found in Rhodesia, in Africa, has also been claimed as early, but it may be no earlier than the main group. In the Solo River Valley, in Java, eleven skulls were found which date at about the same time as the main group. These three fossil types—Heidelberg, Rhodesia, and Solo—are generally called "Neanderthaloid," but they differ somewhat from the main group.

There are at least a dozen good examples in the main group in Europe. They date to just before, and in the earlier part of the last great glaciation (about 100,000–70,000 ago). Many of the finds have been made in caves. The "cave men" the movies and the cartoonists show you are probably meant to be Neanderthalers. I'm not at all sure they dragged their women by the hair; the women were probably pretty tough, too!

Neanderthal men had large bony heads, but plenty of room for brains. Some had brain cases even larger than the average for modern man. Their faces were heavy, and they had eyebrow ridges of bone, but the ridges were not as big as those of Java man. Their foreheads were very low, and they didn't have much chin. They were about five feet three inches tall, but were heavy and barrel-chested. Neanderthalers didn't stand up as straight as we do, either.

One important thing about the Neanderthal group is that there are a fair number of them to study. Just as important is the fact that we know something about how they lived, and about some of the tools they made.

EARLY MODERN MEN

Next on my list is modern man (*Homo sapiens*), the "wise man." But first there are one or two early finds of pre-modern types that we need to catch up on. Like Piltdown, there was another questionable find made long ago in England. This was a skull and skeleton (badly broken), found at Galley Hill in

gravels of the second interglacial period. The bones looked almost too modern to be so old, for the time is that between the second and third great glaciations of the Ice Age (about 275,000 years ago). But in 1935 the bones of a similar pre-modern skull appeared in gravels of the same geological age, at Swanscombe, in England. Also, an equally early skull, although even less modern in appearance, turned up in Steinheim, Germany. So it seems pretty certain that a partially modern type of man was already alive a long time ago. In fact these man were alive even before the *main* Neanderthal group.

There is one other very interesting pre-modern type of man. People lived in caves on Mount Carmel, in Palestine, probably at about the same time as the main Neanderthal group was living in Europe. Some of these Palestinians looked like Neanderthalers, but others looked much more like modern man — or at least "intermediate" between Neanderthal and modern men. Professor T. D. McCown and Sir Arthur Keith figured out that this second Mount Carmel group may be as much as 70 per cent modern.

While the most modern-looking of the pre-modern human bones we have talked about so far are those of Galley Hill and Swanscombe, completely modern skeletons begin turning up in the European caves dating to 50,000 years ago. This is the time of the second stage of the last great glaciation. These skeletons belonged to types of people no different from many people we see today, and, like people today, not everybody looked alike. (The positions of the more important fossil men of Europe are shown in the chart on page 61.)

DIFFERENCES IN THE EARLY MODERNS

Professor C. Coon divides the main early European moderns into two groups, the Cro-Magnon group and the Combe Capelle–Brunn group. Cro-Magnon people were tall and big-boned, with large, long, and rugged heads. They must have been built like many present-day Scandinavians. The Combe Capelle–Brunn people were shorter; they had narrow heads and faces, and big eyebrow ridges. Of course we don't

find the skin or hair of these people. But there is little doubt they were Caucasoids ("Whites").

Another important find came in the Italian Riviera, near Monte Carlo. Here, in a cave near Grimaldi, there was a grave containing a woman and a young boy, buried together. The two skeletons were those of Negroids; that is, the bones of the Grimaldi skeletons closely resemble modern Negro bones. There are as yet no sure cases of Negroid bones in Africa that are as early as those of Grimaldi in Europe!

From a place called Wadjak, in Java, we have "proto-Australoid" skulls that closely resemble those of the modern Australian natives. Other skulls found in South Africa, especially the Boskop skull, look like those of modern Bushmen, but are much bigger. Neither Australians nor Bushmen are Negroes; neither the Wadjak nor the Boskop skulls look nearly as much like Negro skulls as do the Grimaldi skulls.

As we've already mentioned, Professor Weidenreich believes that Peking man was already on the way to becoming a Mongoloid. Anyway, the Mongoloids were certainly present by the time of the "Upper Cave" at Chokoutien. There is a possibility—but not a very strong one—that there were Mongoloids in late Ice Age times in Europe. The Chancelade skull, found in France, has been said to resemble closely the skulls of Eskimos, who are Mongoloids.

What does all this mean? It means that the bone structure typical of the three great stocks of mankind—"Black," "White," and "Yellow"—was already here at least 35,000 years ago, and possibly earlier. The "Australoid" type is sometimes called a fourth stock; it was here, too. The Caucasoid type was in Europe. The earliest traces we have of the Negroid type were also found in southern Europe. It's less probable that there were Mongoloids in Europe, but they were already in the Far East. By 20,000 years ago, these Mongoloids were probably moving, by way of Siberia and Alaska, into the New World.

THE STOCKS OF MANKIND

What are these three great stocks I speak of? I've given you names that approximately correspond with present-day skin

color: Black, Negroid; White, Caucasoid; Yellow, Mongoloid. But hair form and color are important, too. So are the build of the head and of the face, the breadth of the nose, the set of the eyes, and the height of the cheek-bones. Of course a skeleton doesn't have skin and hair, so the skin color and hair form can't be identified; but the skull and a few other parts of the skeleton will show the original build. As far as the skeletons are concerned, we've just seen that bone structures typical of each of the three different stocks have been found at least as early as 35,000 years ago. Even if the stocks had been "pure" then (which they certainly weren't), they would all be mixed up by now. Human beings don't breed for purity.

The only thing the idea of a stock can do is to give us a notion of the general appearance of *large groups* of people; that is, a description of a stock is a description of an average person, a happy medium, or an ideal type.[1] No one person in the stock will fit the description exactly, but thousands may fit it in a general way. Remember, too, that many details have to be taken into account. Some Hindus (whom we class as Caucasoids) have blacker skins than many Negroes, but in hair, head, and facial builds they resemble Italians. So we can't base our description of a stock on only one detail.

Now you'll see why I was careful not to say that the Grimaldi skeletons were those of Negroes. I said the skulls and skeletons were *Negroid* in type. Nobody knows what color skin or kind of hair they had. The bony structure is so close to that of Negroes that we can make a guess about skin color, but we might be wrong.

SUB-STOCKS, GROUPS, OR RACES

Starting with the fact that all modern human beings belong to one *species*, *Homo sapiens*, Professor W. M. Krogman treats the three great stocks as *subspecies*. He then goes on to describe the groups, "races," or *sub-subspecies* into which the stocks may be roughly divided. Under the Caucasoids, he describes nine

[1] Something which grows in the mind of the person who is making the description. You've no doubt seen such a thing tried for an "ideal" movie actress, for example, Lana Turner's hair, Lauren Bacall's eyes, Ginger Rogers' nose, etc.

groups or races, under the Negroids seven groups, and under the Mongoloids seven groups. He says that he probably gets fewer Negroid and Mongoloid groups than he does Caucasoids, simply because we know more about the Caucasoids. He then goes on to make three important statements that are based on our knowledge of the Caucasoids, since we know them best. He says:

1. There is no "pure" race.
2. No single state or nation is composed of a single race.
3. All peoples of Europe are the product of an age-old mixture of races.

We might understand better what these races or groups mean to Professor Krogman, if we looked at two of his modern examples:

1. The Mediterraneans are a group of Caucasoid stock. They live mainly in southern Europe, northern and northeastern Africa, the Near East (the Arabs), and northern India. There are, however, peoples of other groups living side by side with those of Mediterranean type in all these areas. Also, the Mediterraneans have spread out over the edges of these areas to all parts of the world.
2. The German nation is made up of the following groups and possibly others: the Mediterraneans, the Nordics, the Alpines, the Dinarics, and the East Baltics. Also, remember that none of these groups is "pure" in itself.

Almost every physical anthropologist has tried to classify the groups of the peoples of the world. I've given you Professor Krogman's scheme, but it's not the only scheme, or even the only good one. The value of a scheme depends on the care with which the physical anthropologist has judged the details he used to set it up. Suppose you try to make a classification of automobiles, for example. You have first to decide what should count most heavily in your classification. Shall it be the make, or the body color, or the number of cylinders, or the horsepower, or the number of people the car can carry?

After you decide on the detail that is to be most important in your classification, you'll have to decide on the next most important, and so on. I imagine you won't decide that body color is very important!

In the end, when an anthropologist has set up a group, each real person in the group will fit the standard only approximately. This is because (like the stocks) the groups are averages, mediums, or ideal types. There is nothing "pure" and nothing individual about the modern groups or races. Nor is there evidence to show that there ever have been "pure" groups or races.

HOW ABOUT MODERN RACES?

Since this little book is about prehistory, I'm going to leave the problem of modern races to the physical and social anthropologists. I've just given you enough of Professor Krogman's ideas on the subject so that you may see how a physical anthropologist thinks about race. As a physical anthropologist, Krogman is talking about *biological race* when he uses the word "race" he says no human races are pure. The kind of anthropologists who study culture and society (we call them "social" or "cultural" anthropologists) find that the word "race" is used in another way too. This kind of race could be called "sociological" race.

The term "sociological" race is simply an admission (by the social anthropologists who are realists) of a fact. When enough people decide to *think* there is such a thing as a race, then there is such a thing as a race for the people who think it. Habits, customs, choice of clothes, ways of fixing food, and even odder things get mixed into such ideas of race. It is this sort of notion of race on which the thing we know as race prejudice gets built. It is a wrong idea, but it certainly exists. One problem we anthropologists have is in knowing how to fight it. As Professor L. A. White says, you can't convince a crazy man that he's not Napoleon by showing him scientifically that this is 1948, not 1812, that he doesn't speak French, and that his wife's name is not Josephine. So far, science hasn't been much more effective in re-educating the people with race prejudice.

This is really not part of the subject at all. What I can tell you as a prehistorian is that we have no evidence of "pure" race—of any kind—in prehistoric times.

SUMMARY OF FOSSIL MEN AND HUMAN PHYSICAL DIFFERENCES

We started this chapter with Java man and Peking man, who lived about a half million years ago. Peking man used tools, and it's almost certain that Java man used them too; hence they were men, for animals don't use tools.

Weidenreich thinks there was a straight line of evolution from Java man to Solo (the Java "Neanderthaler") to Wadjak (the Java proto-Australoid) to the modern Australian natives. Weidenreich also sees in Peking man twelve characteristics that look like modern Mongoloid traits. Since Peking man was found in caves near Peking, China, it looks as if he were already an ancestral Chinese. It also looks as if stock differences were already beginning half a million years ago.

We haven't yet found fossil men in Europe who are certainly as old as the Asiatic forms that we have described. But by 275,000 years ago, the quite modern Swanscombe (and probably Galley Hill) men were already in England. The Neanderthal-like Heidelberg man had already been in Germany, and it's quite likely there was not an English Channel at the time. There certainly were times later when there wasn't, and when these different types of people could wander around freely and mix.

Men of one Neanderthal type or another have turned up all over the Old World. They made tools, and some of them lived in caves and also buried their dead. This was happening at least 100,000 years ago.

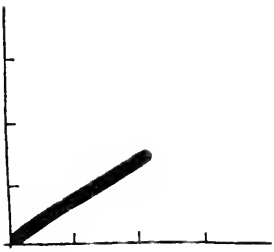
Really modern men appear some time after 75,000 years ago. But there are bones, which probably should be dated earlier than this, of mixed Neanderthal–modern types, at least from Mount Carmel in Palestine. This means either (1) that Neanderthalers and modern types were breeding together, or (2) that here is just one case where the Neanderthaler was in the direct process of evolving into modern man.

Or, both processes may have been working together. Krogman says: "Of one thing we may be certain, viz., that Neanthropic Man (Cro-Magnon, fully modern man) evolved from Paleanthropic Man (the Neanderthalers)."

The first modern men we know in Europe are not all alike. There are at least two kinds of ancestral Caucasoids in Europe, the Cro-Magnon and the Combe Capelle types. There are also the Negroids of Grimaldi, and the possibility that the Chancelade skull of France may be Mongoloid (or at least like an Eskimo). We know other early modern types, in China, Java, and Africa. These were either more Mongoloid or more Australoid; they are not Caucasoids or Negroids.

Some of the more special types of modern Europeans began to move into place about 6,000 years ago. Others came later. But this is a very complicated story of movements and mixings; there had already been mixing beforehand, and we know the result is mixed.

People have been mixing and cross-breeding for so long that any such notion as a "pure race" is nonsense. That is, if we're really talking about *biological* race—about flesh and *germ plasm* and brain and bones. But if we're thinking up a "sociological" race, that's another matter. That's like thinking up a belief in Santa Claus; if we all believe it, then it's so in terms of our beliefs. What is not so is that a "sociological" race has a *biological* basis. There is *no* basis of *fact* to support such a belief.



Cultural BEGINNINGS

Men, unlike the lower animals, are made up of much more than flesh and blood and bones; for men have "culture."

WHAT IS CULTURE?

"Culture" is a word with many meanings. The doctors speak of making a "culture" of a certain kind of bacteria, and ants are said to have a "culture." Then there is the Emily Post kind of "culture"—you say a person is "cultured," or that he isn't, depending on whether or not he eats peas with his knife.

The anthropologists use the word too, and argue heatedly over its finer meanings; but they all agree that every human being is part of or has some kind of culture. Each particular human group has a particular culture; that is one of the ways in which we can tell one group of men from another. In this sense, a *culture* means the way the members of a group of people think and believe and live, the tools they make, and the way they do things. Professor Robert Redfield says a culture is an organized or formalized body of conventional understandings. "Conventional understandings" means the whole set of rules, beliefs, and standards which a group of people live by. These understandings show themselves in art, and in the other things a people make and do. The under-

standings continue to last, through tradition, from one generation to another. They are what really characterize different human groups.

SOME CHARACTERISTICS OF CULTURE

A culture lasts, although individual men in the group die off. On the other hand, a culture changes as the different conventions and understandings change. You could almost say that a culture lives in the minds of the men who have it. But people are not born with it; they get it as they grow up. Suppose a day-old Dutch baby is adopted by a family in Oshkosh, Wisconsin, and the child is not told that he is Dutch. He will grow up with no more idea of Dutch culture than anyone else in Oshkosh.

So when I speak of ancient Egyptian culture, I mean the whole body of understandings and beliefs and knowledge possessed by the ancient Egyptians. I mean their beliefs as to why grain grew, as well as their ability to make tools with which to reap the grain. I mean their beliefs about life after death. What I am thinking about as culture is a thing which lasted in time. If any one Egyptian, even the Pharaoh, died, it didn't affect the Egyptian culture of that particular moment.

PREHISTORIC CULTURES

For that long period of man's history that is all prehistory, we have no written descriptions of cultures. We find only the tools men made, the places where they lived, the graves in which they buried their dead. Fortunately for us, these tools and living places and graves all tell us something about the ways these men lived and the things they believed. But the story we learn of the very early cultures must be only a very small part of the whole, for we find so few things. The rest of the story is gone forever. We have to do what we can with what we find.

For all of the time up to about 100,000 years ago, which was the time of the main Neanderthal group of men, we have found only one living place of very early prehistoric men. This is the fallen-in cave where Peking man was found, near

Peking. On page 49, you will note how the Abbe Breuil suspects that the deepest layer in the French cave of La Micoque is also very early. We know little about it yet, but the Fontechevade finds may help us (p. 46).

You can see that we know very little about the home life of earlier prehistoric men. We find different kinds of early stone tools, but we can't even be really sure which tools may have been used together.

WHY LITTLE HAS LASTED FROM EARLY TIMES

Except for the find-spot of Peking man, all our very early finds come from geological deposits, or from the wind-blown surfaces of deserts. Here is what the business of geological deposits really means. Let us say that a group of people were living in England about 300,000 years ago. They made the tools they needed, lived in some sort of camp, almost certainly built fires, and perhaps buried their dead. While the climate was still warm, many generations may have lived in the same place, hunting, and gathering nuts and berries; but after some few thousand years, the weather began very gradually to grow colder. These early Englishmen would not have known that a glacier was forming over northern Europe. They would have noticed only that the animals they hunted seemed to be moving south, and that the berries grew larger toward the south. So they would have moved south, too.

The camp site they left is the place we archaeologists would really have liked to find. All of the different tools the people used would have been there together—many broken, some whole. The graves, and traces of fire and the tools would have been there. But the glacier got there first! The front of this enormous sheet of ice moved down over the country, crushing and breaking and plowing up everything like a gigantic bull-dozer. You can see what happened to our camp site.

Everything the glacier couldn't break, it pushed along in front of it or plowed beneath it. Rocks were ground to gravel, and soil was caught into the ice, which afterwards melted and ran off as muddy water. Hard tools of flint sometimes

remained whole. Human bones weren't so hard; it's a wonder *any* of them lasted. Gushing streams of melt water flushed out the debris from underneath the glacier, and water flowed off the surface and through great crevasses. The hard materials these waters carried were even more rolled and ground up. Finally, such materials were dropped by the rushing waters as gravels, miles from the front of the glacier. At last the glacier reached its greatest extent; then it melted backward toward the north. Debris held in the ice was dropped where the ice melted, or was flushed off by more melt water. When the glacier had withdrawn to the sea, north of Scotland, great hunks of ice were broken off as icebergs. These icebergs probably dropped the materials held in their ice wherever they floated and melted. There must be many tools and fragmentary bones of prehistoric men on the bottom of the Atlantic Ocean and the North Sea.

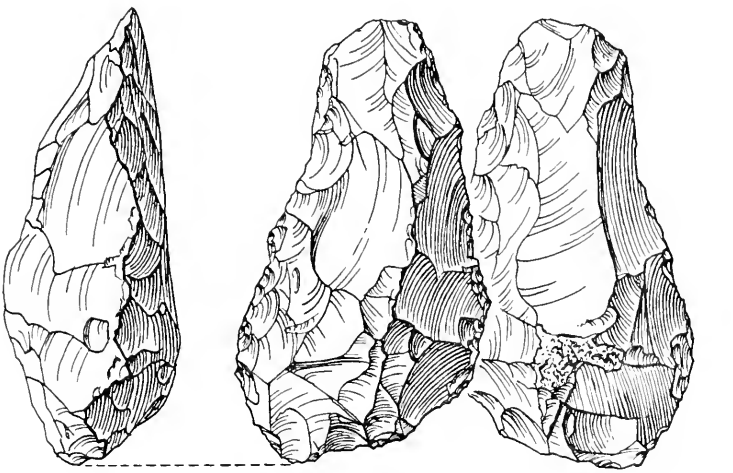
Remember, too, that these glaciers came and went at least four times during the Ice Age. Then you will realize why the things we find are all mixed up. Stone tools from one camp site got mixed up with stone tools from many other camp sites—tools which may have been made tens of thousands or more years apart. The glaciers mixed them all up, and so we cannot say which particular sets of tools belonged together in the first place.

"EOLITHS"

But what sort of tools do we find? For almost a century, people have been picking up odd bits of flint and other stone in the oldest Ice Age gravels in England and France. There is a great question as to whether these odd bits of stone were worked by prehistoric men. The stones are given a name, *eoliths*, or "dawn stones." You can see them in many museums; but you can't be sure they were really worked by men.

Anyway, it doesn't matter very much. It is very hard to pick out "eoliths" that seem to be made in any one *tradition*. By "tradition" I mean a set of habits for making one kind of tool for some particular job. No two "eoliths" look very much alike; tools made as part of some one tradition all

look much alike. Now it's easy to suppose that the very earliest prehistoric men picked up and used almost any sort of stone. This wouldn't be surprising; you and I do it when we go camping. In other words, some of these "eoliths" may actually have been used by prehistoric men. They must have



ABBEVILLIAN BIFACE

used anything that might be handy when they needed it. We could have figured that out without the "eoliths."

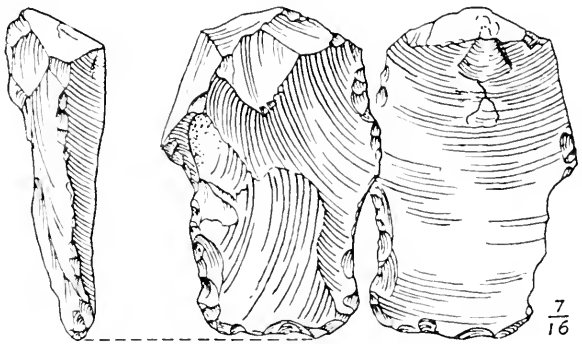
THE BEGINNINGS OF STANDARDIZATION

What does matter is that by half a million years ago, just after the first glaciation was finished, men began making tools according to a certain set tradition. There are three such very early traditions, or sets of habits, in making stone tools. All three seem already to have been established by 500,000 years ago; we don't know which of the three is actually oldest.

CORE-BIFACE TOOLS

The first tradition is the *core* or biface one. The tools in this tradition are large pear-shaped pieces of stone trimmed flat on opposite sides or "faces." Hence "biface" has been used to describe these tools. The front view is like that of a pear

with a rather pointed top, and the back view looks almost exactly the same. Look at them side on, and you can see that the front and back faces are the same and have been trimmed to a thin tip. The real purpose in trimming down the two faces was to get a good cutting edge all around. You can see all this in the illustration (p. 37).



CLACTONIAN FLAKE

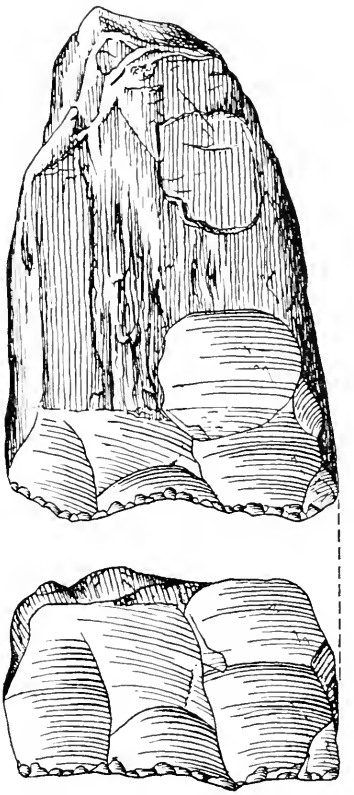
We have very little idea of the way in which these core-bifaces were used. They have been called "hand axes," but this probably gives the wrong idea, for an ax, to us, is not a pointed tool. All of these early tools must have been used for a number of jobs—chopping, scraping, cutting, hitting, picking, and prying. Since the core-bifaces tend to be pointed, it seems likely that they were used for hitting, picking, and prying. But they have rough cutting edges, so they could have been used for chopping, scraping, and cutting.

FLAKE TOOLS

The second tradition is the *flake* tradition. The idea was to get a tool with a good cutting edge by simply knocking a nice large flake off a big block of stone. You had to break off the flake in such a way that it was broad and thin, and also had a good sharp cutting edge. Once you really got on to the trick of doing it, this was probably a simpler way to make a good cutting tool than preparing a biface. You have to

know how, though; I've tried it and have mashed my fingers more than once.

The flake tools look as if they were meant for chopping, scraping, and cutting jobs alone. The people who made flake



ANYATHIAN
CHOPPER TOOL

tools seem to have been trying to produce a broad, sharp, cutting edge.

The core-biface and the flake traditions were spread, from earliest times, over much of Europe, Africa, and western Asia. The map on page 43 shows the general area. Over much of

this great region, there was flint. Both of these traditions seem well adapted to flint, although good core-bifaces and flakes were made from other kinds of stone.

CHOPPER TOOLS

The third very early tradition is found in southern and eastern Asia, from northwestern India through Java and Burma into China. The prehistoric men in this area mostly used quartz and tuff and even petrified wood for their stone tools (see illustration, p. 39).

This third great early tradition is called the *chopper tool* tradition. There are several kinds of tools in this tradition, but all differ from the western core-bifaces and flakes. There are broad, heavy scrapers or cleavers, and tools with an adze-like cutting edge. These last-named tools are called "hand adzes," just as the core-bifaces of the west have often been called "hand axes." The section of an adze cutting edge is $\angle$ shaped: the section of an ax is $<$ shaped.

There are also some pointed tools. Thus the tool kit of these early south and east Asiatic peoples seems to have included tools for doing as many different jobs as did the tools of the Western traditions.

Dr. H. L. Movius believes that the tools which were found in the Peking cave with Peking man belong to the chopper tool tradition. This is the only case as yet where the tools and the man have been found together from very earliest times.

DIFFERENCES WITHIN THE TOOL-MAKING TRADITIONS

These three great traditions in the manufacture of stone tools are all we have to show of the cultures of the men of those times. Changes happened in each of the traditions. As time went on, the tools in each tradition were better made. There could also be slight regional differences in the tools within one tradition. Thus, tools with small differences, but all belonging to one tradition, can be given special group (facies) names.

This naming of special groups has been going on for some time. Here are some of these names, since you may see them used in museum displays of flint tools. They are listed, beginning with the earliest, under the traditions to which they belong:

Core-biface:

- Abbevillian (or Chellean)
- Acheulean I to V
- Acheulean VI and VII (or Micoquian)
- Some blended elements in "Mousterian"

Flake:

- Clactonian
- Tayacian
- Levalloisian I to VII
- Levalloiso-Mousterian
- "Typical Mousterian"

Chopper tool:

- Soan (Early and Late)
- Anyathian (Early and Late)
- Patjitanian
- Choukoutienian

The first two traditions fit in at the bottom of the chart on page 61.

The early archaeologists had many of the tool groups named before they ever realized that there were broader tool preparation traditions. This was understandable, for in dealing with the mixture of things that come out of glacial gravels the easiest thing to do first is to isolate individual type groups. First you put a bushel-basketful of tools on a table and begin matching up types. Then you give names to the groups of each type. The groups and the types are really matters of the archaeologists' choice; in real life, they were probably less exact than the archaeologists' lists of them. We now know pretty well in which of the three early traditions the various early groups belong.

THE MEANING OF DIFFERENT TRADITIONS

What do the traditions really mean, beyond persistent habits in the manufacture of tools? Until not very long ago, some archaeologists still believed that the tools of the flake tradition were all made by Neanderthal-like Paleanthropic men. The Neanderthalers were supposed to have died out about 70,000 years ago, and their tools were supposed to have died with them. The core-bifaces were supposed to have been made only by Neanthropic (modern) men. The chopper tool tradition wasn't actually known as such until a few years ago.

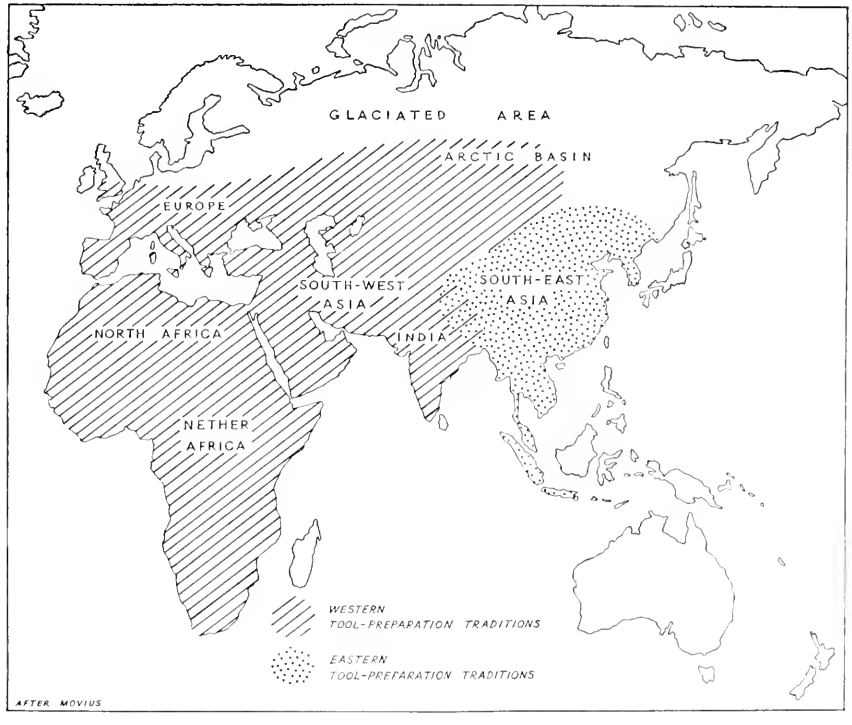
Remember that all the groups and types of tools we're talking about were simply sorted out of the glacial gravels (except for those in the cave of Peking man, which belong in the chopper tool tradition). Archaeologists spoke of the different tool groups as "cultures." No one thought that the same prehistoric man who made and used bifaces for one job could also have made and used flake tools for another job.

This theory is now breaking down. The physical anthropologists are helping to break it; you saw (p. 32) how Professor Krogman's ideas disagree with the notion that Neanderthal man became extinct. Also the archaeologists themselves are waking up. From South Africa, from Morocco, from Portugal, news comes of new finds of early tools. Some of these tools individually show blendings of the flake and biface traditions. Others may be of either tradition but are found together in an undisturbed geological bed.

ONE GROUP OF MEN PROBABLY HAD MORE THAN ONE TOOL-MAKING TRADITION

It looks very much as though the same early men may have had different habits for making different kinds of tools, and that these habits probably lasted long enough to become traditions. The men no doubt had other set habits that were used in making tools of wood, bone, shell and other materials which have not lasted long enough for the archaeologists to find them. Mr. Harper Kelley has now restudied some of the early core-bifaces of France, and he believes that flake tools also fit into the same group. If you will now look at

OLD WORLD
TOOL-PREPARATION
TRADITIONS OF
ICE AGE



the map on page 43 you will see that the core-biface tradition and the flake tradition are spread out over Europe, Africa, and western Asia together. You will see that the chopper tool tradition is found only in the Far East. But all three happen to meet in northwest India, and perhaps in southeastern Africa.

The above paragraph may need some qualification. There may be some cases in Europe where the only jobs that men had to do with stone tools called for tools that were made in just one tradition. There is certainly such a case in one of the Mount Carmel caves of Palestine. Here, in the very level where the blended Neanderthal–modern skulls were found, there were 9,784 tools. Only three tools, obviously strays, were core-bifaces; the rest were all flake tools or flake chips. So apparently there are cases where only tools of one tradition are found. (This particular case argues against the old Neanderthal-flake tradition theory, for the men found in this particular level had skulls much more modern than Neanderthal skulls. The implications of Fontechevade are similar [p. 46].)

LIFE IN THE EARLIEST TIMES

What do we actually know of life in these early times? In the glacial gravels, or in the terrace gravels of rivers once swollen by floods of melt water, or on the windswept deserts, we find stone tools. There is an occasional roughly worked piece of bone. There are also the chance finds of fossil human bones themselves, of which we spoke in the last chapter. Outside of the cave of Peking man, there is nothing else until the time of the main Neanderthal group (see p. 26).

The stone tools we find in each of the three traditions are the simplest kinds of all-purpose tools. Almost any one of them could be used for hacking, chopping, cutting, and scraping; so the men who used them must have been living in the most rough and ready sort of way possible. They found or hunted their food wherever they could. In the anthropological jargon, they were "food-gatherers," pure and simple.

Because of the mixture in the gravels and in the materials they carried, we can't be sure which animals these men hunted.

Bones of the larger animals turn up in the gravels, but they could just as well belong to the animals who hunted the men, rather than the other way about. We don't know.

During a great part of this time the climate was warm and pleasant. The second interglacial period (the time between the second and third great glaciations) lasted about 200,000 years, and during much of this time the climate may have been even better than ours is now. We don't know that earlier prehistoric men in Europe or Africa lived in caves. They may not have needed to: much of the weather may have been so nice that they lived in the open. Perhaps they didn't wear clothes either!

WHAT THE PEKING CAVE-FINDS TELL US

The one early cave dwelling we have found is that of Peking man, in China. Peking man had fire. He probably cooked his meat, or used the fire to keep dangerous animals away from his den. In the cave were bones of dangerous animals, members of the wolf, bear, and cat families. Some of the cat bones belonged to beasts larger than tigers. There were also bones of other wild animals: buffalo, camel, deer, elephants, a horse, sheep, and even ostriches. It's much too cold and dry in north China for all these animals to live there today. So this list helps us know that the weather was reasonably warm, and that there was enough rain to grow grass for the grazing animals. The list also helps the paleontologists to date the find.

Peking man also seems to have eaten plant food, for there are hackberry seeds in the debris of the cave. His tools were made of sandstone and quartz and sometimes of a rather bad flint. As we've already seen, they belong in the chopper-tool tradition. It seems fairly clear that some of the edges were chipped by right-handed people. There are also many split pieces of heavy bone. Peking man probably split them so he could eat the bone marrow, but he probably also used some of them as tools.

Now hold your breath! Many of these split bones were the bones of Peking man himself! Each one of the skulls had

already had the base broken out of it. In no case were any of the bones resting together in their natural relation to one another. There is nothing like a burial; all of the bones are scattered. Now it's true that animals could have scattered bodies that were not cared for or buried. But splitting bones lengthwise and carefully removing the base of a skull call for both the tools and the people to use them. It's pretty clear who the people were. Peking man was a cannibal.

This rounds out about all we can say of the life and times of early prehistoric men. In those days life was rough. You evidently had to watch out not only for dangerous animals but also for your fellow men. You ate whatever you could catch or find growing. But you had sense enough to build fires, and you had already formed certain habits for making the kind of stone tools you needed. That's about all we know. But I think we'll have to admit that cultural beginnings had been made, and that these early people were really *men*.

After the manuscript was in press (see p. 98), a preliminary note appeared on the finding of two fragmentary pre-modern skulls in the basal layer of Fontechevade cave in France. The Tayacian flint tools and the animal bones in the basal layer indicate a third interglacial date for the finds, which are thus somewhat later than the Swanscombe and other groups mentioned on page 26. On the other hand, this *is* a case of pre-modern human fossils in a very early cave layer; its appearance thus qualifies my statements (pp. 26, 34, 44, 45, 54). The full publication of the Fontechevade finds will doubtless give greater substance to the early La Micoque layers (pp. 35, 49, 50) and will also elaborate our knowledge of the Tayacian industry (p. 50). Apparently Fontechevade is an important find.

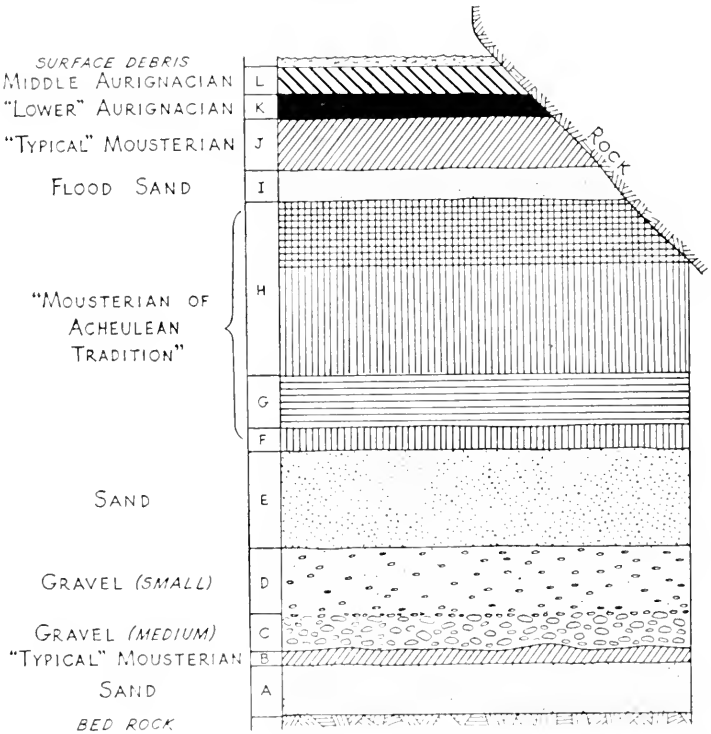
MORE EVIDENCE of Culture

The material that we get from caves in Europe can be dated from about 120,000 years ago, the time of the main Neanderthal group. We don't know why there is no earlier material in the caves; apparently they were not used before the last interglacial phase (the period just before the last great glaciation). We know that men of the main Neanderthal group were living in caves from about 100,000 to 70,000 years ago. Probably some of the more modern types of men also lived in caves already, but we have found their bones only in Palestine.

THE CAVE LAYERS

Many generations of people lived in caves. In parts of France, peasants still live in them. As a result, many caves have deep layers of debris in them. The first people moved in and lived on the rock floor. They threw whatever they didn't want on the floor, and they tracked in mud; nobody bothered to clean house in those days. Their debris—junk and mud and garbage and what not—became packed into a layer. As time went on, and generations passed, the layer grew thicker. Then there might have been a break in the occupation of the cave for a while. Perhaps the game animals got scarce and the people moved away; or maybe the cave became flooded. Later on, other people moved in and began making a new layer.

Perhaps this went on in the same cave for a hundred thousand years; you can see what happened. The drawing on this page shows a section through such a cave. The earliest layer is on the bottom, the latest one on top. They go in order from



SECTION OF SHELTER ON LOWER TERRACE, LA MOUSTIER

bottom to top, earliest to latest. This is the *stratification* we talked about (p. 11).

While we may find a mix-up in caves, it's not nearly as bad as the mixing up that was done by glaciers. The animal bones and shells, the fireplaces, the bones of men, and the tools the men made all belong together, if they come from one layer. That's the reason why the cave of Peking man is so important. It is also the reason why the caves in Europe and the Near East are so important. We can get an idea of which

things belong together and which lot came earliest and which latest.

In most cases, prehistoric men lived only in the mouths of caves. They probably didn't like the dark inner chambers. They also lived at the bases of overhanging cliffs, if there was enough overhang to give shelter. When the weather was good, they no doubt lived in the open air as well.

The most important European cave sites are in Spain, France, and central Europe; there are also sites in England and Italy. A few caves are known in the Near East and Africa, and no doubt more sites will be found when the out-of-the-way parts of Europe, Africa, and Asia are studied.

AN "INDUSTRY" DEFINED

According to the Abbe Breuil, the earliest European cave materials are those from the cave of La Micoque, in France. Breuil believes that the bottommost layer of this cave probably goes back to the time before the Riss (next to the last) glaciation. This material consists of an *industry* of stone tools, apparently all made in the flake tradition. This is the first time we have used the word "industry." It is useful to call all of the different tools found together in one layer and made of one kind of material an industry; that is, they must be found together as men left them. Tools taken from the glacial gravels (or from windswept desert surfaces or river gravels or any geological deposit) are not "together" in this sense. We might say the latter have only "geological" not "archaeological" context. Archaeological context means finding things just as men left them. We can tell what tools go together in an "industrial" sense only if we have archaeological context.

Up to now, the only things we could have called "industries" were the worked stone industry and perhaps the worked (?) bone industry of the Peking cave. We couldn't use the term for the stone tools from the glacial gravels, because we never knew which tools belonged together. But when the cave materials begin to appear in Europe, we can begin to speak of industries.

THE EARLIEST EUROPEAN CAVE LAYERS

We've just mentioned the industry from what is said to be the oldest inhabited cave in Europe; that is, the industry from the deepest layer of the cave at La Micoque. Apparently it doesn't amount to much. The tools are made of stone, in the flake tradition, and are very poorly worked. This industry is called *Clactonian II*. The earlier *Clactonian I* has not been found in any cave. It comes only from the glacial gravels, so it is thus not an industry in the sense in which we use the word. There is a picture of a Clactonian flake tool on page 38.

None of the La Micoque tools are really good. There are scrapers, and more or less pointed tools, and tools that may have been used for hacking and chopping. Many of the tools from the earlier glacial gravels are better made than those of this first industry. There is so little of this material available that we do not know which is typical, and which is not. You would probably find it hard to see much difference between this industry and the one in the next layer above it. Both industries appear in the very ancient cave of La Micoque.

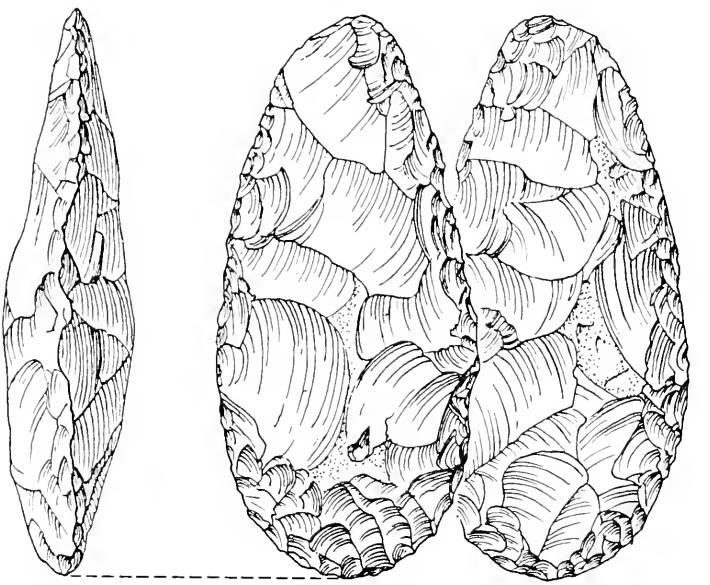
The industry of the second earliest layer at La Micoque cave also contains stone tools in the flake tradition. These tools are as poor as those of the earliest level and they are also generally smaller. This industry is called the *Tayacian*. The stone industry of the bottommost layer of the Mount Carmel cave, in Palestine, where somewhat similar tools were found, has also been called Tayacian. The Tayacian industry and La Micoque are not yet very well known (but see p. 46).

THE ACHEULEAN INDUSTRY

Both in France and in Palestine, the next layers in the deep caves have an industry in both the core-biface and the flake traditions. The core-biface tools usually make up less than half of all the tools in the industry. However, the name of the biface type of tool is generally given to the whole industry. It is called the *Acheulean*, actually a late form of it, as "Acheulean" is also used for earlier core-biface tools taken from the glacial gravels. In western Europe, the name used is *Upper*

Acheulean or *Micoquian*. The same terms have been borrowed to name layers *E* and *F* in the Tabun cave, on Mount Carmel in Palestine.

The Acheulean core-biface type of tool is worked on two faces so as to give a cutting edge all around. The outline of



ACHEULEAN BIFACE

its front view may be oval, or egg-shaped, or a quite pointed pear shape. These tools are really the best and also the final products of the core-biface tradition. We first noticed the tradition in the early glacial gravels (p. 37); now we see its end, but also its finest examples, in the deeper cave levels.

The flake tools, which really make up the greater bulk of this industry, are simple scrapers and chips with sharp cutting edges. The habits used to prepare them must have been pretty much the same as those used for at least one of the flake industries mentioned just above.

There is very little else in these early cave layers. We do not have a proper "industry" of bone tools. There are traces

of fire, and of animal bones, and a few shells. In Palestine, there are many more bones of deer than of gazelle in these layers; the deer lives in a wetter climate than does the gazelle. In the European cave layers, the animal bones are those of beasts that live in a warm climate. They belonged in the last interglacial period. We have not yet found the bones of fossil men definitely in place with this industry.

FLAKE INDUSTRIES FROM THE CAVES

Two more stone industries—the *Levalloisian* and the "*Mousterian*"—turn up at approximately the same time in the European cave layers. Their tools seem to be mainly in the flake tradition, but according to some of the authorities there is also some blending of the habits of the core-biface tradition.

Now notice that I don't tell you the Levalloisian and the "Mousterian" layers are both above the late Acheulean layers. Look at the cave section on page 48, and you'll find that some "Mousterian of Acheulean tradition" appears *above* some "typical Mousterian." This means that there may be some kinds of Acheulean mixtures that are later than some kinds of "Mousterian." The same is true of the Levalloisian.

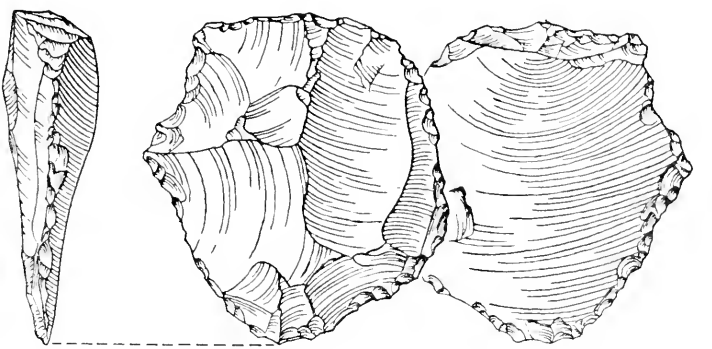
There were now several different kinds of habits that men used in making stone tools. These habits were based on either one or the other of the two traditions—core-biface or flake—or on a blend of both. All were popular at about the same time. So we find that people who made one kind of stone tool industry lived in a cave for a while. Then they gave up the cave for some reason, and people with another industry moved in. Then the first people came back—or at least somebody with the same tool-making habits as the first people. Or maybe a third kind of tool-makers moved in. The people who had these different habits for making their stone tools seem to have moved around a good deal. They no doubt borrowed and exchanged tricks of the trade with each other. There were no patent laws in those days.

THE LEVALLOISIAN AND MOUSTERIAN

The easiest Levalloisian tool to spot is a big flake tool. The trick in making it was to fashion carefully a big chunk of

stone (called the Levalloisian "tortoise core," because it resembles the shape of a turtle-shell) and then to whack this in such a way that a large flake flew off. This large thin flake, with sharp cutting edges, is the finished Levalloisian tool.

There are several "typical Mousterian" stone tools. There are medium-sized flake "side scrapers." There are also some small pointed tools and some small "hand-axes." The last



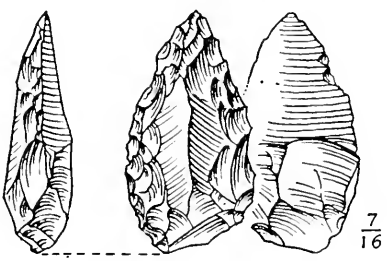
LEVALLOIS FLAKE

of these tool types is often a flake worked on both of the flat sides (that is, bifacially). There are pieces of flint worked into the form of crude balls. The pointed tools may have been fixed on shafts to make short jabbing spears; the round flint balls might have been used as bolas (see p. 56). Actually, we don't *know* what either tool was used for. The points and side scrapers are illustrated on pages 54 and 55.

THE MIXING OF TRADITIONS

Nowadays the archaeologists are less and less sure of the importance of any one specific tool type and name. Twenty years ago, they used to speak simply of Acheulean or Levalloisian or Mousterian tools. Now, more and more, *all* of the tools from some one layer in a cave are called "industries," and are given mixed names. Thus we have "Levalloiso-Mousterian," and "Acheuleo-Levalloisian," and even "Acheuleo-Mousterian" (or "Mousterian of Acheulean tradition").

The time of these late Acheuleo-Levalloiso-Mousterioid industries is from perhaps as early as 120,000 years to 70,000 years ago. This was the time of the first phase of the last great glaciation. It was also the time that the main group of Neanderthal men was living in Europe. So far, none of the early fossil examples of more modern men have been found with these industries in Europe. A number of the Neanderthal fossil finds do come from these cave layers, however. Before the blending of habits was understood it used to be popular



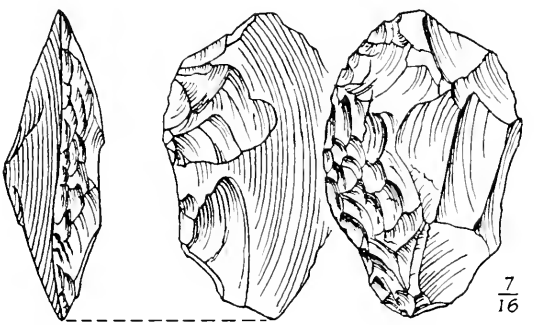
MOUSTERIAN POINT

to say Neanderthal man was "Mousterian man." I think this is wrong, for two reasons. First, what used to be called "Mousterian" is now known to be a blend of both core-biface and flake habits, and so mixed that the word "Mousterian" used alone really doesn't mean anything. Second, it is probably pure accident that we haven't yet found the early modern types of fossil men with these mixed industries. Remember, we do have one or two much earlier examples of modern types of men—Swanscombe and Galley Hill—who come from before the time of the caves. We also have the modern-like Mount Carmel people, found in a cave layer of Palestine with tools almost entirely in the flake tradition, called "Levalloiso-Mousterian," and the Fontechevade-Tayacian (p. 46).

OTHER SUGGESTIONS OF LIFE IN THE EARLY CAVE LAYERS

Except for the stone tools, what do we know of the way men lived in the time range around 120,000 to 70,000 years ago

or even later? We know that in the area from Europe to Palestine, at least some of the people (some of the time) lived in the fronts of caves, and warmed themselves over fires. In Europe, in the cave layers of these times, we find the bones of different animals; the bones in the lowest layers belong to animals that lived in a warm climate; above them are the bones of those who could stand the cold, like the reindeer and mammoth. Thus, the meat diet must have been changing,



MOUSTERIAN SIDE-SCRAPER

as the glacier crept farther south. Shells and possibly fish bones have lasted in these cave layers, but not any trace of the vegetable foods, the nuts and berries and other wild fruits that must have been eaten when they could be found.

Bone tools have also been found from this period. Some are called scrapers, and there are also long chisel-like leg-bone fragments believed to have been used for skinning animals. Larger hunks of bone, which seem to have served as anvils or chopping blocks, are fairly common.

Bits of mineral, used as coloring matter, have also been found. We don't know what the color was used for.

There are a small but certain number of cases of intentional burials. These burials have been found on the floors of the caves; in other words, the people dug graves in the places where they lived. The holes made for the graves were small. For this reason (or perhaps for some other?) the bodies were in a curled-up or contracted position. Flint or bone tools

or pieces of meat seem to have been put in with some of the bodies. In several cases, flat stones had been laid over the graves.

LIFE IN AFRICA ABOUT 100,000 YEARS AGO

Much less is known in detail about Africa during the time when the late Acheulean, Levalloisian, and "Mousterian" industries were in use in Europe and Palestine. Few cave sites of the European type have been found in Africa. This may mean that many of the early Africans lived out in the open or that we haven't found the sites because we just haven't looked hard enough yet.

Recently, Dr. L. S. B. Leakey found in Kenya, in east Africa, a convincing open camp site containing large core-bifaces of the Acheulean type, and also "bolas." The "bolas" are rounded stones, about the size of a baseball, and apparently grooved. They were found in sets of threes.

Bolas, in sets of threes, are still used by the gauchos of Argentina; the three stones are joined by thongs of leather. Holding one stone in his hand, the hunter whirls the other two about his head, and then lets the whole contraption fly at the legs of a running animal. The thongs entangle about the legs of the animal, and trip and bind it. Then it can be approached and killed with a club.

So far, Leakey has not described flake tools from the site, if there were any. He found no evidence of fire, but he did find the bones of giant wild pigs and horses, giant baboons and giraffes, and elephants and hippopotamuses.

This much is clear about Africa: From Casablanca and Cairo to Capetown, there are tools in both the core-biface and in the flake traditions (see map, page 43). Excellent examples of the most typical Acheulean and Levalloisian types have been found. But we are not yet sure how whole industries were made up, or which tools belong with which other tools. To get such information, we'll need to know all about more camp sites like Dr. Leakey's. It is sure, however, that the same general habits of tool-making that we saw in Europe were in use in Africa.

CULTURE AT THE BEGINNING OF THE LAST GREAT GLACIAL PERIOD

The few things we have found must indicate only a very small part of the total activities of the people who lived at the time. All of the things they may have made of wood and bark, of skins, of anything soft, are gone. The fact that burials were made at least in Europe and Palestine is pretty clear proof that the people had some notion of a life after death. But what this notion really was, or what gods (if any) men believed in, we cannot know. Probably they lived in small groups, as hunting and food-collecting seldom provides enough food for large groups of people. These groups probably had some kind of leader or "chief." Very likely the rude beginnings of rules for community life and politics, and even law, were being made. But what these were, we cannot know. We can only guess about such things, as we can only guess about many others; for example, how the idea of a family must have been growing, and how there may have been witch doctors who made beginnings in medicine or in art, in the materials they gathered for their trade.

The stone tools help us most. They have lasted, and we can find them. As they come to us, from this cave or that, and from this layer or that, the tools show a variety of blends of the different basic habits or traditions. This seems only natural, as the groups of people must have been very small. The mixtures and blendings of the habits used in making stone tools must mean that there were also mixtures and blends in many of the other ideas and beliefs of these small groups. And what this probably means is that there was no one *culture* of the time. Nor is it likely that there were simply three cultures, "Acheulean," "Levalloisian," and "Mousterian," as has sometimes been thought in the past. Rather there must have been a great variety of loosely related cultures at about the same stage of advancement.

Over how great an area did these loosely related cultures reach in the time 120,000 to 70,000 years ago? We have described stone tools made in one or another of the flake and core-biface habits, for an enormous area. It covers all of Europe, all of Africa, the Near East, Asiatic Russia to Lake

Baikal, and parts of India. It is perfectly possible that the flake and core-biface habits lasted on after 70,000 years ago, in some places outside of Europe. In northern Africa, for example, we are nearly certain that they did (see chart, p. 61).

On the other hand, in the Far East (China, Burma, Java) and in northern India, the tools of the old chopper-tool tradition were still being made. Out there, we must assume, there was a different set of loosely related cultures. At least, there was a different set of loosely related habits for the making of tools. But the men who made them must have looked much like the men of the West. Their tools were different, but just as useful.

As to what the men of the West looked like, I've already hinted at all we know so far (pp. 24 ff.). The Neanderthalers were present at the time. Some more modern-like men must have been about, too, since they were already present earlier, and since fossils of them have turned up at Mount Carmel in Palestine, and at Teshik Tash, in Transcaspian Russia. It is still too soon to know whether certain blends of tools were made only by certain blends of men. But since tools of both the core-biface and the flake traditions, and their blends, turn up from South Africa to England to India, it is most unlikely that only one type of man used only one particular habit in the preparation of tools. Or, in other words, men in Africa and men in India were making just as good tools in those days as the men who lived in western Europe. Draw your own conclusions.

EARLY Moderns

From some time during the beginning of the last great glaciation (say some time after 70,000 years ago), we have more accurate dates for the European–Mediterranean area, and less accurate ones for the rest of the Old World. This is probably because the effects of the last glaciation have been studied in the European–Mediterranean area more than they have been elsewhere.

A NEW TRADITION APPEARS

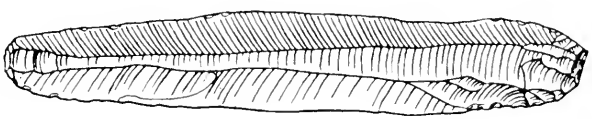
Something new was probably beginning to happen in the European–Mediterranean area 70,000 years ago, though all the rest of the Old World may have been going on as it had been. I can't be sure of this because the information we are using as a basis for dates is very inaccurate for the areas outside of Europe and the Mediterranean.

We can at least make a guess. In Egypt and north Africa, men were still using the old methods of making stone tools. This was especially true of flake tools of the Levalloisian type, save that they were growing smaller and smaller as time went on. But at the same time, a new tradition was becoming popular in Palestine and in Europe. This was the blade tool tradition.

BLADE TOOLS

A stone blade is really just a long parallel-sided flake, as the drawing shows. It has sharp cutting edges, and makes a very useful knife. The real trick is to be able to make one. It is almost impossible to make a blade out of any stone but flint, or a natural volcanic glass called obsidian. And even if you have flint or obsidian, you first have to work up a special "blade-core," from which to whack off blades. To get a good flint blade tool takes a great deal of know-how.

Remember that a tradition in stone tools means no more than that some particular way of making the tools got started



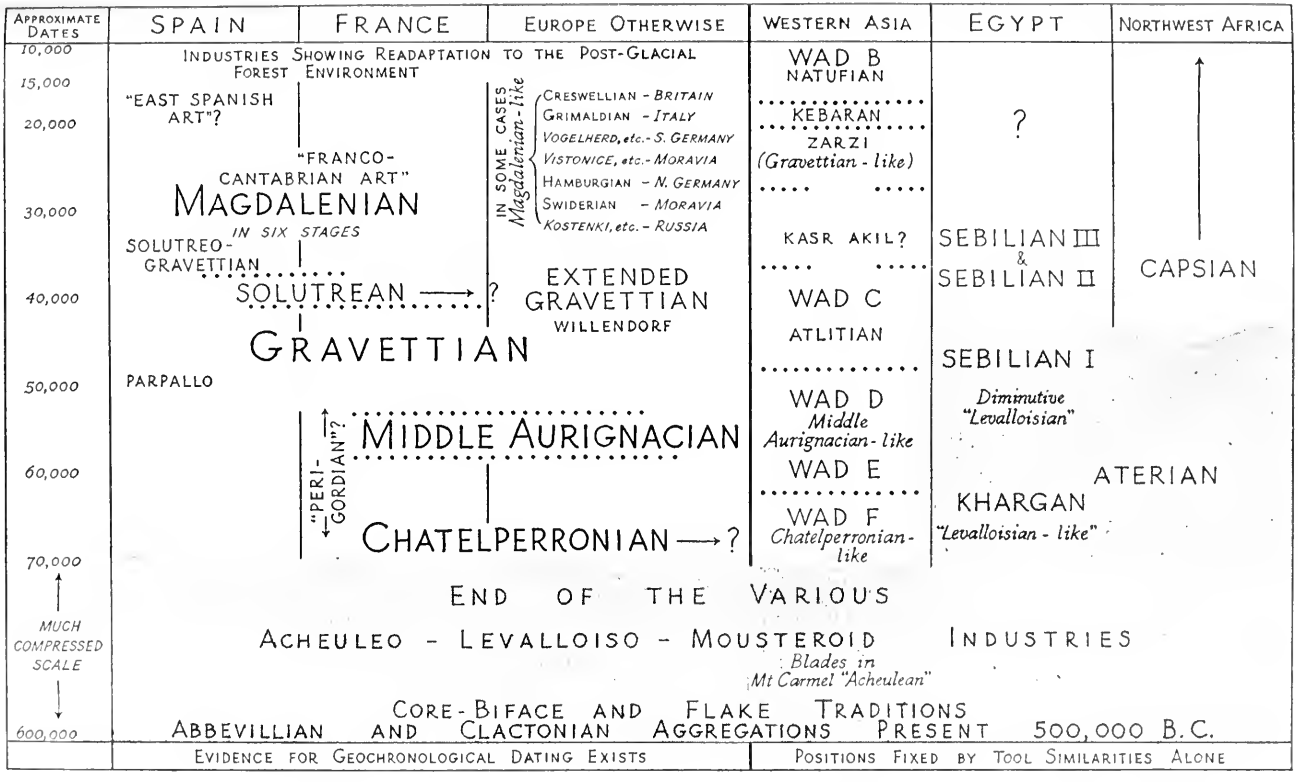
PLAIN BLADE

and lasted a long time. Men who made some tools in one tradition or set of habits would also often make other tools for different purposes by means of another tradition or set of habits. And the two sets of habits often got blended or mixed.

THE EARLIEST BLADE TOOLS

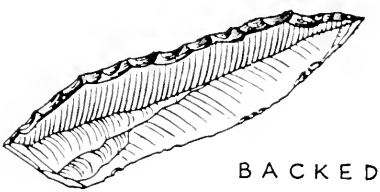
The oldest blade tools we have found were deep down in the layers of the Mount Carmel caves, in Tabun Eb and Ea. Some more or less parallel-sided flakes are known in the Levalloisian industry in France, but they are probably no earlier than Tabun E. The Tabun blades are part of a local late "Acheulean" industry, which is characterized by core-biface "hand axes," but which has many flake tools as well. Professor F. E. Zeuner believes that this industry may be more than 120,000 years old; actually its date has not yet been fixed, but it is very old—older than the fossil finds of modern-like men in the same caves.

For some reason, the habit of making blades at Mount Carmel was interrupted. Blades only reappeared in Palestine at about the same time they were first made in Europe—



SUCCESSION OF ICE AGE FLINT TYPES, INDUSTRIES, AND ASSEMBLAGES, AND OF FOSSIL MEN, IN NORTHWESTERN EURAFRASIA

about 70,000 years ago. Professor D. A. Garrod thinks that men found the way to make blade tools very early, "in some as yet unidentified Asiatic centre." She (Professor Garrod) thinks such a center could have been in the highlands of Iran or beyond. No prehistoric exploration has been done in this



BACKED BLADE

area, and we may some day find that Garrod is right. Her guess is that the first borrowing of the habit of how to make blade tools got only as far as Mount Carmel in early times, but that for some reason, the habit (or the usefulness of the blade tools themselves) didn't last. Later, however, it started spreading again. This spread took it not only to Palestine (Mount Carmel, Wad F) again, but also to Europe, and, at some uncertain time, to Africa. It reached Europe at least by the end of the second phase of the last great glaciation. By 60,000 years ago, it must have been well established in western Europe.

The production of blade tools did not immediately swamp the set of older habits; the use of flake tools also continued.

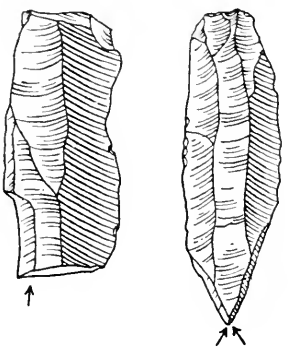
We know a good deal about different blade industries in Europe. Almost all of them come from cave layers, and I have included a chart (p. 61) of some of the complicated details.

SPECIAL TYPES OF BLADE TOOLS

The most useful tools that appear at this time are blade tools, or were made from blades.

1. The "backed" blade. This is a knife made of a flint blade, with one edge purposely blunted, probably to save the user's fingers from being cut.

2. The *burin* or "graver." The burin was the original chisel. Its cutting edge is *transverse*, like a chisel's. Some burins are made like a screw-driver, save that burins are sharp. Others have edges more like the



TWO BURINS

blade of a chisel or push plane, with only one bevel. Burins were probably used to make slots in wood and bone; that is, to make handles or shafts for other tools.

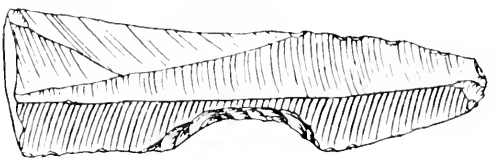
3. The "shouldered" point. These stone points were used to tip arrows or light spears. They were made from blades, and they had a long tang at the bottom where they were fixed to the shaft. At the place where the tang met the main body of the stone point, there was

SHOULDERED POINT

a marked "shoulder," the beginnings of a barb. Such points had either one or two shoulders.

4. The "notched" or "strangulated" blade. Along with the points for arrows or light spears must go a tool to

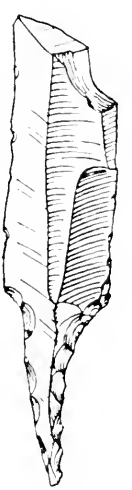
prepare the arrow or spear shaft. Today, such a tool would be called a "draw-knife" or a "spoke-shave," and this is what the notched blades probably are. Our spoke-shaves have sharp straight cutting blades and



NOTCHED BLADE

really "shave." Notched blades of flint probably scraped rather than cut.

5. The "awl," "drill," or "borer." These blade tools are worked out to a spike-like point. They must have been used for making holes in wood, bone, shell, or other things.

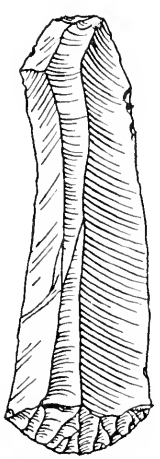


DRILL OR AWL

6. The "end scraper on a blade" is a tool with one or both ends worked so as to give a good scraping edge. It could have been used to hollow out wood or bone, scrape hides, remove bark from trees, and a number of other things.

There is one very special type of flint tool, which is best known from western Europe in an industry called the Solutrean. These tools were usually made of blades, but the best examples are so carefully worked on both sides (bifacially) that it is impossible to see the original blade. These are

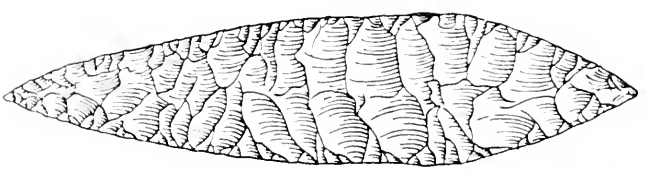
7. The "laurel leaf" and "willow leaf" points. Some of these tools were long and dagger-like, and must have been used as knives or daggers. Others were small, and must have been mounted on spear- or arrow-shafts. Some of the "willow leaf" points are single-shouldered, with a tang. Both types are illustrated on page 66.



END-SCRAPER ON A BLADE

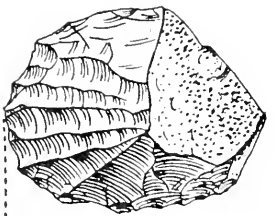
The industries characterized by tools in the blade tradition also yield some flake and core tools. We will end this list with two types of tools that appear at this time. The first is made of a flake; the second is a core tool.

8. The "keel-shaped" round scraper is usually small and quite round, and has had chips removed up to a peak in the center. It is called "keel-shaped" because it is supposed to look (when upside down) like a section through a boat. Actually, it looks more like a tent or an umbrella. Its outer edges are sharp all the way around, and it was probably a general purpose scraping tool.



LAUREL LEAF POINT

WILLOW LEAF POINT



TOP VIEW

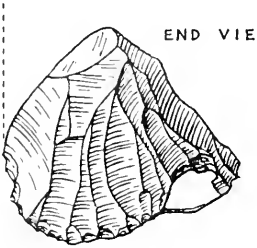
KEELED ROUND SCRAPER

SIDE VIEW

TOP VIEW

KEEL-ENDED SCRAPER

END VIEW



9. The "keel-shaped nosed scraper" is a much larger and heavier tool than the round scraper. It was made on a core with a flat bottom, and has one nicely worked end or "nose." Such tools are usually large enough to be easily grasped, and probably were used like push planes (see illustration, p. 67).

The stone tools (usually made of flint) we have just listed are among the most easily recognized blade tools, although they show differences in detail at different times. There are

SPLIT-BASED BONE POINT

also many other kinds. Not all of these tools appear in any one industry at one time. Thus the different industries shown in the chart on page 61 each have only some of the blade tools we've just listed, and also a few flake tools. Some industries even have a few core tools. The particular types of blade tools appearing in one cave layer or another tell us which industry we have in each layer.

OTHER KINDS OF TOOLS

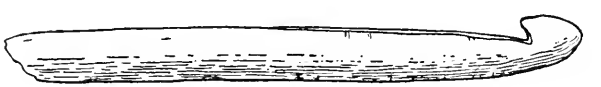
By this time in Europe—say from just before 70,000 to about 20,000 years ago—we begin to find other kinds of material too. Bone tools begin to appear. There are knives, pins, needles with eyes, and little double-pointed straight bars of bone that were probably fish-hooks. The fish-line would have been fastened in the center of the bar; when the fish swallowed the bait, the bar would have caught cross-wise in the fish's mouth.

One quite special kind of bone tool is a long flat point for a light spear. It has a deep notch cut up into the breadth

of its base, and is called a "split-based bone point." We also know examples of bone beads from these times, and of bone handles for flint tools. Pierced teeth of some animals were worn as beads or pendants, but I am not sure that elks' teeth were worn this early. There are even spool-shaped "buttons" or toggles.

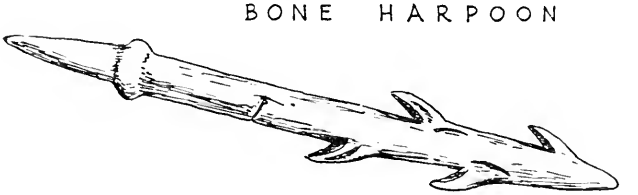
Antler came into use for tools, especially in central and western Europe. We do not know the use of one particular antler tool that has a large hole bored in one end. One suggestion is that it was a thong-stropper used to strop or work up hide thongs (see illustration, p. 70).

Another interesting tool, usually of antler, is the spear-thrower, which is little more than a stick with a notch or hook on one end. The hook fits into the butt end of the spear, and the length of the spear-thrower allows you to put much more power into the throw. It's pretty much the same principle as the sling.



SPEAR - THROWER

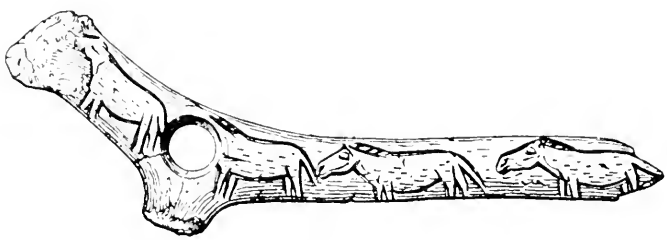
BONE HARPOON



Very fancy harpoons of antler were also made in the latter half of the period in western Europe. These harpoons had barbs on one or both sides and a base which would slip out of the shaft. Some have engraved decoration.

THE BEGINNING OF ART

In western Europe, at least, the period saw the beginnings of several kinds of art work. It is handy to break the art down



THONG - STROPPER

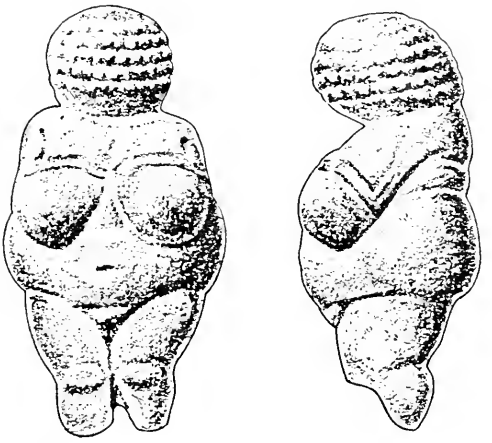
into two great groups: the movable art, and the cave paintings and sculpture. The movable art group includes the scratchings, engravings, and modeling which decorate tools and weapons. Knives, stroppers, spear-throwers, harpoons, and sometimes just plain fragments of bone or antler are often carved. Their surfaces may show animals, or rather abstract floral designs, or geometric designs.

Some of the movable art is not done on tools. The most remarkable examples of this class are little figures of women. These women seem to be pregnant, and their most female characteristics are much emphasized. It is thought that these "Venus" or "Mother-goddess" figurines may be meant to show the great forces of nature—fertility and the birth of life.

CAVE PAINTINGS

In the paintings on walls and ceilings of caves we have some examples that compare with the best art of any time. The

subjects were usually animals: the mammoth, the bison, the reindeer, the wild horse, the bear, the wild boar, and wild cattle. As in the movable art, there are different styles in the cave art. The really great cave art is pretty well restricted to southern France and Cantabrian (northwestern) Spain.



"VENUS" FIGURINE FROM WILLENDORF

There are several interesting things about the "Franco–Cantabrian" cave art. It was done deep down in the darkest and most dangerous parts of the caves although the men lived only in the openings of the caves. If you think what they must have had for lights (crude lamps of hollowed stone, which must have burned some kind of oil or grease, with a matted hair or fiber wick), and of the animals that may have lurked in the caves, you'll understand the part about danger. Then, too, we're sure the pictures these people painted were not meant simply to be looked at and admired, for they painted one picture right over other pictures which had been done earlier. Clearly, it was the *act* of *painting* that counted. You had to go way down into the most mysterious depths of the earth, and create an animal in paint. Possibly you believed that by doing this you gained some sort of magic power over the same kind of animals when you hunted them in the open air. It certainly doesn't look as if you cared very much about

the picture you painted, for you or somebody else soon went down and painted another animal right over the one you had done.

The cave art of the Franco–Cantabrian style is one of the great artistic achievements of all time. The subjects drawn are almost always the larger animals of the time: the bison, wild cattle and horses, the woolly rhinoceros, the mammoth, the wild boar, and the bear. In some of the best examples, the beasts are drawn in full color, and the drawings are remarkably alive and charged with energy. They come from the hands of men who knew the great animals well—knew the feel of their fur, the tremendous drive of their muscles, and the danger one faced when he hunted them.

Another artistic style has been found in eastern Spain. It includes lively drawings, often of people hunting with bow and arrow. The East Spanish art is found on open rock faces and in rock shelters. It is less spectacular than the Franco–Cantabrian cave art.

LIFE AT THE END OF THE ICE AGE IN EUROPE

Life in these times was probably as good as a hunter could expect it to be. Game and fish seem to have been plentiful; berries and wild fruits probably were, too. From France to Russia, great pits or piles of animal bones have been found. Some of this killing may have been done as our Plains Indians killed the buffalo—by stampede. There were also good tools for hunting, however. In western Europe, people lived in the openings of caves and under overhanging rocks. To the east, on the great plains of Russia, very crude huts were being built, half underground. The first part of this time must have been cold, for it was the middle and end phases of the last great glaciation. Northern Europe, from Scotland to Scandinavia, northern Germany and Russia, and also the higher mountains to the south, were certainly covered with ice. But people had fire, and the needles and tools that were used for scraping hides must mean that they wore clothing.

It is clear that men were thinking of a great variety of things beyond the tools that helped them get food and shelter.

Such burials as we find have more grave-gifts than before. Beads and ornaments and some flint tools are included in the grave, and sometimes the body is sprinkled with red ochre. Red is the color of blood, which means life, and of fire, which means heat. Professor Childe wonders if the red ochre was a pathetic attempt at magic—to give back to the body the heat that had gone from it. But pathetic or not, it is sure proof that these people were already moved by death as men still are moved by it.

Their art is another example of the direction the human mind was taking. And when I say human, I mean it in the fullest sense, for this is the time in which fully modern man has appeared. On page 26, we spoke of the Cro-Magnon group and of the Combe Capelle and Brunn group of Caucasoids, of the Grimaldi Negroids, and even of the possibility of a Mongoloid strain in Europe. I doubt that any one of these groups produced most of the achievements of the times. It's not yet absolutely sure which particular group produced the great cave art. The artists were almost certainly a blend of several (no doubt already mixed) groups. The pair of Grimaldi Negroids were buried in a grave with a sprinkling of red ochre, and were provided with shell beads and ornaments, and with some blade tools of flint. The Grimaldians seem to have shared equally in the cultural achievements of the times for all that the archaeologist can say.

LATER BLADE-TOOL INDUSTRIES IN THE NEAR EAST AND IN AFRICA

The blade tool industries we have just talked about were spread from Europe to central Siberia. They also reached down as far as Palestine. We have seen that Professor Garrod thinks the whole blade tradition may have originated in some part of the Middle East.

When we last spoke of Africa (p. 59), I told you that stone tools there were continuing in the Levalloisian flake tradition, and were becoming smaller. At some time during this process, two new tool types appeared in northern Africa: one was a point with a tang, and the other was a sort of "laurel leaf" point. These two tool types are called the "Aterian" and the

"Sbaikian" points. Professor Childe thinks they may have been introduced into Europe in time to account for some of the tanged points and the "Solutrean laurel leaf" points. What does seem clear is that the blade tool tradition arrived late in Africa.

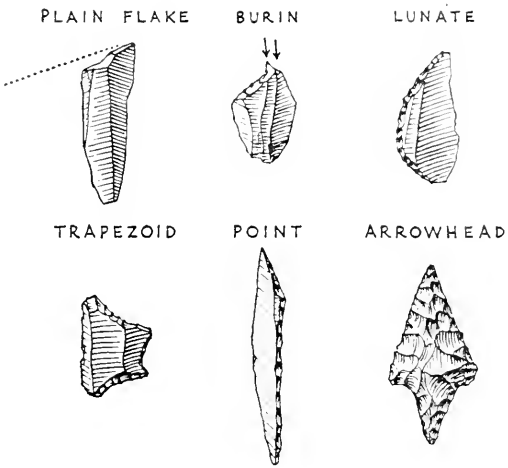
MICROLITHS

When the habits of making blade tools finally did take hold in Africa, at least one strange thing happened. People began making blade tools of very small size. They learned how to chip very slender and tiny blades from a prepared core. Then they made these little blades into tiny triangles, half-moons, trapezoids, and several other geometric forms. These little tools are called "microliths." They are so small that most of them must have been fixed in handles or shafts.

We have found several examples of microliths mounted in shafts. In northern Europe, where their use soon spread, the microlithic triangles were set in rows down each side of a bone or wood point. One corner of each little triangle stuck out, and the whole thing made a fine barbed harpoon. In historic times in Egypt, the microlithic trapezoids were still in use. They were fastened—blunt end out—on the end of an arrow shaft. It seems queer to give an arrow a point shaped like a "T." Actually, the little trapezoidal points were very sharp, and must have pierced the hides of animals very easily. We also think that the broader cutting edge of the trapezoidal point may have caused more bleeding than a pointed arrowhead would. In hunting fleet-footed animals like the gazelle, which might run for miles after being shot with an arrow, it was an advantage to cause as much bleeding as possible, for the animal would drop sooner.

We are not really sure that microliths were first invented in north Africa. They may have come first from Palestine, Turkey, or the Middle East, where we've also found some. So far, we've found them in greatest numbers in north Africa. From there, they seem to have moved (probably over the Strait of Gibraltar) up into Europe, by way of Spain. A few microliths have been found in France, at the time of the later

cave art. In much later times they even moved up into Scotland and to the shores of the Baltic Sea. Those that reached South Russia and central Europe probably moved up out of the Near East.



MICROLITHS

Remember that the microliths we are talking about here are made from little blades, and are usually geometric in outline. Each microlithic industry is made up, in good part, of such tiny blade tools. But there are also some normal-sized blade tools and even some flake scrapers.

NETHER AFRICA

Blade tools and "laurel leaf" points and some other probably late stone tool types also appear in central and south Africa. There is as yet no good way of telling just where they belong in time. Some people have guessed that they are as early as similar European and Near Eastern examples, but I doubt it.

THE FAR EAST

India and the Far East still seem to be going their own way. In India, some blade tools have been found, but these are not

well dated. In the Far East it looks as if the old chopper tool tradition was still continuing. For Burma, Dr. Movius feels this is fairly certain; for China it is pure guess-work. Actually, we know very little about the Far East at about the time of the last great glaciation. This is a shame, too, as you will soon agree.

THE NEW WORLD BECOMES INHABITED

At some time toward the end of the last great glaciation—say 20,000 years ago— people began to move over Bering Strait, from Asia into America. As you know, the American Indians are basically Mongoloids. So must have been the first people who came into the New World 20,000 years ago—the direct ancestors of the historic American Indians.

The stone tool traditions of Europe, Africa, the Near and Middle East, and central Siberia, did *not* move into the New World. With only a very few special exceptions, there are *no* core-bifaces, flakes, or blade tools of the Old World traditions in all of the Indian flints in the New World. Such things just haven't been found here.

This is why I say it's a shame we don't know more of the end of the chopper tool tradition in the Far East. According to Weidenreich, the Mongoloids were in the Far East long before the end of the last glaciation. And it was the Mongoloids who came to America. We know a little about the habits for making stone tools which these first people brought with them, and these habits don't conform with those of the western Old World. We'd better keep our eyes open for whatever happened to the end of the chopper tool tradition in northern China. Also we should watch future excavations in eastern Siberia. Perhaps we shall find the chopper tool tradition spreading up that far.

CHANGES AT THE END OF THE ICE AGE

The last great glaciation of the Ice Age was a three part affair. In Europe the third and last phase of this glaciation reached its peak just before 20,000 years ago. Then the glaciers began to melt back, for the last time. (Remember that Professor Antevs [p. 17] isn't sure the Ice Age is over yet!) This

melting sometimes went by fits and starts, and the weather wasn't always changing for the better; but there was at least one time when European weather was even better than it is now.

The melting back of the glaciers and the weather fluctuations caused other changes too. We know a fair amount about these changes in Europe. In an earlier chapter, we said that the whole Ice Age was a matter of continual change over long periods of time. It just happens that we know the most about this last period of change, from 18,000 B.C. until now. In this period some interesting things happened to mankind.

In Europe, along with the melting of the last glaciers other things were changing. Britain and Ireland became islands. The Baltic was sometimes a salt sea, sometimes a large fresh-water lake. Forests began to grow where the glaciers had been, and in what had once been the cold tundra areas in front of the glaciers. The great cold-weather animals—the mammoth and the woolly rhinoceros—retreated northward and finally died out. It is probable that the efficient hunting of the earlier people of 30,000–20,000 years ago had helped this process along (see p. 72). Europeans of the post-glacial period also had to keep changing to keep up with the times.

The archaeological materials for the time from 18,000 to 8,000 B.C. seem simpler than those of the previous ten thousand years. The great cave art of France and Spain had gone; so had the fine carving in bone and antler. Smaller, speedier animals were moving into the new forests. New ways of hunting them, or ways of getting other food, had to be found. Hence new tools and weapons were necessary. Some of the people who moved into northern Germany were successful reindeer hunters. Then the reindeer moved off to the north, and again new sources of food had to be found.

THE READJUSTMENTS COMPLETED IN EUROPE

After about ten thousand years, things began to look better. Or at least we can say this: by about 8000 B.C., we again get better archaeological materials. The best of these come from the north European area: Britain, Belgium, Holland,

Denmark, north Germany, southern Norway and Sweden. Much of this north European material comes from bogs and swamps where it had become water-logged and has kept very well. Thus we have much more complete *assemblages*[1] than for any time earlier. The best known of these assemblages is the *Maglemosian*, named after a great Danish peat-swamp where much has been found.

In the Maglemosian assemblage the flint industry is still very important. Blade tools, tanged arrow points, and burins were still made. But there were also axes for cutting the trees in the new forests. Moreover, the tiny microlithic blades, in a variety of geometric forms, are also found. Thus, a specialized tradition that began either south or east of the Mediterranean had reached northern Europe. There is also a ground stone industry; some axes and club-heads were made by grinding and polishing rather than chipping. The industries in bone and antler show a great variety of tools: axes, fish-hooks, fish spears, handles and hafts for other tools, harpoons, and clubs. A remarkable industry in wood has been preserved. Paddles, sled runners, handles for tools, and bark floats for fish-nets have been found. There are even fish-nets made of plant fibers. Canoes of some kind were no doubt made. Bone and antler tools were decorated with simple patterns, and amber was collected.

It seems likely that the Maglemosian bog finds are remains of summer camps, and that in winter the people moved to higher and drier regions. Childe calls them the "Forest folk"; they probably lived much the same sort of life as did our

[1] "Assemblage" is a useful word when there are different kinds of archaeological materials belonging together, from one area and of one time. An assemblage is made up of a number of "industries" (that is, all the tools in chipped stone, all the tools in bone, all the tools in wood, the traces of houses, etc.) and everything else that manages to survive, such as the art, the burials, the bones of the animals used as food, and the traces of plant foods: in fact everything that has been left to us and can be used to help reconstruct the lives of the people to whom it once belonged. Our own present-day "assemblage" would be the sum total of all the objects in our mail-order catalogues, department stores and supply houses of every sort, our churches, our art galleries and other buildings, together with our roads, canals, dams, irrigation ditches, and any other traces we might leave of ourselves, from graves to garbage dumps. Not everything would last, so that an archaeologist digging us up — say 2,000 years from now — would find only the most durable items in our assemblage.

Indians of the north central states. They hunted small game or deer; they did a great deal of fishing; they collected what plant food they could find. They had succeeded in domesticating the dog; he was still a very wolf-like dog, but his long association with mankind had now begun. Professor Coon believes these people were direct descendants of the men of the glacial age and that they had much the same appearance. He finds that most of the Ice Age survivors still extant are living today in the northwestern European area.

SOUTH AND CENTRAL EUROPE PERHAPS AS READJUSTED AS THE NORTH

There is always one trouble with things that come from areas where preservation is exceptionally good: the very quantity of materials in such an assemblage tends to make things from other areas look poor and simple although they may not have been so originally at all. The assemblages of the people who lived to the south of the Maglemosian area may also have been quite large and varied; but, unfortunately, relatively little of the southern assemblages has lasted. The waterlogged sites of the Maglemosian area preserved a great deal more. Hence the Maglemosian itself *looks* quite advanced to us, when we compare it with the few things that have happened to last in other areas. If we could go back and wander over the Europe of eight thousand years ago, we would probably find that the peoples of France, central Europe, and south and central Russia were just as advanced as those of the north European-Baltic belt.

South of the north European belt the hunting–food-collecting peoples were living on as best they could during this time. One interesting group, which seems to have kept to the regions of sandy soil and scrub forest, made great quantities of geometric microliths. These are the materials called *Tardenoisian*. The materials of the "Forest folk" of France and central Europe are called *Azilian*.

HOW MUCH REAL CHANGE WAS THERE?

You can see that no really *basic* change in the way of life has yet been described. The upsets that came with the melting

of the last glaciers caused all sorts of changes in tools and in food-getting habits, but the people of Europe in 5000 B.C. or even later were still just as much simple hunters, fishers, and food collectors as they had been in 25,000 B.C. Childe sees the problem that faced the Europeans of 18,000 to 5000 B.C. as a problem in readaptation to the post-glacial forest environment. The Europeans solved their problem by making whatever changes they had to make, in order to go on living the way they had been living—by simple food collection. In other words, they changed just enough so that they would not have to change, if you see what I mean.

CHANGES IN OTHER AREAS?

All this last section was about Europe. How about the rest of the world, when the last glaciers were melting away?

We don't yet know much about this particular time in other parts of the world except the Mediterranean basin and the Middle East. People were certainly moving into the New World by way of Siberia and the Bering Strait about this time. But for the greater parts of Africa and Asia, we simply do not know what was happening. Some day, we shall no doubt find out; today, we are without information.

A REAL CHANGE IN THE NEAR EAST

The southern and eastern shores of the Mediterranean, and the area of the Middle East (as far as Iran and the valley of the Indus River) turn out to be the most interesting region of all, for it was somewhere here that the first *basic change* in human life took place. This change amounted to a revolution, just as important as the Industrial Revolution. In it, men learned to domesticate plants and animals. In other words, they began *producing* their food, instead of simply collecting it. Professor Childe thus has reason to speak of the "food-producing revolution." Why did this change take place?

A THEORY AS TO THE CAUSE OF THE REVOLUTION

The ten thousand years following 18,000 B.C. must have been very difficult ones. These were the years when the most

marked melting of the last glaciers was going on. While the glaciers were in place, the climate to the south of them must have been different from the climate in those areas today. You have no doubt read that people once lived in regions now covered by the Sahara Desert. This is true; just when is not entirely clear. The theory is that during the time of the glaciers, there was a broad belt of rain winds south of the glaciers. These rain winds would have kept north Africa and the Near and Middle East green and fertile. But when the glaciers melted back to the north, the belt of rain winds is supposed to have moved north too. Then the people living south and east of the Mediterranean would have found that their water supply was drying up, that the animals they hunted were dying or moving away, and that the plant foods they collected were dried up and scarce.

According to the theory, all this would have been true except in the valleys of rivers, and in oases in the growing deserts. Here, in the only places where water was left, the men and animals and plants would have clustered. They would have been forced to live close to one another, in order to live at all. Then presently, the men would have seen that some animals were more useful or made better food than others, and so they would have begun to protect these animals from their natural enemies. The men would also have been forced to try new plant foods, foods which possibly had to be prepared before they could be eaten. Thus, with trials and errors, but by being forced to live close to them, men would have learned to domesticate plants and animals.

THE THEORY STILL ONLY A THEORY

So far, this theory is pretty much all guess-work, and there are some questions it leaves unanswered. For one thing, the glaciers which began melting about 18,000 B.C. were merely the last of three phases of the last great glaciation. There had also been three earlier periods of great glaciers, and long periods of warm weather in between. If the rain belt moved north as the glaciers melted, after 18,000 B.C., it must have moved in the same direction in earlier times. Thus the forced neighborliness of men, plants and animals in river valleys and

oases must also have happened earlier. Why didn't domestication happen earlier too, then?

One possible answer is that culture had not yet advanced to a point where domestication could have been comprehended. Another suggestion is that we don't yet have archaeological assemblages in north Africa or the Near East that show great changes during the ten thousand years after 18,000 B.C. The little we have found shows only gradual alteration. It seems fairly clear that in north Africa, Egypt, and Palestine, the habits of making microlithic tools must have started well before 18,000 B.C. It doesn't look as if there had been as much technological change in this area as there was in northern Europe. The great technological change, when we first see it, is later, about 5500 B.C.

THE NATUFIAN, A FINAL FOOD-COLLECTORS' ASSEMBLAGE

I am closing this chapter with a description of one of the best known of the late food-collecting assemblages in the Near East. This is the assemblage called the Natufian. It comes from the upper layers of caves in Palestine, and we don't know just how old it is. If we should guess that it probably falls within two or three thousand years either way from 10,000 B.C., we probably shouldn't be far wrong.

As far as we know, the people who produced the Natufian assemblage were still only cave dwellers. In the best-known example, on Mount Carmel, they lived in the open mouth of a large cave and on the terrace in front of it. On the terrace, they had set at least two short curving lines of stones. But these were hardly architecture; they seem more like benches or perhaps the low walls of open pens. There were also one or two small clusters of stones laid like paving, and a ring of stones around a hearth or fireplace. One very round and regular basin-shaped depression had been cut into the rocky floor of the terrace, and there were other less regular basin-like depressions.

Most of the finds in the Natufian layer of the Mount Carmel cave were flints. About 80 per cent of these flint tools

were microliths made by the regular working of tiny blades into various geometric forms. The larger flint tools included backed blades, burins, scrapers, a few arrow points, some larger hacking or picking tools, and one special type. This last was the sickle blade.

We know a sickle blade of flint when we see one, because of a strange polish or sheen which seems to develop on the cutting edge when the blade has been used to cut grasses or grain. In the Natufian, we have even found the straight bone handles in which a number of flint sickle blades were set in a line.

There was a small industry in ground or pecked stone (that is, abraded not chipped) in the Natufian. This included some pestle and mortar fragments. The mortars are said to have a deep and narrow hole, and some of the pestles show traces of red ochre. We are not sure that these mortars and pestles were used for grinding food. In addition, there were one or two bits of carving in stone.

NATUFIAN ANTIQUITIES IN OTHER MATERIALS; BURIALS AND PEOPLE

The Natufian industry in bone was quite rich. It included, beside the sickle hafts mentioned above, points and harpoons, straight and curved types of fish-hooks, awls, pins and needles, and a variety of beads and pendants. There were also beads and pendants of pierced teeth and shell.

A number of Natufian burials have been found; some burials were grouped together in one grave. The people who were buried within the Mount Carmel cave were laid on their backs in an extended position, while those on the terrace seem to have been "flexed" (placed in their graves in a curled-up position). This may mean no more than that it was easier to dig a long hole in cave dirt than in the hard-packed dirt of the terrace. The people often had some kind of object buried with them, and several of the best collections of beads come from the burials. On two of the skulls there were traces of elaborate head-dresses of shell beads.

The animal bones of the Natufian layers show beasts of a "modern" type, but with some differences from those of

present-day Palestine. The bones of gazelle far outnumber the deer bones; since gazelles like a much drier climate than deer, Palestine must then have had much the same climate that it has today. Some of the animal bones were those of large or dangerous beasts: the hyena, the bear, the wild boar, and the leopard. But the Natufian people had the help of a large domesticated dog. If our guess at a date for the Natufian is right, this is an even earlier dog than was that in the Maglemosian of northern Europe.

The study of the human bones from the Natufian burials is not yet complete. Until Professor McCown's study becomes available, we may note Professor Coon's assessment that these people were of a "basically Mediterranean type with minor Negroid affinities."

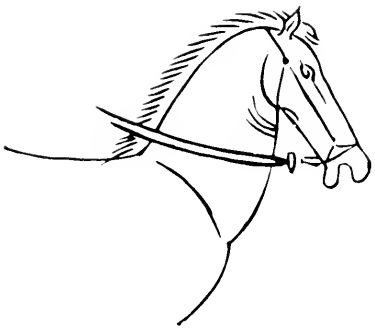
WERE THE NATUFIANS FOOD-PRODUCERS?

It is clear that a great part of the food of the Natufian people must have been hunted or collected. Shells of land, freshwater, and sea animals also appeared in their cave layers. But, on the other hand, we have the sickles, the mortars, and the domesticated dog. Had the great change to the domestication of plants and animals begun in the Natufian?

Professor Childe thinks the birth of the food-producing revolution may already be happening in the Natufian, but I am still skeptical. You might *cut* wild grasses or grains with a sickle, without ever planting them. Mortars and pestles might have been used for grinding only wild grain—if those of the Natufian were used for food at all. The dog doesn't worry us so much; we know he lived with simple food-collectors in the north. But Professor Childe warns us that it will be very hard for archaeologists to see the birth of the food-producing revolution, because the people of those times may have taken a long time to invent tools to go with their new way of life. Unless we are lucky enough to find the actual grain, or the bones of the domesticated animals, we may never be able to put our fingers directly on the archaeological materials that belong to the birth of food production.

Neither Professor Childe nor I mean to tell you that it was the Natufians themselves, or their direct descendants, who

alone invented food production. We are simply saying that the change took place somewhere in the greater Near Eastern area, and that we do not know exactly how it came about. It does happen, however, that the Natufian assemblage appears within the area and belongs to the range of time during which food production began.



THE First Revolution

A basic change in human economy began to take place about ten thousand years ago. I have used Childe's term for it—the "food-producing revolution."

THE DIFFERENCE BETWEEN FOOD-COLLECTORS AND FOOD-PRODUCERS

Childe uses the word "revolution" because of the radical change that took place in the habits and customs of man. Food collectors—that is, hunters, fishers, berry- and nut-gatherers—had to live in small groups or bands, for they had to be ready to move wherever their food supply moved. Not many people can be fed in this way in one area, and small children and old folks are a burden. There is not enough food to store, and it is not the kind that can be stored for long.

Do you see how this all fits into a picture? Small groups of people—living now in this cave, now in that—or out in the open, as they moved after the animals they hunted; no permanent villages, a few half-buried huts at best; no breakable utensils; no pottery; no sign of anything for clothing beyond the tools that were probably used to dress the skins of animals; no time to think of much of anything but food and protection and disposal of the dead when death did come; an existence

which takes nature as it finds it, which does little or nothing to modify nature—all in all, a savage's existence, and a very tough one. A man who spends his whole life following animals just to kill them to eat, or moving from one berry patch to another, is really living just like an animal himself.

THE FOOD-PRODUCING ECONOMY

Against this picture let me try to draw another—that of man's life after food production had begun. His meat was stored "on the hoof," his grain in silos or great pottery jars. He lived in a house; it was worth his while to build one, because he couldn't move too far from his fields and flocks. In his neighborhood enough food could be grown and enough animals bred so that many people were kept busy. They all lived close to their flocks and fields, in a village. The village was already of a fair size, and it was growing, too. Everybody had a more rounded diet; they were all stronger, and there were more children. Children and old men could shepherd the animals by day or help with the lighter work in the fields. After the crops had been harvested the younger men might go hunting, and some of them would fish, but the food they brought in was only an addition to the food in the village; the villagers wouldn't starve, even if the hunters and fishermen came home empty-handed.

There was more time to do different things, too. They began to modify nature. They made pottery out of raw clay, and textiles out of hair or fiber. People who became good at pottery-making traded their pots for food, and spent all of their time on pottery alone. Other people were learning to weave cloth, or to make new tools. There were already people in the village who were becoming full-time craftsmen.

Other things were changing, too. The villagers must have had to agree on new rules for living together. The head man of the village had problems different from those of the chief of the food-collectors' band. If somebody's flock of sheep spoiled a wheat field, the owner wanted payment for the grain he had lost. The chief of the hunters was never bothered with such questions. Even their gods had changed. The

spirits and the magic that had been used by hunters weren't of any use to the villagers. They needed gods who watched over the fields and the flocks, and they began to erect buildings where their gods might dwell, and where the men who knew most about the gods might live.

WAS FOOD-PRODUCING A "REVOLUTION"?

If you can see the difference between these two pictures—between life in the food-collecting stage and life after food production had begun—you'll see why Professor Childe speaks of a revolution. By revolution, he doesn't mean that it all happened over night, or that it happened only once. We don't know exactly how long it took. Some people think that all these changes may have occurred in less than 500 years. But I doubt that. It probably took a thousand years or more to really "get going."

MORE THAN ONE CASE OF THE FOOD-PRODUCING REVOLUTION

The food-producing revolution must have happened several times, and in different places. We're sure it occurred independently in the New World, and rather late (probably after 1000 B.C.). We think it happened separately in China about 3000 B.C., but we don't know whether the ideas that started the revolution there were borrowed or not. There is also a chance that rice was first cultivated in eastern India or Malaysia, and that there may have been an independent revolution there. But the earliest, and for our own history the most important, birth of food production was in the Near East.

WHEN AND WHERE IN THE NEAR EAST?

Food-production probably began in the Near East somewhere about 8000 to 6000 B.C. There is no reason to believe that the people who developed food-production were any different from the Natufians—that is, Professor Coon's "basic Mediterranean type with minor Negroid affinities." We can't say yet exactly where the first beginnings were made. Nor is it likely that only one small region in the whole Near

Eastern area was *the* original center. Different parts of our new stage probably began in different regions of the area. We know that the plants and animals which were to be domesticated were all present in their wild forms in the greater Near Eastern area. Everything we know so far makes it look as if the time was right in the Near East for the revolution to happen, and so it happened.

A GAP IN OUR KNOWLEDGE OF THE NEAR EAST

There is one rather disturbing gap in our knowledge of the Near East in these times; for, following the Natufian cave materials, the next step brings us to well-formed village assemblages. Something must lie in between these two stages, and that "something" will show the real beginnings of the food-producing economy. We need to do more digging to clear up this problem as well as others (see p. 98).

THE DIFFICULTIES INVOLVED IN GIVING DATES

Dates in the early Near East are troublesome; we just guess. These guesses are "informed," which means that we think we know the various angles of our problem. I told you that the Natufian probably falls somewhere within two or three thousand years either way from 10,000 B.C., and this means that the Natufian may fall anywhere from 13,000 B.C. to 7000 B.C. If you ask me a date for the beginning of the food-producing revolution in the Near East, I'd say 7000 B.C., plus or minus a thousand years. For the earliest food-producing assemblages or "village-culture materials" we've found so far, I'm going to give the date of 5500 B.C. plus or minus 500 years. This little table gives you all we know about early dates in the Near East:

Earliest village-culture materials now known	5500 B.C. ±500 yrs.	6000–5000 B.C.
Probable birth of food-producing revolution	7000 B.C. ±1000 yrs.	8000–6000 B.C.
Natufian cave materials of Palestine	10,000 B.C. ±3000 yrs.	13,000–7000 B.C.

If you look at the figures closely, you will see that the lowest date I gave for the Natufian (7000 B.C.) is separated by one thousand years from the earliest date I give for the now known village-culture materials (6000 B.C.). That thousand years or so is the gap in our knowledge of these times—a gap we still have to fill in (see p. 98).

THE EARLIEST FOOD-PRODUCING REMAINS WE NOW HAVE

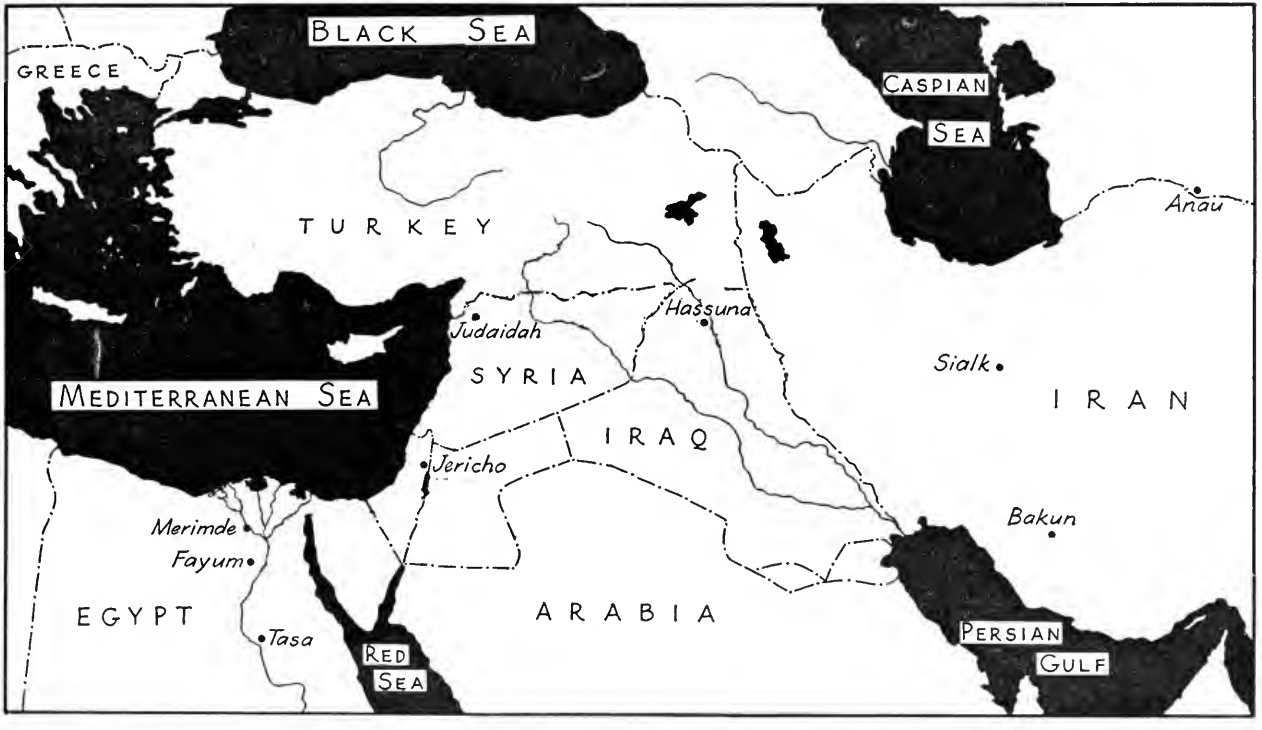
Four of the best-known and the earliest village-culture or food-producing assemblages we've found so far in the Near East are spotted along what Breasted used to call the "Fertile Crescent." The map (p. 91) shows where they were found. According to Breasted this crescent arched up from Palestine, over Syria, and down into southern Mesopotamia. I have changed and extended the area a bit. On my map it begins in the Egyptian delta country, arches up through Palestine and Syria to northern Iraq, and then bends off onto the Iranian plateau in two branches. It is within this irregular "crescent" that all of the very earliest village materials have been found so far.

There may be two or three other, equally early assemblages,[1] but these are not so fully known. Most of the details of the four village assemblages we will talk about can be found in the chart (p. 93).

SIALK IN NORTH-CENTRAL IRAN

Near the east end of the "crescent," up on the Iranian plateau, lies the site called *Sialk*. Here, in the very bottom layer of a great mound, was the remains of a very early village. You can note in my chart all the different kinds of things the French archaeologists found there. It was a true village with built houses and two different kinds of pottery. Sialk is the only one of the very early villages where metal tools have been found. These are little pins or perhaps drills of hammered copper. The early Sialk people buried their dead under the

[1] At Jericho in Palestine, at Bakun B in southwestern Iran, and possibly at Tasa in upper Egypt. These sites are also shown on the map (p. 91). The position of the interesting, but slightly *later*, site of Anau, on the northeastern branch of the "crescent" in Iran, is also shown.



THE "FERTILE CRESCENT," SHOWING POSITION OF SITES WITH EARLIEST KNOWN VILLAGE MATERIALS

floors of their houses and they covered the bodies of the dead with red ochre.

HASSUNA, IN UPPER MESOPOTAMIA-IRAQ

The next important early site is that called *Hassuna*, in the upper valley of the Tigris River, in northern Iraq. This is Mesopotamia, but the site of Hassuna lies much farther north than the area of historic Babylonia. The bottom layers of the mound contain the mud houses of a very early village. There are several kinds of pottery, and some are painted. The chart gives an idea of all the different things the Iraqi archaeologists found in the houses. The Hassuna people made little clay figurines of human females. These are usually called "mother-goddess" figurines and may be idols. The burials at Hassuna were sometimes made in big pots.

JUDAIDAH, IN NORTHWESTERN SYRIA

Now we move westward to the shores of the Mediterranean, in the area where Syria and Turkey join. Here there are several different mounds whose earliest layers have yielded one kind of early village material. The best known of these is *Judaidah*, which was dug by archaeologists from the Oriental Institute of the University of Chicago. Earliest Judaidah was also a true village. The walls of its houses were built of mud, but some of their foundations were stone. Again there are several kinds of pottery, different again from the pottery of Sialk and Hassuna. Stamp seals of stone appear in the early Judaidah assemblage, but we don't know exactly what they were used for. The Judaidah people buried their dead under their house floors, and sometimes pottery and other things were buried with them.

FAYUM AND MERIMDE, NEAR THE NILE DELTA, EGYPT

Near the western end of the "crescent," in northern Egypt, come the last of the four better-known very early village assemblages. There are two sites here. One site, called *Merimde*, is a true village. At the other, the *Fayum* site, only grain bins or silos and many smaller objects were found; the

	FOOD QUEST															UTILITIES																	NON-UTILITARIAN					
	VEGETABLE						ANIMAL						CONTAINERS			HOUSING			CLOTHING				WEAPONS					CRAFT TOOLS										
	Grain	*Sickles*	*Hoes & Celts*	*Querns*	*Mortars*	*Silos - Bins*	*Sheep/Goat*	*Cattle*	*Pig*	*Dog*	*Wild*	*Fish - Shell*	*Pottery*	*Basket*	*Stone*	*Caves*	*Houses*	*Villages*	*Whorls*	*Pins*	*Needles*	*Cloth*	*Maces*	*Points*	*Knives*	*Harpoons*	*Sling Pellets*	*Flint*	*Ground Stone*	*Bone*	*Metal*	*Jewelry*	*Stamp Seals*	*Figurines*	*"Mother Goddess"*	*Studs*	*Decoration*
Fayum and Merimde	✓	✓	✓	✓	/	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	/	✓	✓	✓		✓					/
Judaidah		✓	✓	✓	✓	✓		✓	✓		✓	✓	✓		✓	✓	✓	✓	✓	✓			✓	✓	/		✓	✓	✓		✓	✓			✓	✓
Hassuna	/	✓	✓	✓	✓	✓	✓	✓	/		✓	✓	✓		/		✓	✓	✓		✓		/	✓	/		✓	✓	✓	✓	✓		✓	✓		✓
Sialk		✓	✓	✓	✓		✓	/			✓	/	✓		✓		✓	✓	✓	✓			✓		/		✓	✓	✓	✓	✓		/		✓	✓
Natufian		✓			✓					✓	✓	✓				✓				✓	✓			✓	/	✓		✓		✓		✓		/			✓

✓ PRESENT
/ PROBABLY PRESENT

CHART SHOWING SIMPLE CONTENT OF NATUFIAN FOOD-COLLECTING ASSEMBLAGE COMPARED WITH MORE COMPLEX EARLY VILLAGE ASSEMBLAGES OF NEAR EAST

village itself was gone. Both of these sites are outside of the geographically typical Nile valley strip. Merimde is on the west border of the delta and the desert. The Fayum site is in a lake basin some twenty-five miles west of the Nile, south of Cairo. Since objects last so well in the dry climate of Egypt, you will see on our chart items like baskets and cloth from these sites. Even more important, both the Austrian reports of Merimde and those of the British at Fayum, mention wheat. Barley and flax also appeared in the Fayum site. The grain bins at both sites were holes in the ground lined with mats. Simple burials were found at Merimde.

THE NATUFIAN AND THE EARLY VILLAGE MATERIALS COMPARED

In the chart on page 93 you can compare these four early village assemblages with the Natufian of the Palestinian caves. You can see how in the villages much was going on which didn't happen in the Natufian, and you'll realize why I think there is a gap between the times of the Natufian of Palestine and of the earliest known village materials generally. There is no reason to think that Palestine was backward. The earliest layer in the village mound of Jericho should be just as early as our other four, but less is known of it, so I didn't put it in the chart. I'm sure there's a gap in time between the Natufian and the earliest Jericho village.

Also, I'm sure the Natufian is about the latest cave material we have in the Near East. We haven't yet found any cave material in Iran. The one cave found in north Iraq, at Zarzi, probably was abandoned before Natufian times; the next thing known is the Hassuna village. In northwestern Syria there has been no cave material excavated; we have found only villages like Judaidah. In Egypt, there is evidently a long gap of time between the Fayum and Merimde sites and the nearest earlier period — that of the flint tools called Sebilian III.

HOW WE STAND IN THE PROBLEM OF THE EARLIEST NEAR EASTERN VILLAGES

Evidently, we have much to find out about a very interesting period. Each of our four earliest village peoples probably

did not think up these new ideas separately. Apparently they all had the same domestic animals. So far, we have found actual grain only in Egypt (where the preservation is so excellent). But the other early assemblages must have had grain, too, probably wheat and barley, which appear presently in somewhat later levels. And surely there were not four separate inventions of mud houses and of pottery, sickles, and stone hoes in this one region. There must have been some earlier, even more common level of interchange of ideas and technological know-how.

We are *sure* that something big had already begun to happen. Unluckily we have found few skeletons from our earliest villages, and most of the burials we have found so far are usually so badly crushed and broken that we can't study or measure the bones. But Professor Coon believes that the few skulls from Merimde are of Mediterranean type, and without the Negroid trace he saw in the Natufians. Professor H. V. Vallois says that the skulls of adults from Sialk I are "Mediterraneans, or, more exactly, 'Proto-Mediterraneans.'" It looks as if the general type of Mediterranean man that we see in the Near East today, was already there. We had him in the Natufian, we find him in the earliest villages, and we keep finding him. From what we know now, the honor of discovering food-production for the first time belongs to this Mediterranean type of man.

THE BEGINNINGS OF FOOD-PRODUCTION ELSEWHERE

We know even less about regions outside of the Near East. The time gap between the upper cave layers and the first known villages in China must be very long. We can't yet watch the change from the food-collecting stage to the food-producing stage in China, and so we can't yet answer the question, "Was food-production in China simply an idea borrowed from the Near East?"

I said (p. 88) that food-production may have begun by itself in several other places; but we haven't yet found enough in these places to tell *how* it got started. We do *know* that the Mongoloid New World ancestors of the American Indians

discovered it for themselves, some time after it had become established among the Mediterranean whites of the Near East.

THE SPREAD OF FOOD-PRODUCTION TO EUROPE

How about Europe? I won't give you any details on it at all.[1] This much is clear. The general idea and much of the know-how and the tools of food-production moved from the Near East to Europe. So did the plants and animals which had been domesticated. I don't mean there were traveling salesmen. The process took a long time, and the ideas must have moved from one group of people to the next. There were just possibly some long distance movements of a few people, but we don't yet know enough about these to be sure.

The ideas were carried to Europe in two main directions: (1) through Turkey to Greece or to south Russia, and up the Danube River valley; (2) along north Africa or by sea to Italy, Spain, and France, then on to Britain and the north. I say by sea because there are early village materials on Crete, Malta, Sardinia, and the Balearic Islands. Within the time range concerned, there is no question of land-bridges. People had to get to these islands by boats.

Don't get the notion that the early village materials of Europe were merely poor imitations of those in the Near East. Some of the ideas which reached them were much improved on by the people in Europe. There is one early village assemblage in Germany which seems to have been *purely* food-producing. No wild animal bones and no arrow points or hunting weapons have turned up at all. This would be rare until much later times in the Near East; in fact it may never have been the case there.

THE SWISS LAKE-DWELLERS

One of the best-known early village assemblages anywhere is the material from the Swiss lake-dwellings. This is spectacular because much of it has been preserved. The people lived in

[1] Several of the books I have listed on page 112 will give the details. One of the best is Professor Childe's *The Dawn of European Civilization.*

wooden houses set on piles out in the lakes; so whatever they dropped became water-logged, and has thus been saved for us. There are all kinds of stone tools set in their wooden or antler hafts; there is cloth; there are the remains of grain, vegetables, and fruit. There is so much more than we usually find at such an early date that it makes the Swiss lake-dwellers look pretty special. Actually, they probably weren't any more rich or clever than the rest of the Europeans of their times. We just happen to have more of the things they left.

DEVELOPMENT AND FURTHER SPREAD OF FOOD PRODUCTION

In the areas where things got started first, new ideas appeared and new ways of doing things were being invented. While the earlier ideas were spreading out, the newer ideas kept appearing in the center. Later the new ideas began spreading too. The new ideas from the center might get taken up outside, or they might have to compete with things already developed in the outer areas. It was a complicated process as to which ideas might win out; even simple caprice may often have decided the point. Not everybody can have taken up all of the ideas they heard about.

Things get very complicated in the Near East alone, in the two thousand years following our four earliest known village materials. We said our four earliest villages would probably date about five hundred years either way from 5500 B.C. Soon after 3500 B.C., history begins, and that's the end of my story.

In that two thousand years between 5500 and 3500 B.C., many things happened in the Near East. Villages grew into towns and some of the towns into still larger towns, trading centers and ports. Houses began to show differences in size and richness; some of the biggest houses may have been inhabited by priests and kings, but others were probably those of rich and successful men. Some buildings that have been found can only have been shrines or little temples. Pottery was often richly varied and decorated. Metal tools appeared. They were made of copper and were simple, but their forms were different from those of the old stone tools. On Judaidah,

in northwestern Syria (about 3800 B.C.), we found a business-like dagger and a perfectly modern-looking cold chisel, both in copper. These things couldn't have been made by farmers; they must have been the product of craftsmen, who spent their time working in metal. Also, the copper didn't come from that area. It had to be traded into the area, and something must have been given in exchange for it.

The coming of metal tools must have been a thing of great importance. Metal tools tell us a story of ever-growing technical skills and of ever broader horizons of trade and economic interchange. Professor Childe has outlined the steps by which different metal tools began to appear in the ancient Near East and Europe. The first step was the simple hammering of "cold" copper into copies of stone tools, or into small ornaments. Next came weapons and larger ornaments of copper and the first bronze, but few tools of "industrial" type. In the third step, smaller copper and bronze tools for craftsmen were added. Heavy bronze tools for agriculture or rough work came last of all.

Iron tools followed some of the same steps, although that metal did not come into general use until after 1500 B.C. The first iron tools were only copies of contemporary bronze or stone ones. Not until this first step was past did tools of iron begin to take advantage of the strength of the new metal, and appear in new and heavy forms.

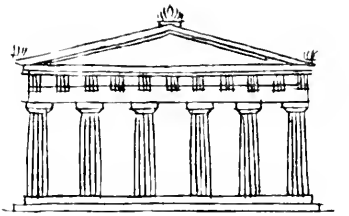
There are more details like this which we could use to build up the story, but I simply want you to get the idea: In the 2,000 years after 5500 B.C., more advances were made than in all the half million years just before. Don't you agree with us in thinking that this whole development was revolutionary?

After this publication went to press, my wife and I and our graduate assistant, Miss Charlotte Otten, returned from a spring field season in Iraq. Our "Iraq Project" for the Oriental Institute of the University of Chicago worked on a site called Jarmo in the foothills of southern Kurdistan. Jarmo yielded materials of a technological stage intermediate be-

tween that of the Sialk, Hassuna, and similar villages (see pp. 90–93) and that of the Natufian. Thus Jarmo fills, at least in part, the gap in knowledge that I have stressed on pages 82, 89, 90, 94, and 95.

Jarmo is a village site with simple mud-walled houses that have several rectangular rooms. The Jarmo people had made animal and human figurines of clay, but portable pottery vessels were not yet known. A flourishing ground-stone industry included stone vessels. One link backwards to the Natufian stage was the persistence of microliths. Quantities of animal bones and a few kernels of grain were recovered.

The full implication of the Jarmo materials will only be known after a complete study has been made. When the materials can be placed in a chart like that on page 93, I should judge that the assemblage will be nearer to the Sialk-Hassuna stage than to that of the Natufian. The gap in knowledge is not yet completely filled, but the discovery of Jarmo qualifies what I say of the gap on the pages indicated above.



THE Conquest of Civilization

We are now coming to the point where history is about to begin. I am going to stick pretty close to the Near East in this chapter. It is perhaps most interesting to most of us, for the foundations of Western Civilization were laid in the Near East.

There is another interesting thing, too. We have seen that the first experiment in food-production took place in the Near East. So did the first experiment in civilization. Both experiments "took." The traditions we live by today are based, ultimately, on those ancient beginnings in food-production and civilization in the Near East.

WHAT "CIVILIZATION" MEANS

I shall not try to define "civilization" for you; rather, I shall tell you what the word brings to my mind. To me civilization means urbanization: the fact that there are cities. It means a formal political set-up: that there are kings or governing bodies that the people have set up. It means formal laws, rules of conduct, which the government (if not the people) believes are necessary. It probably means that there are formalized projects—roads, harbors, irrigation canals, and the like—and also some sort of army or police force to protect

them. It also usually means there is writing. (The people of the Andes—the Incas—had everything which goes to make up a civilization but formal writing. I can see no reason to say they were not civilized.)

In different civilizations, there may be important differences in the way such things as the above are managed. In early civilizations, it is usual to find religion very closely tied in with government, law, and so forth. The king may also be a high-priest, or he may even be thought of as a god. The laws are usually thought to have been given to the people by the gods. The temples are protected just as carefully as the other projects.

CIVILIZATION IMPOSSIBLE WITHOUT FOOD-PRODUCTION

Civilizations have to be made up of many people. Some of the people live in the country; some live in very large towns or cities. Classes of society have begun. There are officials and government people; there are priests or religious officials; there are merchants and traders; there are craftsmen, metal-workers, potters, builders, and so on; there are also farmers, and these are the people who produce the food for the whole population. Civilization *cannot* exist without food-production. Food-production has to be pretty efficient before civilization can even begin.

But people can be food-producing without being civilized. In many parts of the world this is still the case. When the white men first came to America, the Indians in most parts of this country were food-producers. They grew corn, potatoes, tomatoes, squash, and many other things the white men had never eaten before. But only the Aztecs of Mexico, the Mayas of Yucatan and Guatemala, and the Incas of the Andes were civilized.

WHY DIDN'T CIVILIZATION COME TO ALL FOOD-PRODUCERS?

Once you have food-production, what else has to happen before you get civilization? Many men have asked this question and have failed to give a full and satisfactory answer. There

is probably no *one* answer. I am going to give you my own idea about how civilization *may* have come about in the Near East alone. But remember, it is only a guess. It does not apply to the beginnings of the civilizations of the American Indians, and probably not to those of China, India, or the other places where civilizations sprang up by themselves.

WHERE CIVILIZATION FIRST APPEARED IN THE NEAR EAST

You remember that our earliest villages in the Near East lay along a great "crescent." (See map on p. 91.) The crescent arches up from Egypt through Palestine and Syria and then into northern Iraq and off into Iran. Food-production, as early as we know it, already existed over this crescent-shaped area (say at 5500 B.C. ±500 years).

Now notice that this area does not include southern Mesopotamia, that is, Babylonia proper.[1] The earliest known villages there are at least a thousand years later. Also it does not seem (so far as we've yet discovered) to run up into the Nile valley proper at the very beginning, for the Merimde and Fayum sites are north and west of the typical strip of river land.

We know that by about 3200 B.C. the Early Dynastic period had begun in southern Mesopotamia. The beginnings of writing may go back several hundred years earlier, but we can safely say that civilization had begun in Mesopotamia by 3200 B.C. In Egypt, the beginning of the First Dynasty is at about 3100 B.C., and writing probably did not appear much earlier. There is no question but that history and civilization were well under way in both Mesopotamia and Egypt by 3000 B.C.—about five thousand years ago.

THE "CRESCENT" VERSUS THE RIVER LANDS

Why did these two civilizations spring up in these two river lands which apparently were not even part of the area where food-production began? Why didn't we have the first civiliza-

[1] Professor Breasted's original "Fertile Crescent" did include southern Mesopotamia. On page 90, I explained how my "crescent" is different.

tions in Palestine, Syria, north Iraq, or Iran, where we're sure food-production had had a long time to develop? I think the probable answer gives a clue to the ways in which civilization began in Egypt and Mesopotamia.

The land in the "crescent" is of a sort which people can farm without too much trouble. It is made up of a fairly fertile coastal strip in Palestine and Syria. There are pleasant mountain slopes, streams running out to the sea, and rain, at least in the winter months. The rain belt and the foothills of the Turkish mountains also extend to northern Iraq, and on to the Iranian plateau. The Iranian plateau has its mountain valleys, streams, and some rain. The whole strip of the crescent is almost made-to-order for beginning farmers. The grassy slopes of the higher hills would be pasture for their herds and flocks. As soon as the earliest experiments with agriculture and domestic animals had been successful, a pleasant living could be made in the "crescent"—and without too much trouble.

THE RIVER LANDS

Now look at Egypt and southern Mesopotamia. Both are lands without rain, for all intents and purposes. Both are lands with rivers that have laid down very fertile soil—soil far superior to that in the "crescent." But in both lands, the rivers are of no great aid without some control.

The Nile floods its banks once a year, in late September or early October. It not only soaks the narrow fertile strip of land on either side; it lays down a fresh layer of new soil each year. Beyond the fertile strip on either side rise great cliffs, and behind them is the desert. In its natural, uncontrolled state, the yearly flood of the Nile must have caused short-lived swamps that were full of crocodiles. After a short time, the flood level would have dropped, the water and the crocodiles would have run back into the river, and the swamp plants would have become parched and dry.

The Tigris and the Euphrates of Mesopotamia are less likely to flood regularly than the Nile. The Tigris has a shorter and straighter course than the Euphrates; it is also the more

violent river. Its banks are high, and when the snows melt and flow into all of its tributary rivers, it is swift and dangerous. The Euphrates has a much longer and curving course. Its banks are lower and it is less likely to flood dangerously. The land on either side and between the two rivers is very fertile. Unlike the Nile Valley, neither the Tigris nor the Euphrates is flanked by cliffs. The land on either side of the rivers stretches out for miles and is not much rougher than a poor tennis court.

THE RIVERS MUST BE CONTROLLED

The real trick in both Egypt and Mesopotamia is to make the rivers work for you. In Egypt, this is a matter of building dikes and reservoirs that will catch and hold the Nile flood. In this way, the water is held and allowed to run off over the fields as it is needed. In Mesopotamia, it is a matter of digging canals, branch canals, and ditches to irrigate from the rivers.

Obviously, we can no longer find the first dikes or reservoirs of the Nile valley, or the first canals or ditches of Mesopotamia. The same land has been lived on far too long for any traces of the first attempts to be left; or, especially in Egypt, it has been covered by the yearly deposits of silt, dropped by the river floods. But we're pretty sure the first food-producers of Egypt and southern Mesopotamia must have made such dikes, canals, and ditches. In the first place, there can't have been enough rain for them to grow things otherwise. In the second place, the patterns for such projects seem to have been pretty well set by historic times.

CONTROL OF THE RIVERS THE BUSINESS OF EVERYONE

Here, then, is the probable reason why civilization grew in Egypt and Mesopotamia first—not in Palestine, Syria, or Iran. In the latter areas, in the "crescent," people could manage to produce their food as individuals. It wasn't too hard; there were rain and some streams, and good pasturage for the animals even if a crop or two went wrong. In Egypt

and Mesopotamia, people had to put in a much greater amount of work, and this work couldn't be individual work. Whole villages or groups of people had to turn out to fix dikes or dig ditches. The dikes had to be repaired, the ditches cleared of silt.

There also had to be hard and fast rules. The person who lived nearest the ditch or the reservoir must not be allowed to take all the water and leave none for his neighbors. It was not only a business of learning to control the rivers and of making their waters do the farmer's work. It also meant controlling men. But once these men had managed both kinds of controls, what a wonderful yield they had! The soil was already fertile, and the silt which came in the floods and ditches kept adding fertile soil.

THE GERM OF CIVILIZATION IN EGYPT AND MESOPOTAMIA

This learning to work together for the common good was the germ of the Egyptian and the Mesopotamian civilizations. The bare elements of civilization were already there: the need for a governing hand and for laws to see that the communities' work was done, and that the water was justly shared. You may object that there is a sort of chicken and egg paradox in this idea. How could the people have set up the rules until they'd managed to get a way to live, and how could they manage to get a way to live until they set up the rules? I think that small groups must have moved down along the rivers quite early, making use of naturally favorable spots, and that the rules grew out of such cases. It would have been like the hand-in-hand growth of automobiles and paved highways in the United States.

Once the rules and the know-how did get going, there must have been a constant interplay of the two. Thus, the more the crops yielded, the richer and better-fed the people would have been, and the more the population would have grown. The more the population grew, the more land would have needed to be flooded or irrigated, and the more complex the system of dikes, reservoirs, canals, and ditches would have needed to be. The more complex the system, the more neces-

sity for work on new projects and for the control of their use. . . . And so on. . . .

What I have just put down for you is a guess at the manner of growth of some of the formalized systems that go to make up a civilized society. My explanation has been pointed particularly at Egypt and Mesopotamia. I have already told you that the irrigation and water-control part of it does not apply to the development of the Aztecs or the Mayas, or perhaps anybody else. But I think that a fair part of the story of Egypt and Mesopotamia must be as I've just told you.

WHAT WE KNOW OF THE EGYPTIAN AND MESOPOTAMIAN PEOPLES

Who were the people who brought about civilization in southern Mesopotamia and Egypt? For Mesopotamia we do not know. No studies have yet been made. Few human skulls or bones have been preserved except from later times. But we know there were already Mediterranean types in Iran as early as the Sialk village. There were certainly Mediterraneans in Syria, soon after this. Most of the historical peoples of Mesopotamia belonged to one of the Mediterranean subgroups. For the range of our present interest (about 4500 to 3500 B.C.), we can hardly doubt that most of the peoples of southern Mesopotamia were also Mediterranean-like, even if we haven't yet found their skulls.

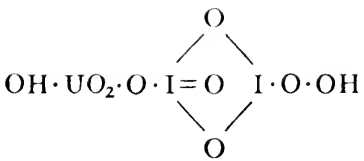
In Egypt, we have found skulls and whole skeletons for the range of about 4500 to 3500 B.C. Professor Coon believes these all belong to one or another of his sub-groups of the Mediterranean type. This is the type of skeleton that certainly continues to appear in Egyptian graves in historic times.

In both lands civilization seems thus to have been the product of Mediterranean peoples. This is the type of man whom we saw first in the Natufian caves of Palestine, and he is still the most usual physical type in the Near East. This business of "sub-groups" means that there was nothing "pure" about the Mediterraneans of those early days, just as there is nothing "pure" about them today. In the descriptions the

physical anthropologists give of the Mediterraneans, phrases such as "a slight Negroid tendency" keep cropping up. We've already met the phrase in the description of the Natufians (p. 84). Recently, Professor Krogman has published evidence for another physical type in the early Near East. This is the "proto-Nordic" type of skull (although neither light skin nor blond hair can possibly be assessed here). The "proto-Nordic" is present in Iran by 4000 B.C., early enough to have played its part in the general mixing of peoples.

For the beginnings of writing, for the names of the first kings and of the gods, you must go to the history books. The prehistorian's job has been finished when he gets you this far.

Summary



In the pages you have read so far, you have been brought through the earliest 99 per cent of the story of man's life on this planet. I have left only 1 per cent of the story for the historians to tell.

THE DRAMA OF THE PAST

Men first became men when evolution had carried them to a certain point. This was the point where the eye-hand-brain co-ordination was good enough so that tools could be made. When tools began to be made according to sets of lasting habits, we know that men had appeared. This happened over a half million years ago. The stage for the play may have been as broad as all of Europe, Africa, and Asia. At least, it seems unlikely that it was only one little region that saw the beginning of the drama.

Glaciers and different climates came and went, to change the settings. But the play went on in the same first act for a very long time. The men who were the players had simple roles. They had to feed themselves and protect themselves as best they could. They did this by hunting, catching, and finding food wherever they could, and by taking such protection as caves, fire, and their simple tools would give them. Before the first act was over, the last of the glaciers was melting away, and the players had added the New World to their

stage. If we want a special name for the first act, we could call it *The Food-Collectors.*

There were few climaxes in the first act, so far as we can see. But I think there may have been a few. The great cave art of France and Spain was probably an expression of one. Even the ideas of burying the dead and of the "Venus" figurines must also point to levels of human thought and activity that were over and above pure food-getting.

THE SECOND ACT

The second act began only about ten thousand years ago. A few of the players started it by themselves near the center of the Old World part of the stage, in the Near East. It began as a plant and animal act, but it soon became much more complicated.

But the players in this one part of the stage—in the Near East—were not the only ones to start off on the second act by themselves. Other players, possibly in several places in the Far East, and certainly in the New World, also started second acts that began as plant and animal acts, and then became complicated. We can call the whole second act *The Food-Producers.*

THE FIRST GREAT CLIMAX OF THE SECOND ACT

In the Near East, the first marked climax of the second act happened in Egypt and Mesopotamia. The play and the players reached that great climax that we call civilization. This seems to have come less than five thousand years after the second act began. But it could never have happened in the first act at all.

There is another curious thing about the first act. Many of the players didn't know it was over and they kept on with their roles long after the second act had begun. On the edges of the stage there are today some players who are still going on with the first act. The Eskimos, and the native Australians, and certain tribes in the Amazon jungle are some of these players. They seem perfectly happy to keep on with the first act.

The second act moved from climax to climax. The civilizations of Egypt and Mesopotamia were only the earliest of these climaxes. The players to the west caught the spirit of the thing, and climaxes followed there. So also did climaxes come in the Far Eastern and New World portions of the stage.

The greater part of the second act should really be described to you by a historian. Although it was a very short act when compared to the first one, the climaxes complicate it a great deal. As a prehistorian what I have told you about is only the first act, and the very beginning of the second.

THE THIRD ACT

Also, as a prehistorian, I probably should not even mention the third act—it began so recently. The third act is *The Industrialization.* It is the one in which we ourselves are players. If the pace of the second act was so much faster than that of the first, the pace of the third act is terrific. The danger is that it may wear down the players completely.

What sort of climaxes will the third act have, and are we already in one? You have seen by now that the acts of my play are given in terms of modes or basic patterns of human economy—ways in which people get food and protection and safety. The climaxes involve more than human economy. Economic and technological factors may be part of the climaxes, but they are not all. The climaxes may be revolutions in their own way, intellectual and social revolutions if you like.

If the third act follows the pattern of the second act, a climax should come soon after the act begins. We may be due for one soon if we are not already in it. Remember the terrific pace of this third act.

WHY BOTHER WITH PREHISTORY?

Why do we bother about prehistory? The main reason is that I think it may point to useful ideas for the present. We are in the troublesome beginnings of the third act of the play. The beginnings of the second act may have lessons for us. I know there are at least *some* lessons, even in the present

incomplete state of our knowledge. The players who began the second act, separately, in different parts of the world, were not all of one "pure race." Some apparently quite mixed Mediterraneans got off to the first start on the second act and brought it to its first two climaxes as well. "Pure race" had nothing to do with it. Mongoloids of different kinds achieved the first climaxes in China and in the New World.

By the time the written records of Egypt and Mesopotamia begin to turn up in number, the climaxes there are well under way. To understand the beginnings of the climaxes, and the real beginnings of the second act itself, we are thrown back on prehistoric archaeology. And this is as true for China, India, Middle America, and the Andes, as it is for the Near East.

There are lessons to be learned from all of man's past, not simply lessons of how to fight battles or win peace conferences, but of how human society evolves from one stage to another. Many of these lessons can only be looked for in the prehistoric past. So far, we have only made a beginning. There is much still to do, and many gaps in the story are yet to be filled. The prehistorian's job is to find the evidence, to fill the gaps, and to discover the lessons men have learned in the past. As I see it, this is not only an exciting but a very practical goal for which to strive.

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(In the thirty-five cent *Pelican* Series)

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What Happened in History. 1946 (1942).

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Dunn, L. C. and Dobzhansky, Th.
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Dating the Past. 1946.

FOSSIL MEN AND RACE

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