CHAPTER I

PRIMITIVE MAN, IN GEOLOGICAL TIME

I. THE SETTING OF THE STAGE

HISTORY, in its common and more popular sense, is the study of Man's dealings with other men, and the adjustment of working relations between human groups. But there is a larger sense, in which Human History merges in Natural History, and studies the dealings of Man with Nature; and it may be observed that it has been only by slow degrees that any human group has attained to such vision of the unity of mankind, or of civilization, as might constrain it to regard other human groups as more than a peculiarly intractable element in its own natural surroundings. An austere conception of War—that under certain circumstances Right has no court of appeal but Might—survives to remind us that Man has not yet wholly rid himself of this confusion between things and alien persons; and the most modern conception of international right so far accepts this fact of an alienation between the higher functions of human groups, however reasonable, as to take differences of language—of the medium, that is, for interchange and reconciliation of ideas,—as the best guide when and where, for the present, it is safer to keep human groups apart, and let them manage their affairs as far as possible each in their own way.

History, in the narrowest sense of all, as the interpretation of written evidence for arrangements made for right living within a human group, or between such groups, accepts implicitly the same criterion, and stops short where such evidence is not available. Linguistic palaeontology goes a little further back, in the study of the distribution of intercommunicant groups, and of such relations between them as loan-words, or structural likenesses in the speech, may suggest. But the spoken word does not fall to the ground, like the spent missile or the broken vessel, to be its own memorial of human achievement: it vanishes in air, so that the philologist deals not with originals, but at best with the reminiscence of an echo. To recover, therefore, what men were doing, or making, still more what they were thinking or desiring, before the dawn of history, the sole available method is that of the archaeologist,

merging as it does in that of the geologist: since these alone handle and interpret original creations of men's thought and will, and contemporary elements of the physical surroundings of those men. Where the tree falls, there shall it lie, and where the lost implement or shattered potsherd, or worn-out man fell, there have they lain, for all that any one cared then, or knows now. It is the carelessness (in the literal sense) of the river as to the gravel which it carried, and an equal carelessness of those men as to what happened to their leavings, that justify such a hypothesis of the credibility of these data, and make prehistoric times at least a penumbra of history.

Nor are we compelled any longer by prejudice or authority to regard those times as catastrophically short, any more than we must believe that Rome was built in a day. Man's prehistory merges in the pageant of the animal world, and of the planet-wide arena on which it has been in progress. Mountain and sea-basin too have their history. Their geographical distribution has varied in immemorial years; the faith that can remove mountains is the same in kind as that in which the historian brings together armies and frontiers, 'bone to his bone,' showing 'all the kingdoms of the world in a moment of time.' Such 'historical' geography and 'historical' ethnology are a proper prelude to the history of the ancient world; and much, even within that history, cannot fully be understood without them. Ancient peoples come upon the stage of history, not all together, but in a certain order, and by their proper entrances; each with a character and make-up congruous with the part they will play. The pageant—or is it the drama?—of history presupposes the formation of that character, and its equipment, in the green-room of the remoter past; and the sketch of the growth of initial 'cultures,' which follows now, is intended, like the *hypothesis* of a Greek play, to describe how men came by those qualities of build and temperament, those aims in life, and the means wherewith they were attempting to achieve them. For, to the student of prehistory, a 'culture' is nothing more or less than this—the total equipment with which each generation of men starts on its career, in whatever external conditions; to the archaeologist, no less, it is literally that equipment which the men of each generation were discarding, when they and it respectively ceased to be of significant use.

To see how the stage itself was set for this pageant, we must look back beyond the moment when the first characters enter it. For it has been Nature, rather than Man, hitherto, in almost every scene, that has determined where the action shall lie. Only at a

comparatively late phase of that action, does Man in some measure shift the scenery for himself.

And by Nature and Man are here meant neither supernatural force nor superhuman design, altering the arrangement of us and our surroundings like chessmen on a board. Nature, adopted in our speech from Latin *natura*, an unlucky mistranslation of Greek φύσις, stands as a common and inclusive term for all 'physical' events that happen; its Greek original being a verbal substantive signifying the fact of growth, the 'way things grow,' the mere processes of a world as apprehended by a mind. It has nothing to do, as its Latin antecedents might suggest, either with birth or any sort of coming-into-being; nor with any question 'what shall it be in the end thereof?' These are matters outside 'natural' history and human history alike. All history is the mere study of processes, of the 'way things grow' in the old Greek sense; for to this, modern thought has laboriously but unequivocally reverted, after long preoccupation with beginnings and endings, with cosmogony and eschatology of all kinds, in the centuries between Greek science and our own.

Within this Nature, so presented as a process or coherent sequence of occurrences, and so far as we know (by inference of me and you, each from experience of the rest of us corporeally participant in what goes on) a part of this Nature, stands Man, perceiving what goes on, learning what that is, conceiving it as alterable by inventive effort, and striving accordingly, with experience of what we call results, great or small, of that strife.

By Man, then, in what follows, is meant the collective total of such perceiving, learning, inventing, striving and experiencing 'selves,' myself and yours and theirs. By *races* of men, are meant groups and sequences of such selves linked by corporeal similarities propagated by natural process within each group: by *peoples* or *nations*, groups of selves exhibiting peculiarities of interpretation, invention, and effort sufficiently similar for their results to be cumulative and coherent; and by *cultures* or *civilizations* the accumulated and coherent results of such similarities in the activity of selves like you and me.

II. PRE-GLACIAL GEOGRAPHY

The stage of human history is a wide one from the first. Even disregarding those varieties of man in inner Asia or equatorial Africa which come latest and most incidentally into the story, the stage even of ancient history is the whole home of the 'white races,'

from the Atlantic coast of Europe to the Persian plateaux, from the Sahara to the Baltic; the north-western quadrant of the land-mass of the Old World.

To understand even the actual configuration of this area, some of which is very complicated—still more, to understand the changes which have occurred in the form and extent of the land-masses since they have been inhabited by man—we must review the whole series of events which have resulted in the formation of the present European peninsula, of the sea-basins which lie north and south of it, and also of its eastward continuation into Hither Asia, a similarly constituted highland with comparatively low-lying flat-lands to north and to south. For, if we trace this series of events far enough back, we reach, at all events, the more immediate reasons for those strongly marked contrasts in the composition and structure of its rocks, which have so profoundly affected the habitability and human prosperity of each component region, through the peculiar distribution of its plants and animals, and eventually of its breeds of Man.

Herodotus, attempting to summarize the contrast between the northern flatland and the Aegean cradle of the Greeks, describes Scythia as a land where there are no earthquakes and they grow corn for sale. That immensity of arable is itself the corollary of the flatland's long immunity from geological stress, and its accumulation of successive sediments, as sea-floor or dusty desert. The recurring earthquakes in Greece and Italy, through ancient and modern times, are sufficient evidence that the process of mountain building is not yet complete, and the rarity and discontinuity of cultivable soils illustrate the dislocation and wear-and-tear incidental to such a process. The catastrophic geology of Genesis and the Psalms voices the same experience of Nature's workings among a people of the Nearer East. Let us summarize, then, the main course of that period of planetary history, within which the history of Man is one of the more recent episodes.

The chalk which composes the 'white walls' of England, the massive limestones of the 'hills which stand about Jerusalem,' and the similar grey limestone which gives its wilder grace to the landscape of Greece, were formed by deposition on the floor of a great sea which covered all, and more than all, of the stage on which history has played its greatest drama hitherto. This sea, to which geologists give the picturesque name of 'Tethys,' belongs to the second of the three great schemes of oceans and continents, whose distribution can be distinguished in the long course of the earth's history. It had taken shape as the result of that period of violent

planetary convulsion which closed the 'primary' phase, and its obliteration, with the exception of the Mediterranean, Pontic-Caspian, and Caribbean basins, marks the change from the 'secondary' to the 'tertiary' in which human history is the most recent episode. Unlike the modern Atlantic and Pacific Oceans of the 'tertiary' phase, which (whatever their breadth) extend from the Arctic to the Antarctic circle, Tethys had its greatest diameter from east to west, and was comparatively narrow from north to south. Eastward it abutted on an ancient 'Angara' continent, of which the solid core lay in north-eastern Asia, with more recent extensions further south: westward it opened into a Pacific Ocean. Southward it was bounded by another ancient continent, 'Gondwana-land,' which had once extended in one vast oblong from west of South America to east of Australia, but was already foundering in places, so that growing gulfs in its southern margin were separating South America from South Africa, and South Africa from Australia; first symptoms of the South Atlantic and Indian Oceans that were to be. Similar collapse of its northern margin allowed the waters of Tethys to form a deep bay between Brazil and Morocco; and a long gulf between East Africa, on the one hand, and, on the other, a 'Lemurian' peninsula connecting South Africa through Madagascar with peninsular India. Both of these eventually broke clean through to meet the southern gulfs, and insulated South America and 'Lemuria' for ever. Round the north end of 'Lemuria,' there was in due course open sea between Tethys and the new Indian Ocean; and meanwhile the rise of the first mountain structure of south-eastern Asia connected the Australian fragment of old 'Gondwana' with the southward appendages of 'Angara-land,' so that a single continent extended from Arctic Siberia to New Zealand.

Northward, 'Tethys' had probably sea-passage, of uncertain and perhaps varying width, to an Arctic Ocean, between 'Angara-land' and Scandinavia, one of the oldest and most massive corner-stones of the whole fabric. West of this again, between Scandinavia and Britain, a narrower strait extended far north, and perhaps reached the same Arctic Ocean. Beyond this, the rugged Caledonian highlands of Britain stood outpost on the eastern margin of a 'Laurentian' continent. The south coast of 'Laurentia' probably crossed the north Atlantic along the modern liner-route, bulging then southward round the nascent Appalachian chain, and retreating northward near the Pacific coast of North America, till it approached (or even joined) eastern 'Angara-land' beyond the north Pacific. All north of this coastline seems to have been solid

land, with Greenland and Labrador at its core; but from time to time a wide lakeland covered the 'middle west' of North America.

Round these ancient shores, under the influence of solar heat, the general planetary circulation of winds and sea-currents played then as now. The resulting climates however were different, by reason of the shape of the sea-basins, and the altitude of the land-masses. In particular, the long trough of 'Tethys,' lying wholly in north temperate and subtropical latitudes, and landlocked towards the north from Mexico to Scandinavia, served—like the Mediterranean of to-day, but on a vaster scale—to mitigate and assimilate in an exceptional degree the climates of its foreshores, and still more those of its islands.

For though most of 'Tethys' was open water, a large region between north Africa and Scandinavia was broken by large islands, ruinous fragments of continents older still, like Scandinavia itself, and the Caledonian highlands, Snowdonia, and the Malvern and Mendip Hills, imbedded in the margin of 'Laurentia.' One such forms now the plateau core of Spain and Portugal; Sardinia, Corsica, Elba, and the rugged 'toe' of Italy are peaks of another, which we may call 'Tyrrhenia'; the Caucasus, the Bohemian highland, the Ardennes, are others, round whose skirts old shingle-banks and other shore deposits replace the clean limestones characteristic of the greater depths. So early in the history of the planet was the site of our European and Mediterranean region conspicuous for its abnormalities, and its juxtaposition of old and new.

The 'tertiary' period of crust-history, which is still in progress —for the term 'Quaternary,' signifying those recent phases when Man's presence can be demonstrated, is a needless concession to self-esteem—is characterized, like its 'primary' and 'secondary' predecessors, by vast readjustments of the crust, breaking up the Laurentian and Indo-African continents, and crumpling the cretaceous sea-bed of 'Tethys' into a series of elevated ridges. These folds result from two series of lateral stresses. The one, thrusting outwards from Angara-land to east, south and west, has caused a series of southward-bulging 'arcs' (like the rucks in a tablecloth when a heavy book is pushed across it) which define the present continent of Asia. Such arcs form the half-submerged island-chains, Aleutian, Kurile, Japanese, Lu-chu; the grand sweep through Burma, and the Malay peninsula with its insular prolongation to the Moluccas; the Himalayan range and the Hindu-Kush; the Iranian arc which traverses Baluchistan, south and west Persia, and Kurdistan; and further west, the Tauric and Dinaric systems which bound respectively Asia Minor on the south, and

the Balkan peninsula on the west, as far as the head of the Adriatic. Then follows the southward and westward-bulging Atlas range, and its prolongation into south-eastern Spain. Within these outer arcs rise other folds obviously concentric with them, most easily recognizable in north-eastern Asia, and behind the Himalaya, but perceptible also in Iran and northern Asia Minor. Between the folds, lie less crumpled areas, at higher or lower levels. The plateau of Tibet stands now at over 15,000 ft., the Tarim basin at over 3000 ft., and the core of Asia Minor at about 1000 ft. above the sea; the Behring, Japan, and China Seas, on the other hand, have bottom at 12,000–9000 ft. down; the Gulf of Oman at 6000 ft., and the southern lobe of the Caspian at about 2000 ft. Similarly, outside each greater arc, the margin of old Gondwanaland has been forced down and under, in the Bay of Bengal, in the Persian Gulf,—where the whole of Arabia has been tilted like an ill-laid paving slab—and in the eastern basin of the Mediterranean, where the north African foreland has been fractured stepwise, so that, while the Libyan shore is beset with quicksands, the greatest depths are off the Peloponnese and Rhodes.

The folds of the other series result not from southward but from northward thrusts, and overhang similarly sunken 'forelands,' this time on their northern side. Examples are the Altai range between Mongolia and western Siberia, the Caucasus, and the whole Alpine series,—Balkans, Carpathians, Alps, and Pyrenees. The course of these European folds is complicated by several factors, chief among which is the presence of those older lands already mentioned, both north of the Alpine folds, in Bohemia, the Black Forest and Vosges, and the Auvergne, and within the folded area, as in Spain, 'Tyrrhenia,' and Hungary; the stubbornness of which has not merely accentuated the transverse amplitude and overfolding of the ridges themselves, but has compressed them lengthways into the ƨ-shape presented now by the Carpathians and Balkans and caused the spiral distortion of the Pyrenees, Alps, Apennines, Atlas, and the Spanish-Balearic arc.

Finally, local relaxations of these strains brought about the collapse of whole regions of the crust, either parallel to the trend of the folded arcs, or transversely. Examples of longitudinal subsidence are the Black Sea and southern Caspian, carrying away both ends of the Caucasus and another great segment of mountain range between the Crimea and the Balkans: another is the Adriatic, nipped between the Dinaric arc and the Apennines. Transverse fracture and collapse are illustrated, within the mass of old Angaraland, by the long 'trough-fault' or 'rift valley' of the Red Sea,

which is prolonged between Crete and Rhodes right across the junction of the Dinaric and Tauric arcs, submerging the Aegean archipelago, and breaking down a shattered trough through Macedonia and Serbia to the Hungarian plain. A branch of this same rift forking west across the Dinaric folds depressed the Gulf of Corinth; another diverging eastward further south forms the Gulf of Akaba, the Dead Sea, and the trough of Coele-Syria, and may be traced far athwart Armenia. All these are only classical examples of the main types of crust movement to which the tertiary transformations of old 'Tethys' are due.

Crust-movements of such amplitude occupied a vast period of time. And all the while, rainfall and frost were denuding and dissecting the land surfaces; rivers were transporting the debris, and depositing it in lake basins and coastal seas; limestones and marls were accumulated in deeper waters; and at times along the lines of severest distortion and fracture, volcanic matter was discharged molten from beneath.

Principal stages in this tertiary derangement of what had been the cretaceous sea-bottom of Tethys may be summarized as follows Their importance for us, over and above their contribution to the actual distribution of land and water, of mountains and plains, is that in conjunction with the changes of climate resulting from such rearrangement of lands and seas, they have restricted or extended the regions which this or that type of vegetation could occupy, and the range of the animal forms which such vegetation fed, and so contributed in due course to localize and differentiate the main varieties of Man.

Foldings and upheavals of the old sea-floor began earliest, as they have since reached their greatest amplitude, eastward in the heart of Asia, where the Himalaya, Kuen-lun and Tienshan ranges, with the plateaux of Tibet and Mongolia uplifted between them, intervene between Angara-land and the 'Lemurian' sub-continent, of which only fragments soon remained, represented by Madagascar and peninsular India. Elsewhere too during this stage there was widespread exposure of the sea-floor; especially along that east-and-west axis of upheaval which eventually becomes the 'Highland Zone' of western Asia and southern Europe. And without being elevated, many of the remaining sea-basins dried up altogether, leaving vast deposits of salt and gypsum, like those which are forming now in the waste heart of Persia.

Renewed submergence followed, from the westward ocean, as far south as Kordofan, and as far east as Khorasan. But the Hindu-Kush and Iranian arc barred off for ever from Tethys its old south-

ward gulf; and a mere bulging of the African continent cut off the el-Juf depression in western Sahara from what we may now begin to call the Midland Sea; for it is the first phase of the Mediterranean of to-day. But the fauna and flora of the lands which were appearing now along the line of the Alpine folds were still essentially of such Indo-African type as had spread thither during the period of exposure. And such they long remained; for these lands were mainly insular, and as the Laurentian continent still limited the Atlantic northwards not far from the line joining Newfoundland to Cornwall, the oceanic currents which bathed their shores maintained a subtropical climate, warm, moist, and equable.

Further folding and upheaval of the western arcs extended and consolidated the mountain zone of the Nearer East as a long promontory connecting the high plateaux of Asia with these mid-European islands, and these again with the British promontory of Laurentia, along the very ancient line of folding represented by the Ardennes and the Mendips. The result was to bisect the Midland Sea into a southern or 'Mediterranean' and a northern or 'Sarmatian' basin, which henceforth have separate histories until almost modern times. A further result was that the sinuous Apennine-Atlas ridge encircled a 'West Mediterranean' basin, which though it communicated usually with both the Atlantic and the East Mediterranean, was occasionally cut off from both, and in late Miocene times was so much reduced by evaporation that none of its deposits of that age are now above water level. There was therefore ample communication between the new mid-Europe and the Moroccan lobe of the old Africa.

The East Mediterranean long retained much of the character of its predecessor the Midland Sea. The highland arcs along its north border included Crete and Cyprus; the Adriatic had not yet sunk outside these arcs, nor the Aegean within them. The mountains of Media and Elam were still very imperfectly developed, and the Arabian slab of Gondwana-land had not yet been fractured or even tilted under their stresses. The southern border of this sea lay therefore far to the southward across Africa, from a Moroccan Gulf, south of Atlas, to Abyssinia, Hadramaut, and the mountain ridge of Oman; with an easterly gulf extending far into Iran. It was separated however from all seas to the south-east, as its marine fauna show, by the ridge already mentioned connecting the Asiatic with the African continent. Occasionally disconnected from the Atlantic by elevation of the lands round the western basin, it underwent repeated phases of evaporation; and Indo-African

plants and animals still occupied its northern margins, leaving their remains for example in Samos and Attica.

The northern or Sarmatian Sea had a similar though separate history. It extended repeatedly far east, to lake Balkash and the foothills of Altai and Tienshan, and far north round the base of the Urals, an old ridge accentuated by the same tertiary stresses as the mountain-zone which bounded this basin on the south. Caucasus was sometimes insulated, but usually formed part of its southern margin, with only gulfs or lakes outflanking it southward. Westward communication with the Atlantic was interrupted earlier, oftener, and more completely than in the Mediterranean area, thanks to the growing intimacy between Mid-Europe and those ridges and stacks of old land which we have seen embedded in the Laurentian foreshore. Between the rising Alps and the Bohemian and mid-German highlands a long gulf remained, or in high-and-dry periods a drainage basin which we may already call 'Danubian', but the strong northward and outward bulge of the Carpathians eventually cut off these lowlands and the sunken Hungarian basin, to form inland lakes. An outlet through the Iron Gates to the Pontic basin cannot be demonstrated till later.

As the land-masses of Mid-Europe and also of North Africa and Western Asia increased in extent, the climate of the whole region became drier: the 'Sarmatian' sea shrank into a 'Pontic' series of lakes, connected only by flood channels, if at all, but including then a region so far to the south-west as the present north Aegean. Eventually one of the deep river valleys, which dissected the exposed Sarmatian sea-floor, cut back into the high ground in the re-entrant angle between the Carpathians and Balkans, opened a new outlet for the waters of the Hungarian and Bavarian basins already mentioned, and created the Danubian drainage system. In this period also a long trough, faulted across Mid-Europe, determined the upper basin of the eventual Rhine, though it was long before this lakeland was tapped, like the Danubian, by a river cutting back from the north through the old Taunus highland from Coblenz to Bingen.

The same period of uprise and continental climate affected the Mediterranean also. The rising escarpment of Media and Elam cut off its Iranian gulf, which became silted, first with river deposits, then, as its waters evaporated, with a crust of salt and gypsum. And as the folded escarpment rose, very steep and lofty, the foreland in front of it to the south-west was forced down and under, till the great quadrangular slab which we call Arabia was snapped off from Africa, and tilted bodily, downwards at the foot

of the new Zagros range, but with a free broken edge upreared to westward, and long troughs of dislocation and subsidence between itself and the African continent. The Red Sea trough opened for long into the Mediterranean, like the Nile trough to the west of it; but was closed at its south end by the main ridge from Asia to East Africa.

Further north, the same fractures crossed the Mediterranean floor, so that the free edge of the Arabian slab, or rather the detached strip of it which forms the Lebanon range, was thenceforward the eastward limit of that sea. The movement, violent as it appears in retrospect, was however gradual, and progressed from south to north so that the drainage basin formed on the tilted slab remained connected with the Mediterranean through North Syria, and the Jordan valley, lying in a smaller and earlier rift than that of the Red Sea and for long a tributary of a great river system of north-eastern Africa, still contains species in common with the Nile and the Euphrates. But, in time, Mesopotamia too became a separate basin like Iran, accumulating its own river sediments, and in dry periods its beds of salt and gypsum.

The gradual coherence of new land-masses where the Tethys basin had been, and the restricted communication between the remaining seas and the Atlantic, affected the climate of the whole region profoundly and adversely, and the fauna and flora were modified accordingly. Surviving representatives of the first occupants of tertiary Europe are now only recognizable in the Malay zoological region, and to some extent in tropical west Africa. For our present purpose we need only note that it is in these two regions alone that the great anthropoids, gorilla and orang-utan, survive; that it is certain that various monkeys, and probable that creatures ancestral to Man, were among these 'Malayan' occupants of mid-Europe; that the most 'simian' varieties of Man himself, the dwarfish, heavy-jawed, and long-armed Negritos, have a similarly discontinuous distribution surviving only in central Africa, in Malaya and beyond, and to some extent in southern India; and further, that the only creatures really intermediate between these and the anthropoids, are *Pithecanthropus* from a deposit considerably later in Java and the Broken Hill skull from Rhodesia. It is not without reason, therefore, that search has been made for human handiwork, even in eocene and miocene beds. But the 'eoliths' collected in Belgium from miocene deposits have not yet been generally accepted as such: those from gravels lining the sides of the present Nile valley are rather better attested, but must still be viewed with reserve.

less buried under later sediments. And westward, where the Alpine folds fade away towards the foreshores of the new Atlantic Ocean, and around the British remnants of Laurentia, now detached, there is a 'continental shelf' of varying width, and liable to moderate oscillations of level.

Three main regions are therefore to be distinguished here: (1) the Highland Zone itself; (2) its Northern Foreland, from the North Sea to the foothills of Tienshan and Altai, with its south-eastern half liable to be submerged in 'Sarmatian' or 'Ponto-Caspian' lakes; (3) its Southern Foreland, from Morocco to Mesopotamia, continuous and undisturbed at a fairly high average level in latitudes remote from the Highland Zone; more broken and depressed further north, till its fractured slabs sink beneath the waters of the Persian Gulf, the east Mediterranean, and the lake region of southern Tunis. As already described, it is by no geological accident that the west Mediterranean basin lies north, not south, of the Atlas folds; within the Highland Zone, that is, not adjacent to it like the eastern basin.

The later history of these three principal regions must be traced separately, if only because the altitude of the Highland Zone has long been sufficient to give it a markedly cooler and moister climate than either of the Flatlands; so that its greater rainfall has sculptured it very deeply, and wrought upon its surface abrupt and complicated scenery of mountain and valley; the varied rocks thus exposed contributing directly, and still more (by their detritus) indirectly, to accentuate local differences in the soils and eventual flora of each drainage area. As its limits lie obliquely from north-west to south-east between latitude 50° in central Europe and 25° in south Persia, the larger changes of climate have affected its main regions serially from one extremity to the other. Its uplands have been sufficiently continuous at most periods to permit the spread and withdrawal of consecutive types of vegetation; yet the deep engraving of its passes has permitted the transmission of comparatively lowland flora from one basin to another. And what is evident for vegetation applies equally to all animals which are susceptible to changes of climate and food supply.

This Highland Zone, then, may conveniently be regarded, in its main characters, as a single geographical region. Frequently and for long periods, it has been a promontory based on central Asia, or a long isthmus, connecting a south-eastern continent with a wide and old land in the north-west. At all times its upland conformation, moister climate, and denser forest vegetation have secluded it from the Flatlands on either flank. In so far as there

has been interaction, it has been the Highland which has had the initiative; because in periods of excessive moisture it has been from the foothills of the Highland that forest has spread over adjacent plains; whereas in periods of drought, the extension of steppe conditions into the foothills has been retarded by the residual rainfall around the heights. Only by glaciation, it would seem, could the Highland vegetation be devastated from within, and even so under the most favourable conditions for reoccupation from the less frost-bitten highlands continuous with it to the south-east. And as we shall see in due course, such glacial devastation did actually occur, between the close of the pleistocene period and the beginning of our own.

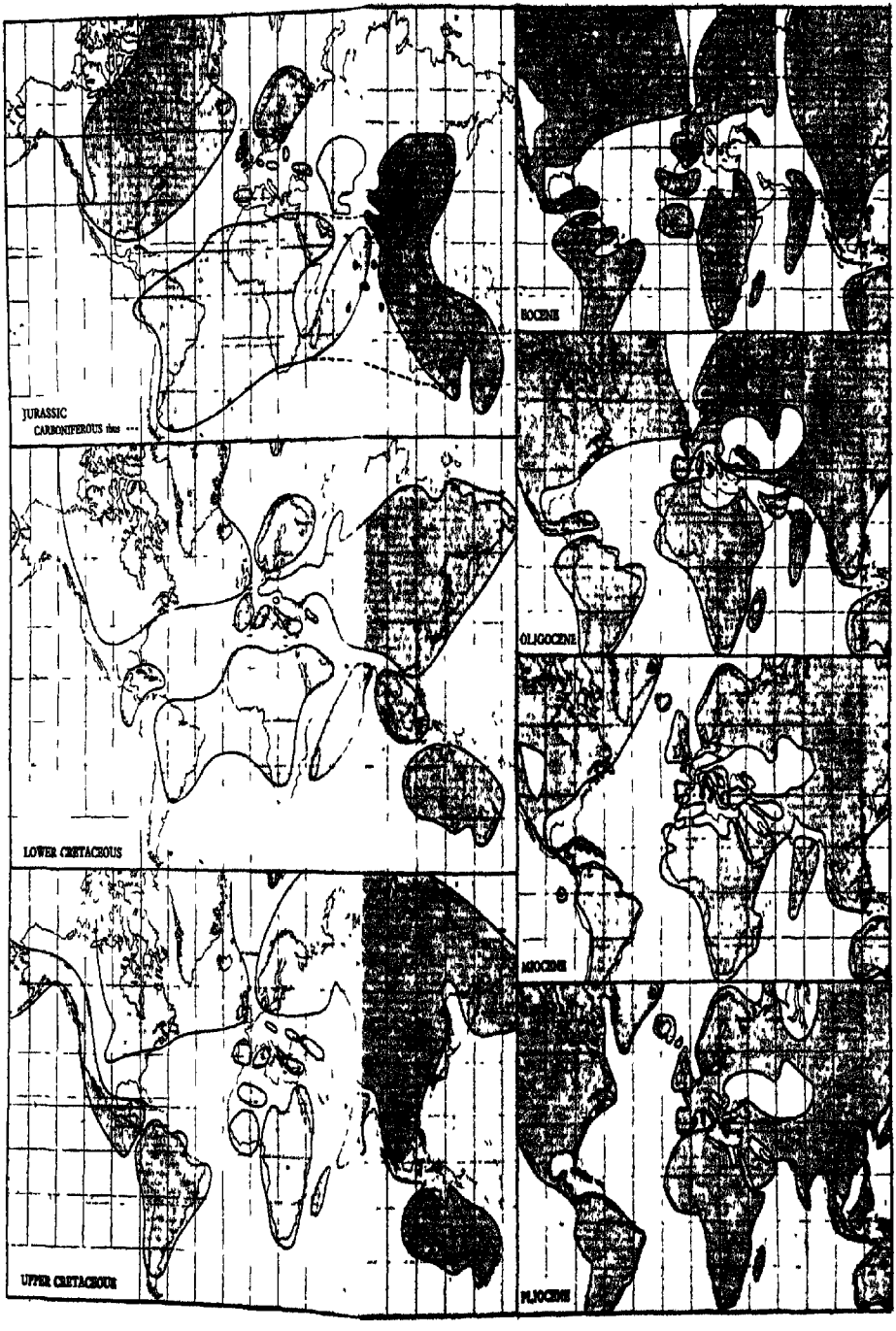
North of the Highland Zone lies the Northern Flatland. It is almost featureless from Altai and Tienshan to the Baltic and North Sea; except for the narrow transverse fold of the Ural range, which however fades away southward before reaching latitude 50°. But beyond those almost accidental depressions of its western margin, which form our 'narrow seas,' this Flatland is limited by two considerable mountain-masses, Scandinavian and British, of great age and stability; and beyond these to the north-west extended formerly a long arm of that old Laurentian continent which still encircled the north Atlantic, long after it had ceased to occupy it; and it was probably the subsidence of this Laurentian land (represented now by the 'Wyville-Thomson Ridge,' on the ocean floor from Britain to Iceland and Greenland) and the circumstance that the breach of continuity lay west and not east of the Scandinavian and British mountain ranges and involved general redistribution of currents between the Atlantic and Arctic Oceans, that determined the profound changes of climate to which allusion has already been made (p. 12).

Of secondary importance are the minor oscillations which determined whether the northern parts of the Flatland, east and west of the Ural divide, should be above or below water; and thereby assigned to the remainder, and to the whole north face of the Highland Zone, a climate either moist enough to fill the Sarmatian depression with lakes or a sea, or dry enough to exhaust this reservoir and reduce the whole northern Flatland to a cold desert as inhospitable as the hot desert on the south side, to which we turn now.

The southern or Eurafrican Flatland is almost as simple in its main features as the northern, and far more uniform in detail. As this region lies within the planetary trade-wind belt and is devoid of abruptly folded ridges which might precipitate rain—except the

Atlas to the north, which belongs to the folded Mountain Zone, and the highlands of Nigeria and Abyssinia,—it has always been less well watered than the regions north and south of it, which are moistened respectively by the westerlies and the equatorial rain-belt. As no cause seems to be known which could displace the equatorial belt of perennial rainfall and dense forest, to any considerable degree, the normal result of a pluvial or glacial crisis in the northern hemisphere has been to contract this trade-wind belt and its desert régime; and conversely. The only other important variable affecting the Southern Flatland has been the greater or less extent of submergence, in the Mediterranean and Mesopotamia, mitigating or accentuating the dryness of northerly winds. The mitigating influence of the Atlantic has of course been persistent, but has been neither great nor far-reaching, after the disappearance of that old gulf or lake-basin south of the Ahaggar plateau after the miocene period. It should be noted however that in periods of greater rainfall both this plateau and the Tassili and Tibesti uplands further north and east, have attracted sufficient moisture to feed large rivers, running some southwards to the Niger, others northwards into the Mediterranean, by the Wadi Irharhar and the Tunisian Schotts.

Direct land-contact between the southern Flatland and the Highland Zone is interrupted for the middle third of its length by the persistent water-surface of the east Mediterranean basin, last remnant of old 'Tethys'; and again far eastward, by the Gulf of Oman and the Mesopotamian Gulf, formerly much larger and wider than now. Between these two sea-barriers, outer ridges of the Tauric arc radiate south-westward and southward into north Syria and Cyprus, and this highland prominence is continuous southward with the upstanding edge of the great Arabian slab and detached fragments of it, as far as the peninsula of Sinai, forming a causeway along which migrations of momentous importance have occurred repeatedly. In the west Mediterranean the Atlas range, which must always be regarded as being geographically continuous, as well as structurally, with the ranges of Sicily and Italy, and also of south-eastern Spain, has the west Saharan Flatland along its steep southern face; but the continuity of the Eurafrican land-mass here is qualified by the depth, and usual submergence, of the west Mediterranean depressions. Only at either end of this western basin have there been intermittent land-bridges from Atlas; north-eastward through Sicily to the Apennine arc, concentric with the Alps and repeating on a small scale some features of the Syrian causeway; and through Spain, an


JURASSIC
CARBONIFEROUS thus ...
LOWER CRETACEOUS
UPPER CRETACEOUS
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MIOCENE
PLIOCENE

old highland comparable in size and structure with that of Asia Minor, to the broad coast-plains of the Atlantic seaboard north of the Pyrenees.

It results from these northward avenues of the southern Flatland, that there has been long intercourse between its inhabitants and those of the Highland Zone, at both ends of their long frontier; simple, marginal, and almost uniformly from north to south over the Syrian causeway; intermittent, complicated, oscillatory, and far-reaching, in the 'Eurafrican' west.

Such oscillations and, no less, the general replacement of 'African' by 'Arctic' forms of life throughout the whole north-west of the Old World, were caused, or at all events greatly accelerated, in the pleistocene period by the onset of a profound change of climate, very severely felt all over the new European sub-continent of Eurafrica, but by no means confined to this region; for the 'Ice Age' or 'Glacial Period' of the Old World has its counterpart in the New, and even very similar sub-periods. There have also been 'Ice Ages' in the southern hemisphere, but there is no proof that they either coincided or alternated with those in the northern, and they had no known influence on mankind. With the northern, and especially with the European Ice Age it was otherwise. That the replacement of African occupants, on the other hand, was as gradual as it was, was due to the fact that the Ice Age was not continuous, but had its 'interglacial' phases, which permitted African forms to return northward, and also allowed Asiatic species to move westward into Europe along the Highland Zone; and we shall see that this oscillation had profound significance for Man.

For if we compare the earliest known distributions of the other primates with the actual distribution either of their modern representatives, or of the principal races of man, it becomes clear that whereas the four-handed, and also many of the four-footed members of this 'order' of animals, retained mainly arboreal habits, and consequently were withdrawn southward and eastward into Africa and Malaya, as the subtropical forests were restricted by the general change of climate, one intermediate variety, two-handed and two-footed, and thereby more able to accommodate itself to the accidents of life in the open, became so far master of its fate as to outlast the forest, and enter on a career of pedestrian adventure and manual exploitation. We do not yet know at what stages in this acclimatization to the parkland and grassland sequel of the retreating forest this biped primate achieved its three primary controls over its surroundings—control over dead matter, in the

shape of boughs and stones, prolonging the reach, and enhancing the force, of its natural hand-stroke; control over the wayward energy of fire, the scourge and the terror of all other animals; and therefore not only comparative security against carnivorous animals, but control over the fund of sustenance and energy supplied by animal flesh. But we do know already, from an implement-strewn surface of old land underlying some of the earliest glacial debris of East Anglia, that some sort of tool-using, and animal hunting 'precursor' of ourselves ranged so far as this to the north-west before the climate was as yet quite glacial; and from similar indications in the Nile gravels, and on the surrounding desert, that subtropical drought restricted him as little as subarctic cold. How far these early traces, or remoter relics such as the Trinil brain-case from Java, or the Broken Hill skull and other bones from Rhodesia, may be connected with ancestors of any actual variety of Man we must consider in fuller view of the effects of the glacial crisis.

III. THE GLACIAL CRISIS

The causes of this Ice Age have been much discussed, and are still obscure: recent investigations lay greater stress on geographical factors, such as the distribution of land and water, the elevation or depression of the region, and other circumstances favourable to intense snow-fall at certain places and seasons, than to those astronomical explanations by nutation of the earth's axis, or precession of the seasons, which were formerly popular. It is at all events certain that the severest glaciations occurred in periods of submergence, and that the repeated relaxations of glacial austerity coincide with greater exposure of land-surfaces, and with a continental climate drier rather than warmer, since dry air, however cold, precipitates little snow; without copious snow there is nothing to feed a glacier, much less a continental ice-sheet; and under dry cold winds on the lowland the snout of the best-fed glacier shrinks rapidly by sheer evaporation. The same circumstance goes far to explain why the main ice cap of the Old World lay so far towards its western edge, exposed to wet westerly winds off the north Atlantic which as we have seen had only recently attained its modern extent. In the same way, the evidence for extensive glaciation on the mountain ranges of Caucasus, Armenia, and especially of Central Asia coheres with that for a wide water surface in the Ponto-Caspian lakeland, and for submergence of western Siberia.

Of such glacial maxima there have been recognized three in

most parts of France, and four on the north side of the Alps and Pyrenees, and in north-western Germany, followed by two oscillations during the final retreat over those districts which lay nearer to the principal snow-caps. The second, or 'Mindel,' spell in the Alpine series (corresponding with the later part of the first, further north) was the severest; submergence was deepest, temperature lowest, and the Scandinavian ice sheet widest, covering all but the south coast of Britain, and meeting the glaciers of the Alps (while the Rhone glacier, for instance, extended to Lyon) and those of the Carpathians and Urals so that their margins, like the glaciers of the Caucasus, bordered and replenished the Sarmatian sea. Outlying ice-caps, mainly of this phase, have been traced on the Pyrenees, Apennines, and Dinaric and Tauric chains; in Armenia, Zagros, and the north Persian ranges; and over the whole mountain knot of the Pamirs and Hindu-Kush, from its Sarmatian shore to an ocean-gulf which flooded the Punjab. Over these vast areas, therefore, all life was obliterated temporarily, and round their margins and interspaces was reduced to sub-arctic desolation.

There is strong reason for believing that the climatic oscillations of the whole north-west Quadrant synchronized and formed part of a single great planetary episode. Not only is the fourfold glaciation of north-western Europe repeated around the Alps and represented in a fourfold 'pluvial' sequence in the Nile Valley; but the glacial maxima represented by deposits in Nebraska, Kansas, Illinois and Wisconsin respectively, though not necessarily contemporary, seem to repeat the relative intensity of the Gunz, Mindel, Riss, and Würm maxima of the European Ice Age. It is therefore permissible to treat as standard the southern Flatland, where there would seem to have been least breach of continuity in plant and animal life, and interpret the more broken and complicated sequence in the western and the northern Flatlands, and also in the Highland Zone, by reference of their main episodes to the principal stages in the south.

Before dealing with the human occupants of these regions, and their redistribution during and after the Ice Age, it is convenient to note briefly the effects of any such crisis on the distribution of animals and plants, partly because these effects can be more fully illustrated, partly because it was in response to changes in his animal and vegetable surroundings that man's first human efforts seem to have been made.

It follows directly that in any displacement of climatic zones the corresponding flora and fauna were displaced accordingly, with due allowance for peculiarities of soil or configuration which either

permitted the maintenance of any elements of such plant and animal associations, or accelerated their retreat. In this connexion, it is important to observe the normal sequence of the types of vegetation; round the margin of perennial snowfield or ice sheet, frozen treeless 'tundra' with transitory herbage after the spring thaw; then dwarf birch and stunted pine, passing to coniferous forest, and through this into mixed deciduous forest; oak, beech, and nut-bearing trees such as chestnut and walnut predominating in succession. Forest however may be interrupted, on soils unfavourable to trees, by other types of vegetation; on loess, representing ancient deposits of wind-blown dust from adjacent desert, by precarious steppe or grass-land; on limestone, by the treeless turf of chalk-downs or wolds, owing to the withdrawal of surface water by underground channels; on ancient and impervious rocks, especially where these adjoin a wind-swept seaboard, by the dry bitter heather and gorse of moorland. Marshland too, and the gravels of river valleys, have their special 'plant associations,' forming open glades between the forests which clothe the higher ground. This normal sequence is of course retarded also locally by altitude, which increases rainfall, and reduces mean temperature. Parnassus for example has pines above its olives and bay-trees, and alpine flowers above its pines.

Further south, in the 'Mediterranean' type of climate, with wet winter and rainless summer, deciduous trees give place to evergreens, and tall forest to thickets or shrubs; and as drought and warmth increase, even shrubs stand further apart, in an undergrowth of tough resinous bushes, and spring-flowering bulbs, annuals, and grasses. Eventually grasses, halfa-rush, and spiny leathery camel-fodder predominate, until they too fade out before drifting sand and sun-tanned rock.

As climate becomes milder, the zones of vegetation move northwards, and uphill; but as trees take centuries to mature, the shift of vegetation may lag behind that of climate. On the other hand, adverse shift of climate rapidly destroys the less hardy plants, for they cannot retreat and only acclimatize slowly; more mobile forms of life, such as the larger animals and man, will either follow their habitual food-plants or maintain themselves in austerer climate by change of diet, by growing winter-fur, by taking shelter in caves, or, in man's case, by appropriating the hides and fur of other animals.

In an oscillating climate, therefore, such as that of this Ice Age, recurrent necessity offered exceptional stimulus to invention. It is man's inertia, rather than any initiative, his obstinate reluctance

to abandon a mode of life once adopted, his recourse to any compromise—'rather to endure the ills we have, than fly to others that we know not of'—and, in the result, his unique ability to conquer Nature by reasoned conformity with Nature's ways, that differentiates him from all animals but those, such as horse and dog, in which he has apprehended and elicited faculties remotely analogous to his own.

IV. THE PRINCIPAL HUMAN RACES

We are next concerned with the human stock, or stocks, which occupied these regions before and during the Ice Age. It has been noted already that the geological evidence points to prolonged geographical severance between the plateaux of Central Asia, with their vast folded mountains and their eastward and northward forelands (including the whole of ancient Angara-land), and all that westward prolongation of the folded zone, with its forelands, which we have been discussing. This geographical severance at the narrow and almost impassable neck of high land where the Hindu Kush intervenes between Afghanistan and the Pamirs has its human counterpart in the segregation of the ancestors of the yellow-skinned, straight-haired Mongoloid stock from all westerly varieties; for although anatomical evidence of its ancestry is not yet collected, enough is known, as we shall see (pp. 48, 59), about the slowness of the development of human types (for example, in peninsular Europe) to justify the belief that this ancient seclusion of central and eastern Asia lasted none too long for the differentiation of a kind of man so well-marked physically and even mentally.

In the same way, the correlation of the black-skinned, woolly-haired stocks with the Malayan fauna, which is suggested by their actual distribution, would seem to postulate a period of time comparable with that suggested above for the Mongoloids, within which the no less highly-specialized negroid physique could be developed from a precursor more widely distributed, especially north-westward, and presenting those features in which both the negroid and the white stocks differ from the yellow.

On the northern slopes of the Asiatic core the supply of moisture during the Ice Age brought the Altai glaciers down to 6000 ft. from sea-level, far lower, that is, than sufficed to close all avenues from central Asia to the lowlands of Siberia and Turkestan. On the Himalayan side, monsoon winds from an Indian Ocean which covered the Punjab and Bengal, furnished snow

more copious still, and moraines are found as low as 3000 ft. But though the comparatively narrow neck of high land between the valleys of Indus and Oxus was wholly beset by its ice-cap, it is not necessary to suppose that within the great plateaux of central Asia there was perennial snow, or a wholly uninhabitable region. Rather the vast accumulations of loess, the deposit of countless dust storms, suggest a 'continental' climate with wide variations, and the possibility of at least seasonal occupation by fleet grazing-animals, such as the horse. It is indeed to an intimate parasitic connexion with such an animal 'host,' in some such circumstances, that we have probably to ascribe the highly specialized type of man characteristic of this region now. The yellow skin-colour of Mongoloid man gives him protective camouflage in sandy desert and dry-grass steppe; the structure of his straight wiry hair, and its rarity except on the scalp, suggest adaptation to a continental climate; while its extreme length in both sexes serves to disguise the characteristic profile of the human head and neck, and approximate it to that of a quadruped seen from behind. From the rather prominent jaw combined with globular brain-case may be inferred long habituation to some food which minimized the pull of the jaw muscles on the side-walls of the skull; and the only food which fulfils this condition is milk and its products, on which nomad Tartars still live almost exclusively: the absence of face-hair, the short concave nose with spread nostrils, the peculiar infantile lips, the wide flat face and obliquely set eyes, are adaptations we should expect if for ages this milk was absorbed direct from the udder; and the short legs of some Mongoloids, and poor development of the calf-muscles in all, suggest that, like Tartar infants nowadays, the parasitic proto-Mongol sat tight upon his host between meals, and shared its wanderings.

On the steppes of glacial Europe, man hunted and ate the horse; if we suppose that in central Asia, during the same and perhaps in long earlier periods, he made friends with him and lived upon his friendship, we seem to have a clue to the paradox of the emergence of a highly specialized breed of man from a region which had been for a very long time so little suited, except on these terms, to sustain him at all. The absence of any widespread relics of such occupancy explains itself on the same hypothesis. Men who did not hunt or fight, had no more need of *coups-de-poing* than of supra-orbital ridges or a fighting-jaw, such as characterize the negroids or the 'Neanderthal' type in Glacial Europe. As they must travel with their animal hosts or perish, they had no choice but to desert their ailing relatives when they

fell behind; interments therefore are not to be expected, nor a group-psychology which sets much value on human life, or gives outlet to futile emotion. Almost inhuman in his normal apathy, the Mongol can display almost equine savagery when provoked by panic or ill-usage.

The development of so peculiar a type presupposes not only a large continuous region, of appropriate physique, but also complete seclusion. The high plateaux had supplied the former for a very long time, since loess-land is so inhospitable to trees or shrubs that wide oscillations of climate only affect the density of its vegetation without changing the quality. Seclusion has been assured by the great altitude of these plateaux, the ruggedness of the surrounding ranges, and the dense rain-forest of their monsoon-swept outward slopes. While therefore it has been exceptionally difficult for alien folk to intrude, it has been relatively easy for Mongol man to emerge, on one of two conditions—either that he parts company with his milk-giving host, and takes to hunting, as has happened in the north-east, or to agriculture, as in the south-east of Asia; or else, if he is to retain his nomad pastoral habit, he must wait till the climate has become so dry that there are clearings of grassland through the forest belt. Even then he can only proceed so far as he finds grassland still in front of him; and this has only happened at two points: to the west, through the great avenue between Altai and Tienshan, and to the north-east, down the valley of the Hoang-ho; and even here it only happened far on in post-glacial time.

It would be beyond the plan of this chapter, to discuss in detail the subsequent spread of Mongoloid Man through the Asiatic foreshores of his plateau-home; but his western and north-western expansion has so profoundly influenced the course of history in the modern world, that it is necessary to trace at least the outlines of them, so far as they can be recognized; and also to make quite clear their upward limits in time, which appear to be very narrow.

The older drainage of the southern and more elevated plateau, south of the Kuen-lun ranges, issued to the south-east, towards what is now the Malay Archipelago, but the Brahmaputra, cutting back through the eastern Himalayas, where they have been intersected by the great Malayan folds, has captured the southernmost of these drainage areas; the Hoang-ho similarly has captured the northernmost, and the Yangtze the majority of those which lay between, leaving only a small remainder to feed the Salwen and the Mekong. Consequently the main avenues of human movement have long been towards the eastern lowlands, and the vast alluvial

area deposited by Chinese rivers, thus reinforced, has received and acclimatized most of the human overflow from the interior.

From the northern and less elevated plateaux of Mongolia, however, the older drainage was mainly north-eastward; and here owing to the conformation of the eastern arcs, the eventual recipients have been on the one hand the Amur, on the other the northward-flowing Lena and Yenisei. Here the continental core of old 'Angara-land,' which is embraced between these two rivers and has been an immemorial reservoir of ancient forms of life, has also formed the 'asylum' into which have descended successive types of flora and fauna discarded from the plateau-margins in successive periods of austerity. The human population here, so far back as it can be traced, belongs to such discarded fauna, and is consequently Mongoloid, but of far less specialized types than those which have never left the plateaux. It is from this Angara reservoir, and the mountain arcs which prolong the north margin of the plateaux and encircle them eastwards, that the whole north-eastern promontory of Asia has received its human population; and similar types, essentially yellow-skinned and straight-haired, have passed on through it to Alaska and the New World.

Westward, the long-continued submergence of the Siberian lowland from the Yenisei to the Urals prevented all expansion until very recent times: and the present belts of tundra and forest vegetation are post-glacial. As far west as the longitude of Moscow they are of east Siberian origin, and it is only here that this Siberian forest meets mid-European forests advancing in the opposite direction; so that there is overlap of competing species, with a slight balance of advantage on the side of the eastern types. The importance of this is that with the forest, and its animals, man has spread also, from east, as from west; coalescing in the same longitude as the species of trees. And over and above the disputable evidence of hybrid physique around the line of coalescence, the Mongolian antecedents of all groups east of that line are betrayed by the fact that they have the reindeer domesticated, and do not hunt it, as Redskins do, and as did the men of the glacial west so long as wild reindeer survived there.

Quite distinct from all this, and representing a very much later phase of redistribution, is the exodus from the western gate of Mongolia. Here, about latitude 45°, the roughly parallel ranges of Altai and Tienshan stand (on an average) two hundred miles apart; the descent by this avenue onto the Kirghiz steppe is easy and manifold; the head waters of the Irtish have already cut back into the plateau, and an earlier affluent of the Sarmatian sea once

did the same, through the gap east of Lake Balkash. But this avenue only becomes passable under a special conjunction of circumstances; the Kirghiz steppe, which all lies below 1 500 ft., and much of it below 600 ft., must be neither submerged nor sand-swept; yet the avenue itself must be free of snow-cap and convergent glaciers; the forests on the outer slope and in the passes must be discontinuous enough to permit pastoral nomads to pass with their flocks; and thirdly, there must be sufficient inducement to leave the plateaux at all. Obviously there is not here any large margin between one set of obstacles and the other. Moreover, except when the Sarmatian sea-floor is exposed, the Kirghiz steppe itself leads only to the Urals, where progress is barred again by forest. It is intelligible therefore that over long periods this western avenue was not open for man; or if traversed at all, it served rather to admit western hunters from the steppes, or foresters along the foothills, than to let out the pastorals of the high plateaux; and the actual mixture of races all along this edge of the plateaux suggests that for a long while, and very widely, it was the west that was the aggressor, as indeed its cultures would lead us to suspect.

This summary outline is enough to show what seems to have been going on in the Asiatic continent which bounds the North-west Quadrant on the east. Its significance is that so far as can be seen, High Asia and its characteristic type of man remained utterly secluded from the North-west Quadrant until post-glacial time, and may be quite left out of its history.

We have next to deal with the African region which adjoins it on the south.

This African region, like the core of highland Asia, consists of ancient and stable land, on the northern half of which cretaceous and subsequent limestones have been laid down without serious disturbance over an area which has gradually diminished during tertiary times. In the north-west the multiple Atlas ranges belong to the Alpine folds, not to flatland Africa. Eastwards the continuity of this vast flatland has been broken, as we have seen, by the sunken troughs of the Nile and Red Sea, as the Arabian slab was tilted and detached. Similar depression and tilting in front of the Tauric and Dinaric arcs submerged successive long strips of the north margin to the Mediterranean sea-floor, but the greater part of the Libyan flatland stood fast, and the Cyrenaic plateau was even forced slightly upwards. Here there has been oscillation, even within historic times, for the harbour of ancient Leptis is high and dry now, whereas at Cyrene the sea has invaded the Greek theatre.

With no barriers due to configuration, the distribution of plants

southern India and beyond; for the ancient descriptions of 'Asiatic Ethiopians' in Mekran and in the extreme south of Arabia, around the margin (that is) of the sunken regions of Indo-Africa; and for the curious survival in the Mediterranean, and even in France and Britain, of types which combine certain characteristics of negro and of white man without any of the common marks of the half-breed.

If an anthropologist were required to indicate an extant type of man to illustrate such common characters, he would choose the widespread and loosely interconnected group which includes the aboriginal elements of the population of Ceylon and peninsular India, and a long series of remnants further west; through southern Persia, and parts of southern Arabia, merging in the darker-coloured and slighter built elements of the mixed 'Hamitic' population of north-eastern Africa, and in a superficially similar strain which is perceptible among outcasts and derelicts of the Mediterranean region and recurs as far afield as the British Isles, though here there are few precise observations yet.

Summing up the relations which have existed between the negro and the white races on the African continent we reach the following result. The climatic zone represented by the Saharan desert, though it has varied in width, has been maintained long enough to serve as an impermeable screen between the negro and the white stocks, except along a narrow coast belt fringing the Atlantic, and perhaps in the Nile Valley. Only the rare 'negroid' individuals in the palaeolithic caves of the Riviera suggest that during exceptional northward shift of the climatic belts, African man may have reached south-western Europe, temporarily and in small numbers: though others would explain these facts not by northward incursion of ready-made African 'negroids,' but by the former presence, along the whole length of the region immediately south of the Highland Zone, of 'dark white' types such as those already mentioned.

We have thus reconstituted, so far as it is known, the earlier distribution of the yellow-skinned, straight-haired, round-headed Mongoloids, in the secluded upland heart of Asia; of the black-skinned, woolly-haired, and long-headed negroes of Indo-African antecedents; and of the very indeterminate group of varieties which range from the Dravidian and other 'dark-white' stocks to the 'poor-whites' of the Near East and the Mediterranean. Having associated the peculiarities of their physical build with the prevalence of geographical conditions likely to give rise to them, we turn to the more complicated problems presented by the so-called

'white race' of the north-west Quadrant. Here the criteria of stature, hair-texture, skin colour, and headform seem at first sight to fail us, in the medley of tall and short peoples; slim or thickset; blondes, auburns, and brunettes; with all varieties of wavy or curly hair, and of florid or pasty complexions; with eyes brown, hazel, grey or various shades of blue; and with heads rivalling the average proportions alike of Mongol and Negro, and presenting besides very marked variation, in the height and contour of the brain-case, and in the modelling of face and jaw.

In the long controversy which has been provoked by these anomalies, the following have been the principal turning points. Blumenbach selected a Georgian type from the Caucasus to illustrate what he regarded as the embodiment of the qualities of the white race as a whole, and gave to the group a name the full appropriateness of which is appreciated only when it was realized what a medley of men is harboured in the Caucasus itself. Huxley insisted on the importance of the varieties of skin and hair, and distinguished within the whole group a blonde and a brunette section. Sergi recognized a closer structural relationship between the long-headed brunettes of the Mediterranean, and the long-headed blondes of the Baltic shores than between either of these and the broad-headed men of the Alpine zone; Bogdanof proved that the long-headed people of neolithic Russia and western Siberia belonged to the Baltic or 'Nordic' type, not to the Mediterranean type as Sergi had supposed, and were to be classed as blondes; Lapouge realized that the broad-headed strains, distributed through the mountain zone of central Europe, over an area tapering somewhat from east to west, and extending beyond this zone far into western Russia, into the Netherlands and Denmark, and into the south and east of Britain, originated not by local adaptation of various longer headed peoples to highland altitudes or other geographical conditions, but by the intrusion of a fresh 'Alpine' race, anatomically distinct in its general build as well as in its characteristic head form. Ripley associated this European 'Alpine' type with the great mass of even broader-headed varieties which occupy Asia Minor and the mountain zone eastward as far as the Pamirs. Deniker discriminated within this broad-headed complex, at least three brunette sub-types, the short thickset 'Cevenole' of central France and Savoy, the tall, well-proportioned 'Dinaric' variety of Dalmatia and Albania, and the very peculiar 'Armenoids' of Asia Minor, with their heads abruptly flattened behind; to which it was an easy corollary, that the blonde Alpines of north-eastern Europe had arisen by interbreeding with

'Nordic' blondes, and his 'Littoral' and 'Atlantic' types by similar interbreeding with 'Mediterranean' brunettes. Keith distinguished between those broad-headed folk who entered Britain across the North Sea, coming from north-eastern Germany, and those who entered across the Channel and originated west of the Rhine. More recently Peake has restated the evidence for separating altogether from any 'Alpine,' that is to say south-easterly immigration, those broad-headed peoples, of northern Mongoloid descent who came westwards with the spread of the Siberian forest, round the northern edge of the old Sarmatian lake-land. It only remains before summarizing present knowledge, as heretofore, in brief narrative form, to note tentative identification by de Quatrefages of the 'Cro-Magnon type' of late-palaeolithic man with recent Berber and Guanche strains; the separation established by Schliz of the old long-headed population of the Danube Valley both from the Nordic long-heads of the Baltic area, and from the Mediterranean folk of the south-west, and his affiliation of it to the late palaeolithic hunting-folk; and Fleure's recent confirmation of the long-suspected survival, in the moorlands of central Wales, of a breed anatomically indistinguishable from the widespread 'Aurignacian' type, of the same remote period. For the steps by which these main positions have been won, and consolidated into a realm of knowledge, reference must be made to current hand-books and the literature on which they are based.

The problem of the 'white races' is simplified in some degree by the severe glaciation of northern and central Europe, which is the central event of 'Pleistocene' and 'Quaternary' times; since the origin of the modern population of the glaciated regions is to be sought not in any general survival of earlier kinds of man within them, but in their reoccupation by plants, animals and men alike, from unglaciated areas. It is therefore only in these adjacent areas that questions of continuous descent can arise; and the actual distribution of the Mongoloid and Negroid varieties, and still more the reported occurrence of non-Mongoloid and pre-Mongoloid remains on a number of sites around the fringe of South America, offer a strong presumption that the human species had already spread very widely before the glacial crisis deranged its distribution. The close association of Negroid survivals with the discontinuous African fauna makes it certain, as we have seen, that man accompanied this fauna before its disruption, and probable that he was associated with it when it was still in full occupation of the North-Western Quadrant. Human remains do in fact occur with those of 'African' animals. in numerous European deposits

belonging to fairly early phases of the Ice Age; and the later and better attested varieties of 'eoliths,' belonging to phases not long antecedent, would be accepted by many people as evidence of a tool-using mode of life, if there were found contemporary traces of men who might have used them. In any case, the 'Chellean' types of implements (p. 46), which are contemporary with the earliest human remains, are clearly not by any means primitive, but presuppose much experience in the improvement of handy stones.

V. PALAEOLITHIC MAN IN THE SOUTH AND EAST

The sequence of early forms of man and of his handiwork was first established laboriously and by comparison of many sites in western Europe; and it is only recently that it has been realized that in the Nile valley we have a single continuous series of deposits, outside the glaciated area, and free from its destructive austerity, but near enough to it to be affected by marked alternations of moist and dry climate which can now be securely linked to the main periods of the Ice Age in Europe. With this clue to guide us, we can more easily seize the outstanding features of the European series, among their bewildering complexity of detail.

The deep narrow Nile-gulf which was formed, as we have seen, in the pliocene period, across an otherwise featureless plateau, became at the close of that period a series of long lakes fed partly from the upper Nile, but partly also by considerable lateral streams whose gravel-screes, washed from the plateau surface during a period of considerably greater rainfall than now, contain chipped flints of 'eolith' types; and such 'eoliths' are found on the plateau also. In a period of increasing subsidence and more abundant rain these lakes were gradually silted up by the deeply stratified *Melanopsis*-beds, which overlie the lateral screes as high as 180 ft. above the present flood level.

A rain maximum, which may be taken to represent the first glacial crisis in Europe, accelerated this silting, and made good hunting on the plateau for some kind of man, whose implements, of the 'Chellean' type familiar from interglacial gravels in western Europe, are found both there and in the *Melanopsis*-beds. Breasted ascribes to this phase, on account of their deeply weather-stained appearance, certain earlier rock-engravings of animals and even of boats, on the precipitous edges of the plateau. A first interpluvial drought (representing an interglacial mitigation of the climate of the north-west) terminated this silting; but the Nile stream, fed as now by tropical rainfall further south, continued to flow

over the dry lake-beds, and cut into them a deep cañon. It should be observed here that any northward shift of the desert régime should be accompanied by some extension of the tropical rain belt, and probably also of the area affected by the monsoon rains, since the Indian Ocean was by this time as extensive as now; and that these rains, then as now, would continue to feed the Nile stream, however arid the climate of its lower valley. In this period of drought and erosion, man seems to have maintained himself on the dry lake-bed, for Chellean implements are found among those remnants of its surface which forms the 'upper-terraces' on either side of the gorge.

Next, a second rain-age, corresponding with the second or 'Mindel' glaciation of Europe, flooded the gorge and set the lateral torrents to work again; and as a rise in the sea-level, like that which submerged much of the Atlantic seaboard, checked the main stream, a fresh series of gravels, analogous to those of the Somme and Thames, were deposited to a height of 90–100 ft. above present flood level. In the new screes, as well as on the old plateau surface outside the valley, implements are found, of the more advanced 'Acheulian' fabric, showing that man became again ubiquitous as the region became refertilized; and in the early part of the second interpluvial pause, he spread once more, as in France and Britain, on to the gravel beds, and scattered implements there to the margins of the new gorge which was being cut through them by the main river.

Once again in a third rain-maximum, corresponding with the third or 'Riss' glaciation, fresh gravels were laid down in this inner gorge, not so copious as the earlier series, but partly covering the recent lateral screes, and standing in some places as much as 30 ft. above modern flood level; since the actual valley has been eroded in them during a third interpluvial drought. And once again, man ranged over the surface of these gravels, and left his implements there, as well as on the plateau, where they lie on the desert surface mixed with all their predecessors.

Then follows the fourth rain-maximum, a comparatively mild one, corresponding with the fourth or 'Würm' glaciation. The gorge, of which the bed lies not less than 60 ft. below modern flood level, began to accumulate the first deposits of the present alluvium; which are shown by borings to contain human implements at nearly all depths. A first pause in the deposition of this alluvium, corresponding probably with the 'lower forest' period around the North Sea and the Channel, allowed man to descend through the fens to the river margin, and accounts for the presence,

at a depth of 50–60 ft. not merely of implements but of rough fragments of pottery, and animal bones of domesticable if not domesticated species.

As the rate of deposition since the thirteenth century B.C. averages 4·08 inches in a century, this depth would represent a period of 15,000–18,000 years, assuming that the rate remained uniform. But as there were certainly oscillations, and probably more rapid deposition at first, this estimate can only be approximate, and should perhaps be reduced. A second and a third access of alluvium, corresponding with the lower and upper peat-moss periods in Europe, and separated by ill-defined pauses, has raised the flood plain to its present level, at which it covers not only the edges of the last-eroded gorge, but part of the valley floor of the fourth rain-maximum between the 'lower terraces' already mentioned, which in some places now rise only about 20 ft. above the flood plain.

It will be seen from this sequence of events that there is every reason to believe that the Nile valley, and the margins of the desert plateau on either side of it, have been occupied by man continuously, though with varying density of population, at least from the beginning of the pleistocene period. Wherever any of its successive land surfaces remain in the valley itself, his implements have been found representing successive stages of skill analogous to those of western Europe; and on the surface of the plateau, which has been exposed continuously, implements of all periods are found indiscriminately, and constitute a more nearly uninterrupted and graduated series than anywhere else. The only serious gap, inevitably, is in the period immediately preceding the settlements on the present alluvial surface, because this alluvium is in process of deposition, and its encroachment, since the last interpluvial pause, on the surface of the lower terrace, has been burying the sites and tombs of immediately preceding phases.

As human occupation has been thus continuous and (in the more fertile intervals) widespread, and as there is nothing in the physique of the earliest known inhabitants of the alluvial surface to suggest that they have been of anything but the local variety of Eurafrican man, it seems probable that the arts of life represented in all these deposits are of indigenous, or at least quite local development. The last period of alluvial aggression has however been a very long one, and while the pauses in it may be presumed to represent phases of greater drought than now, the periods of more rapid deposition should be interpreted conversely as periods of moister climate, and consequently of less complete isolation from

the comparatively well-watered and fertile region of Palestine and Syria, where a similar though not yet so perfect sequence of implements is being found. At these phases therefore allowance must be made for the possibility of intrusions of Palestinian and Syrian man, anticipating that which is known to have occurred when the so-called 'Gizeh' type entered and dominated Egypt in early dynastic time. And the gradual dilution of this alien type on that occasion imposes caution in assuming, from the approximate purity of the predynastic inhabitants of the valley, that no such intrusion had ever occurred earlier.

The importance of such caution will be understood when we take stock of the predynastic culture, more fully to be described in Chap. VI, and compare it with the distribution of some of its chief elements elsewhere. First, the types of implements preserve almost without qualification the ancient technique of mere chipping and flaking. The grinding and polishing, characteristic of neolithic implements in Europe and along the Highland Zone, are employed only late and in a supplementary way. The flaking on the other hand exhibits a climax of unparalleled delicacy just before the first apparition of copper implements, in immediately predynastic time. This obstinate adherence to the flake-technique cannot be merely due to the abundant supply of suitable flint, in the rocks of the valley sides; for the upper valley exhibits a large variety of crystalline and volcanic rocks, and pebbles from these rocks are included in old gravels downstream. Considering the proximity of the large West Asiatic region of ancient and highly developed skill in grinding and polishing such pebbles, the persistence of the flake-technique in Egypt is therefore a strong presumption of technical isolation; and the rare occurrence of polished celts, of the fully formed neolithic types common in Western Asia, points rather to occasional trade than to local manufacture.

This isolation is confirmed by the original and unparalleled sequence of the pottery-forms, at all events down to the point at which appears the 'red-polished' ware which is common to Egypt, Syria, and Cyprus in immediately predynastic time. And the fact that so many of the Egyptian pot-forms seem to depend on those of vessels cut out, or rather *ground out*, from hard stone, makes all the more remarkable that abstention from the grinding-technique for implements, which has been noticed above. With the ovoid forms of many of these stone vases should be compared those of the perforated stone mace-heads, which likewise betray great technical skill in shaping and perforating refractory rocks.

It must however be remembered that it is just at this period that the Nile-valley series is least continuous and complete. Between the two main groups of the oldest remains (the refuse heaps and the burials beyond the advancing edge of the alluvium) there is a notable discrepancy. For from the moment when the population left their earlier settlements, descended into the fens, and began to domesticate cattle and practise agriculture, until the time when the fens were completely reclaimed, the dead were probably buried in the alluvium, or on its margin, and the earlier tombs are therefore covered more or less deeply by the later alluvium. That this was so, is shown by one or two of the oldest known burial-grounds, which not only lie on the very edge of the present alluvium but have been proved to extend beneath it. Yet even these show phases of culture which are highly developed and in some respects already decadent; and throughout the long 'predynastic' period for which burials are available, there is further decadence, especially in the finer stonework. Moreover, even in the earliest known graves, objects of lapis lazuli, which must be of foreign origin, are found occasionally, and also objects of copper. Probably therefore the greater part of the purely neolithic stage of Egyptian civilization still remains to be disinterred from tombs on the valley floor beneath the recent alluvium, and from sites on old flood plains within the alluvium itself.

Other arts of life, represented in the earliest burials, are the use of wattled huts, basketry, matting and vegetable thread; of leather and wood-work, and of bone, ivory, and shell for ornaments. Rouge and green malachite were used for paint. Agriculture is represented by flax, millet, barley, and wheat; of the latter grain, both the variety called emmer (*Triticum dicoccum*, which is found wild in limestone uplands in Syria, and Moab, and in western Persia) was grown, and also the cultivated wheat (*Triticum vulgare*). Goats, sheep, and short-horn cattle were kept, all apparently of African varieties, and attempts were still being made even in early dynastic times to domesticate ibex, gazelle, antelope, deer, and other desert ruminants. There were domestic geese and ducks from the fens, and from early paintings it would seem that the ostrich was familiar, if not kept in captivity like the gazelle. The dog was known, and in early dynastic times there were special breeds for sport and other purposes. The only beast of burden was an African variety of ass. There was organized irrigation, and probably an ox-drawn hoe, the prototype of the plough, as it is depicted in early-dynastic hieroglyphs. The river was navigated in large house-boats; there was fishing with hooks of delicate

flint work, and immemorial hunting on the desert and in the fens, for the prowess of chiefs was symbolized by a robe of leopard-skin.

That in fertile periods a similar neolithic culture spread widely westward over north Africa is clear from early Egyptian records, depicting the Libyans as pastoral folk, with herds of cattle, and asses; and from the survival, even now, of pot fabrics and basketry of predynastic technique and decoration.

Connecting links between the palaeolithic series of the Nile valley and of western Europe are not yet numerous; but enough has been found, especially in Algeria, and around Gafsa in south Tunis, to support the conclusions drawn from the climatic régime, and geological confirmations of its effects, and from the general character of the modern population, which includes Aurignacian remnants like those of Plynlimmon and Dordogne, and is otherwise strikingly uniform with the older elements in western Europe. Eoliths have been recorded around Gafsa and in Algerian quaternary beds; pre-Chellean and Chellean types from Gafsa; and the later deposits around Gafsa reveal a typical North African culture equivalent to the later palaeolithic of Europe. Rock-drawings from Algeria resemble those in the later French and Spanish caves. The area of this 'Capsian' culture (so called from the ancient name of Gafsa itself) seems to cover all northern Africa as far south as the oasis of Ghadames; it passes over westward into the later palaeolithic of Spain and southern France, and extends eastward into Syria. And the continuity, now abundantly evident for this later 'Capsian' culture, is indicated for earlier periods also by more scattered finds of implements of all fabrics common to the Nile and to west Europe, in the wide ill-explored area between Gibraltar and North Syria. We may safely assume, therefore, essential continuity of human occupancy of this region from before the first pluvial period, qualified only in its extent by the climatic oscillations, which cohere, as in Egypt, with those of the European Ice Age. We may conclude also that all interglacial ebb and flow of human types from the south towards the Atlantic seaboard was essentially the marginal expansion or contraction of this large Eurafrican region. Of the physical characters of Eurafrican man we learn more at present from the remains on European sites, than from the ill-explored areas further south; in Egypt, unfortunately, no such remains have been found before the time of the predynastic graves, which belong, as we have seen, to the latest alluvial phases.

Before turning however to the palaeolithic series in Europe, the question confronts us: what was happening east of the Nile valley,

and south of that section of the Folded Highland which affronts so abruptly the Levant and the Persian Gulf; namely on that large Arabian flatland which lies dislocated and tilted askew between great Africa and greater Asia, and along the Palestinian isthmus which connects its north angle with the Highland Zone? In its earlier stages, as we have seen, this flatland was itself a part of Africa: and the great fractures which determined the geography of the Red Sea and the Nile valley did not wholly break this connexion. Both at the northern and the southern end of the Red Sea, there had been frequently continuous land, and in dry periods this sea shrank through evaporation, as the Dead Sea has shrunk now. But the great slab of Arabia itself, tilting steadily under Iranian fold-stresses, became structurally secluded behind its abrupt western escarpment, and offered to its occupants an independent, if rather restricted career. Until the comparatively late disruption of the Hormuz Strait, the waters of the long Mesopotamian lake—an Adriatic of the Nearer East—restricted the land area of this peninsula, and mitigated its climate. The dimensions of its eastward-flowing drainage systems testify to former fertility; and we must probably conceive it as having long enjoyed a régime not unlike that of peninsular India, with Lebanon and Bashan playing the part of the Ghats.

That it was inhabited by man, with a palaeolithic culture resembling that of north Africa, is proved by implements from Sinai, Palestine and Phoenicia, the only districts which have been sufficiently explored; they range from 'Mousterian' types onwards; that is to say, from at least the third pluvial maximum. Of the sequence of physical types, we know nothing: provisionally it may be assumed, from the sequence of artefacts, that if 'Neanderthal' Man ranged over this region, as is suggested by the 'Mousterian' implements, he was extirpated, as in the west, by men of generically Eurafrican stock; for the actual inhabitants, though far from uniform, are in essentials akin to their western neighbours. It would be natural to expect some traces of the 'Grimaldi' negroids of the Riviera caves, and of the 'poor white' strains (already mentioned) which are common to the Atlantic seaboard, the Mediterranean, and peninsular India; and superficial observation supports this; but there has been no accurate survey as yet. All that can be stated at present is that a modern population, of generically Eurafrican stock, shows larger local modifications than the present uniform régime would lead us to expect; and it may be inferred from this, that with more copious vegetation the main drainage areas were formerly better secluded, and permitted such differ-

entiation. The most important of these local varieties is a comparatively broad-headed type in the extreme south of Arabia; but there is no evidence as to its antiquity here, and it may only result from intercourse in historic times with trading centres in north Syria, which as we have seen is an ancient dependency of the Highland Zone.

Such are the physical circumstances in which was fashioned one of the most notable of human stocks, the Semites of Arabia. Physically they are akin to their 'Hamitic' neighbours beyond the Red Sea and throughout Eurafrica, and strongly contrast with the men of the Highland Zone who have spread southward along its Syrian projection, or overflowed from time to time along the margins of the tilted slab. Culturally they have been habituated for long ages, like the Nile-plateau folk, to alternations of moisture and drought, which however never seem to have permitted any extensive growth of forest, except on the monsoon frontage to the south-east, nor, on the other hand, ever to have extinguished the grassland vegetation entirely. They are therefore typically grassland folk. They have domestic animals of their own, goat, camel, and ass, all native to Arabia; the sheep, and eventually the horse, have been acquired by them from outside; in both cases from the north. They have a remarkable type of linguistic structure, remotely shared only by the Hamitic group, which lies nearest to them otherwise; and a temperament and outlook more coherent and persistent than that of any other of the greater races. In the moister spells, such people multiply over the widening grassland more rapidly than any alien can habituate himself to pastoral life, or to precarious agriculture 'between the desert and the sown.' On the other hand, in spells of drought, Arabia erupts like a volcano, pouring floods of highly organized and mobile tribes across its land frontiers north-eastward, northward, and across the Jordan rift into coastland Syria and Palestine, perchance even into Africa. There has been percolation also, more insidious, but of wide effect, across the Red Sea, and especially its southern strait, where the transit into Africa is shorter, and timber for boats is more available. Such periodic exodus of Arabian tribes can be traced back inferentially to the third millennium at least; and it need not be supposed that the earliest recorded movement was by any means the first. The predynastic régime of Upper Egypt, for instance, seems to be partly due to such a movement crossing the Red Sea to Koseir, and reaching the Nile at Coptos by a trail which can be followed now. And it has already been hinted that the old population of the Nile valley may have been so supplemented even

earlier. The physical resemblance between Arabian and Eurafrican man is however close enough to make detection difficult, even if early evidence were found. See also pp. 182 *sqq.*, 193, 254.

Allusion has already been made to the prolongation southwards of spurs from the Highland Zone through North Syria, to form with the high western edge of Arabia a continuous highland causeway along the abrupt eastern margin of the Mediterranean, and then along the Gulf of Akaba to loftier and steeper escarpments fronting to the Red Sea. In structure most of this causeway is Arabian, but its exposure to wet winds from the west has given it a Mediterranean climate and a considerable rainfall; it is the 'good land beyond Jordan, flowing with milk and honey,' which tempts the nomads of Arabia in all ages, yet has never acclimatized them to itself. For the vegetation is partly old African, with tropical survivals still in the hot moist jungle of the Jordan gorge; partly Mediterranean, spreading along the coast plains and seaward foothills; but always mainly Asiatic, reinforced, ever since the junction of highland causeways above mentioned, from the Highland Zone at its north end. Of its earlier human occupants we have little but a few Mousterian implements; but in the first neolithic culture in Palestine the people are of the highland breed; they burn their dead; and their implements, pottery, and other equipment are in strong contrast both with everything Egyptian, and with the grassland influences which predominate later. Arabian man has occupied the 'good land' again and again; but the moist air seems to be fatal to him, and many of the peasantry of south Palestine are hardly to be distinguished from their neolithic predecessors.

But the Palestinian complication is not the only one which qualifies the homogeneity of Arabia. Very ancient interaction of the streams which furrow the south face of the Highland Zone has reduced its drainage systems in this region to three. The Cilician rivers, trending south-westward, have created a secluded alluvial foreshore on the Gulf of Alexandretta, peopled, in all ages, by tribes who have come down from the mountain region inland, or, more rarely, have landed from oversea. The Tigris, flowing south-eastward, is joined below Mosul by the two Zab rivers from the Median highlands in what was once another such foreshore, at the head of a Mesopotamian gulf; but it could only attain its eventual importance when that foreshore spread along the foothills of Zagros and merged with the similar deltas of the Diyāla, and eventually of the Kerkhah and Karun further south again. The latter even now has a separate mouth west of the Shatt el-Arab. Here again, as in

Palestine and Cilicia, vegetation and other occupants spread outwards from the valleys, and coastwise, as these delta foreshores encroached on the gulf.

But between the head-waters of the Tigris and those of the Cilician rivers, one southward stream, Euphrates, has cut back deeper and further than its neighbours and intercepted not only the original headwaters of the Tigris, between Malatia and Diarbekr, but far larger areas of old westward drainage as far as Erzerum and the slopes of Mount Ararat. Thus reinforced, Euphrates has excavated, in successive periods of elevation and copious rainfall, a wide and deep valley, well-watered and fertile throughout, athwart the sunk north-eastern slope of the Arabian slab, reaching the gulf formerly at el-Der, later at Ana, and (at the beginning of the modern phase) at Hit, where it descends a last terrace of solid coast-line almost to the present sea-level. To plants, animals, and people of the foothills and the Syrian parkland, this long fertile valley has always offered sustenance far out into the steppe and desert which it traverses.

By this emphatic frontier of the Euphrates channel, a roughly triangular area of southward sloping plateau—a miniature Arabia about as large as Ireland—is marked off from the Syrian and north Arabian plateau, and has never wholly been rejoined in history. This is Mesopotamia, the 'land between rivers,' for the Tigris delimits it no less clearly eastward from the foothill country below the Zagros ranges. Its structure is continuous with that of Syria; its climate is essentially the same, giving it (at present) desert and steppe régime in the south, and parkland nearer the hills. Its only river, the Khabur, rises in the highland, where it threatens to behead what is left of the Upper Tigris at Diarbekr; but till this happens its drainage-area is not sufficient to give it geographical importance; except that where it falls into the Euphrates close below el-Der, its delta forms a cultivable plain opening on the main valley. It will be seen at once that like Syria to the westward, Mesopotamia forms a region of transition, occupiable from the highland north of it, as far as its parkland extends at any given period; but offering wide steppe-pasture to any nomads of Arabia who may succeed in putting their flocks across the Euphrates.

These then were the geographical and economic factors down to the time when the present sea-level was established, and the Euphrates delta, propagated south-eastward from Hit, began to coalesce with those of the Tigris and the Diyāla round the Mesopotamian gulf-head, which then lay between Baghdad and Samarra.

We might compare an immature Lombardy with the Ticino preparing to join deltas with the Po.

What has followed, while the joint delta pushed its alluvial steppe and dense fen-margin seaward over the 550 miles which separate Hit from the modern coastline, is disputed, and must inevitably be obscure. As in Egypt, the population, human and other, of the alluvial flood-plain may be presumed to have been derived from the shores of the gulf as it silted up. But these shores, as we have seen, were themselves peopled from different sources; the deltas of the eastern torrents, from the Zagros foothills; the Tigris banks, with sparse but continuous offshoots of the occupants of its upper valley; the fertile bed of the Euphrates, with similar elements, longer segregated however from their highland and parkland ancestry. Arabia, on the other hand, established a longer and longer land frontier with the growing flood-plain, as happened to Libya while the Nile trough was being silted up; it overflowed this frontier with its own aborigines, wherever steppe conditions were established; and this Arabian element became more important as two conditions were fulfilled: first, as the northern part of the delta between the main rivers, and behind its advancing fen-frontage on the gulf-head, was assimilated in climate and vegetation to the steppe of southern Mesopotamia; second, as the main Euphrates stream took a more easterly course (as it eventually did), leaving a larger expanse of alluvium from Kerbela southward undefended by any considerable water-channel against Arabian immigrants; and this, too, nearly opposite the point where intercourse is easiest with the comparatively hospitable Nejd oases in the heart of the peninsula. On the other hand the establishment of an important bifurcation of the Euphrates threw a new channel across to the Tigris near Baghdad, and interposed a fresh obstacle to nomad intruders from Mesopotamia into what we may henceforward call by its historic name of Babylonia, or by the older names of Sumer and Akkad, its principal sub-regions, which differ slightly in accordance with their respective situations. That under these circumstances the southern or Sumerian half of the growing delta should be more exclusively populated from the foothills of Zagros, and that the northern or Akkadian half should show greater affinities with Arabian and Mesopotamian people, would seem to be inevitable, and is generally admitted. It is however unnecessary, in view of the geographical antecedents, to attribute all such northerly or westerly affinities to the earliest Semitic migration of which there is historic record. The same factors had been co-operating already for a long time.

VI. THE ICE AGE IN THE NEAR EAST

We have next to see how this region of the 'Two Rivers,' and the sections of the Highland Zone adjacent to it, northwards and eastwards, were affected by the glacial crisis. As evidence is at present scanty, conclusions must be more general, and a wider survey will best bring out the most essential points. As far as the head of the Adriatic, a single series of events has been reconstructed in greater detail for all western Europe, and to this we shall return later. East of the Adriatic, information is less copious, but the main course of events is fairly clear. The Carpathians, Dinaric ranges, and the Thracian mass of Rhodope were heavily snow-capped, and glaciated locally, and similar conditions prevailed on the coast-ranges of Asia Minor, both north and south. Caucasus and Armenia, rising to greater altitudes, were glaciated more severely; and Lebanon, flanked by the Mediterranean on the one side, and with the shores of the Mesopotamian Gulf not so far off as now, on the other, had an ice-cap exceptionally heavy for its latitude. But a large part of Asia Minor probably remained fertile and habitable throughout. What is far more characteristic of this region, as of the Aegean depression and the Hellenic promontory, is the severely pluvial denudation, accentuating the rugged highlands, and smothering the foothills in vast sheets of gravel and sand. In these the rivers cut fresh gorges during the drier intervals, which were also periods of emergence and consequently of longer and steeper gradients. The older drainage of Asia Minor had been longitudinal, towards the Aegean subsidence; sections of it are recognizable in the headwaters of the Euphrates, Halys and Iris; and the great westward avenue past Afium-karahissar probably represents its main outlet seaward. But later upthrusts of the west end of the Tauric arc closed this outlet, and converted the central plain into a lake-land, where some salt and gypsum were deposited as in Iran. But this had all happened in preglacial times, and the subsequent development of Asia Minor was different. For it was an immediate result of the subsidences already mentioned in the Black Sea region, to accelerate erosion in the torrents on the new north coast, and two of these, Sangarius and Halys, cutting back clean through the Paphlagonian range, drained the greater part of the central lake-land, and kept all its floor fresh and habitable except the small central basin of Lake Tatta. The present drought is recent, and in part remediable; even in the fifth century B.C. the district west of the Halys was 'richest in sheep and corn of all known lands' for Herodotus.

Further east, the Armenian ice-cap extended at times almost to the plateaux, east and west; but in milder intervals there was continuous highland country, full of small plateaux, glacier-fed gorges and lake-basins, from eastern Asia Minor to western Iran; probably even at the worst some sort of corridor by way of Sivas, Kharput, Diarbekr, and the Upper Tigris; while the triangular uplands of North Syria, between Adana, Damascus and Mosul, do not seem to have been glaciated at all.

Even now, though the water-surface of the Persian Gulf has been greatly restricted, the deflection of the 30-inch rain-line north-eastward beyond the Lebanon reveals an exceptionally moist and equable climate, and associates this margin of the Arabian slab with the highlands to the north, and with the Mediterranean seaboard, rather than with the rest of Arabia. It is no wonder that we have record of elephants in one of these Syrian valleys as late as the twelfth century B.C., or that the Macedonian veterans of Alexander the Great made here their most enduring settlements. But the well-marked ridge which is followed by the caravan route from Damascus to Palmyra makes the transition from parkland to steppe rather abrupt; and as long as the Lebanon retained any considerable ice-cap—and it was certainly glaciated severely—there was little or no communication between north Syria and the south. The spread of Highland Man into Palestine (p. 39) was probably quite post-glacial.

The course of events further east has been less easy to discover. Through the extension of an 'Indian Ocean' along its southern margin, and through the re-establishment of the Sarmatian sea on the north, the climate of Iran necessarily became moister and more equable than it had been while its salt and gypsum beds were accumulating. Allowing always for its more southerly latitude, and ampler size, we may compare its geographical position with that of Asia Minor now, between the Levant and the Black Sea; and as it retains many elements of its old Indo-African fauna, there cannot have been any such climatic break as occurred further west. At most the salt and gypsum-covered waste in its centre has been larger or smaller, and more or less occupied by lakes; and its present drought is consequent on the quite recent shrinkage of the Sarmatian sea. During the glacial crisis, its high marginal ranges were snow-laden, but not severely glaciated except in the north-west and north-east; the diluvial thaw was consequently not very destructive; and as the main basin was never tapped by inward-cutting torrents, like Asia Minor (though some intermont basins in Zagros have begun to be drained by streams flowing

south into the Persian Gulf) its local reserve of moisture was only slowly dissipated, at the cost however of greater ultimate salinity. East and west of it, however, the ice-caps of the Hindu Kush and Armenia, where the marginal ranges converge, isolated this region no less completely than did the seas to north and to south; for until the diluvial debris became continuous along the western frontage, the Persian Gulf extended, as we have seen, at least to the point where the Tigris emerges from the foothills of Kurdistan; while raised beaches of it have been traced far west of the Euphrates.

All these regions therefore were habitable during the greater part of the Ice Age, and there are Chellean implements on the surface in Iran and Arabia, and in gravels containing mammoth bones on the Caspian shore, to show that they were inhabited widely by Man.

The diluvial thaw, however, brought disaster here. As was natural so far south, it was very rapid, once the cold crisis was over; violent torrents seamed deeply the superficial sediments of the Arabian slab, and spread masses of debris, among which the older rivers followed uncertain courses, like the Oxus later on the Sarmatian sea-floor. Then, to diluvial rains succeeded drought and drifting sand, before any grassland, still less any forest régime could be established, sufficient to disintegrate this debris and accumulate soil. In the foothills of Zagros similar torrents, descending more abruptly, spent their diluvial energies within a narrower radius; so that the eventual course of the Tigris skirts and even erodes their fan-shaped screes of gravel. Rapidly at first, and afterwards more gradually, the northern part of the old Persian Gulf was filled up by these converging deltas; while further south finer sediment accumulated with proportionate speed. There was upward earth movement, too, after long subsidence, for at Hit the Euphrates has cut down to an older shore line, and its rapids are now wearing through the sill of this. The disastrous effect of this diluvial phase was to eliminate Mesopotamia as a focus of post-glacial culture, and to postpone effective occupation till an alluvial area had been created beyond it. The contrast, in every respect, with Egypt on the one hand, and with the Po valley on the other, is complete, and of historical importance.

VII. THE ICE AGE IN EUROPE

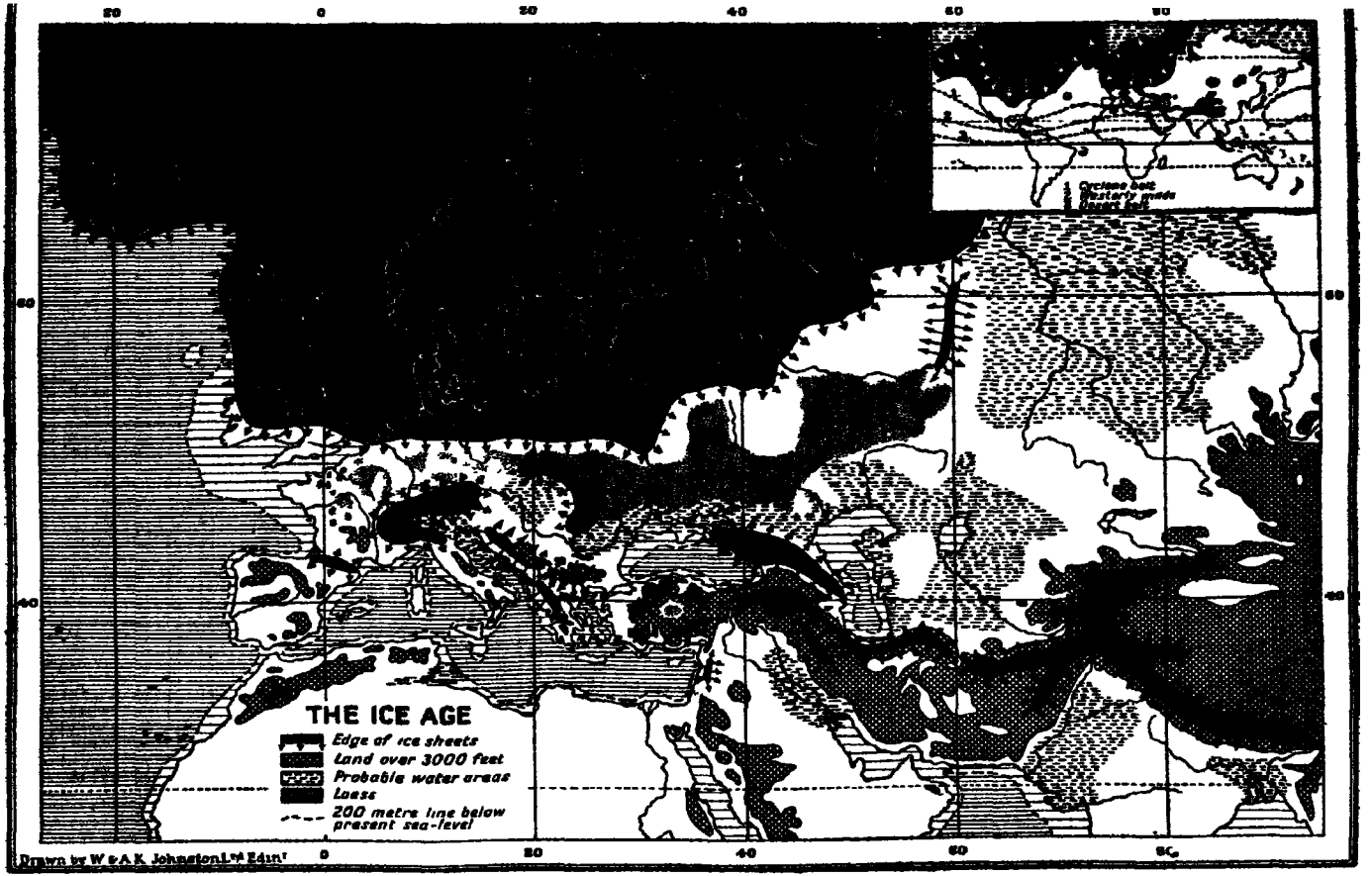
We return now to peninsular Europe, west of the Adriatic and the Black Sea. Here the fourfold Alpine maxima of the glacial period correspond, as we have seen, with the pluvial maxima of the Nile, and with repeated glaciation, fringed by diluvial rainfall, of the Balkan lands and western Asia. Earlier study of the river gravels and caves of the Atlantic seaboard, from Britain to Spain, and most of all in northern and central France, has recently been supplemented by research along the north side of the Pyrenees, and in many parts of Spain; among the caves of the central German and Bohemian highlands; in the widespread deposits of interglacial loess along the Rhine, in the Danube valley, along the margins of the north German lowland, and beyond the Carpathians, in Poland, and Ukraine. There is controversy still as to the perspective of the earlier human finds; the principal question being whether these are later than the third or 'Riss' glaciation, or go back into the milder interval between this and the second or 'Mindel' crisis, which was the severest and most extensive of all. In what follows, the longer intervals are adopted, in the belief that these accord more closely with the pluvial series on the Nile. In Europe, as in Egypt, 'eolithic' objects from preglacial deposits, have been claimed by some observers as human handiwork. In the light of the Egyptian material, which offers very similar forms, the probability that they are so is somewhat increased; but it is too early yet for an accepted verdict on most of them. In East Anglia however the presence of preglacial Man seems already secure (p. 18).

On the longer reckoning above adopted, it is in the 'first interglacial' deposits which preceded the boulder clays and moraines of the 'Mindel' glaciation, that the earliest human fragment has been found, a lower jaw chinless but recognizably human, from a gravel-bed near Heidelberg. No implements have been discovered in this deposit. A more perfect skull of a quite different and more modern-looking type comes, together with 'eoliths' and rolled bones of subtropical animals, from a very early river-side deposit at Piltdown, near Lewes, above, though not actually with, which lay gravel with implements ruder than those next to be mentioned, but generally similar in type. The date of the Piltdown deposit is still disputed, but it cannot be later than the earlier glacial gravels of the Thames, and may be considerably earlier.

Next in the 'second interglacial' debris of the thaw-swollen Somme, and other west European rivers, occur numerous imple-

definitely human chin. Well represented by examples from Britain, France, and as far east as Predmost in Moravia, this is a type in which not only 'there are no salient features which cannot be matched among the living races of the present day,' but it remains the predominant element among the modern inhabitants of secluded districts such as the Plynlimmon moorland in central Wales; it is common still in the west of Ireland, in the Dordogne, in Sardinia, about Guipuzcoa in Spain, and in parts of Tra-os-Montes, and has been noted in the oases south of Algeria and Tunis, and among Egyptians, Somalis, and elsewhere in north-eastern Africa. The numerous earlier allusions to 'Neanderthaloid' individuals in modern European populations probably refer to these Aurignacians, who look 'primitive' enough when contrasted with the majority of modern men, but are separated by almost as great an interval from the real Neanderthal type. From characteristics of these survivors it is possible to supplement the evidence of the early skeletons. The forehead is narrow, with marked hollows in the temples, above the heavy eyebrows; the orbits are long and narrow, the cheeks are high and broad. The nose is broad, the jaw prominent, and the chin rather weak; the stature is low, the carriage loose and ungainly, and the arms very long: the hair, eyes, and complexion are dark, and the whole body is very hairy. In some individuals, the resemblance to a common type of aboriginal Australian is well-marked; and the similarity between Aurignacian skulls in Europe and the prehistoric skulls from Lagoa Santa, in Brazil and other remote localities round the margins of South America, suggests that this type had once almost as wide a distribution as that of the older types of implements. It does not however seem to have been recorded, as those have been, from tropical or southern Africa; and its extreme hairiness and the wavy texture of individual hairs distinguishes it altogether both from the Negroid and from the Mongoloid breed.

With the occupation of western Europe, therefore, by Aurignacian Man begins a continuous series of events and material remains running on to modern times. There are moments in this series where continuity of civilization cannot be directly traced, but continuous descent is sure, and therewith continuity of tradition, which above all other human characters engages the attention of historians. Other breeds of man have intruded later, as we shall see, from the south-east along the Mountain Zone, and from the north-east as the Siberian forest extended towards the Volga basin; but in western Europe, Aurignacian man has never been wholly superseded, and still forms coherent groups such as the


THE ICE AGE
Edge of ice sheets
Land over 3000 feet
Probable water areas
Loess
200 metre line below present sea-level
Drawn by W & A K Johnston Ltd Edin'

MAP 2

Plynlimmon moorlanders, and the secluded settlements already mentioned in Spain, Portugal, and Algeria.

We are confronted however at this stage with a new turning point of advancement, the participation of more than one distinct breed of man in a single tradition of culture, and in exploitation of the same region. For, side by side with this Aurignacian type, at least two other varieties of man made their appearance in western Europe during the warmer and drier period now in question. One of these, represented by the 'Cro-Magnon' skeletons, is both less widely distributed, and of larger and more modern-looking build; and has left, like the Aurignacian, its descendants among the modern population of France, Spain and North Africa, and also (according to some observers) round the western Baltic. Its general similarity with the Aurignacian has led to the presumption that it spread likewise from the south-west.

The other type, distinctly negroid, is best represented by skeletons from the Grimaldi cave near Mentone. There can be little doubt of its African affinities, and there are two other indications of such African types in Europe: a pygmy breed of somewhat negroid appearance, from an ill-dated deposit at Schaffhausen, near Constance; and the well-marked steatopygy which characterizes negroid Bushmen and Hottentots of South Africa, and of some other negro breeds further north, and is represented in European drawings and sculptures of the female figure from Aurignacian times to the neolithic art of Malta. Steatopygy however is not an exclusively negroid character, and as it has been observed among the living in the same secluded districts along the western Pyrenees as the Aurignacian individuals already mentioned, all that results from the Grimaldi and Schaffhausen finds is that African varieties either had not yet entirely disappeared from southern Europe, or occasionally returned thither during periods of exceptional warmth. In general, however, it may be assumed that the present climatic zones were henceforward fairly well established; and that negro man, in the mass, did not range north of the Sahara desert, nor, except sporadically as now, along the Atlantic seaboard of North Africa.

The mode of life of 'Aurignacian' man differed, no less than his build, from that of the Mousterians whom he superseded; and there is no reason for an archaeologist to dispute the consensus of anthropologists that there is no trace of intercourse between the two types. If they met, it was as independent competitors for the means of subsistence; and the almost total disappearance of Mousterian man after the arrival of Aurignacian, suggests that it was

'war to the knife' between them. The Tasmanians had no better fortune, after the arrival of Europeans in their country; and while the Tasmanians were rather less brutish than Mousterians, European culture claims some advance over Aurignacian.

Aurignacian industry shows great superiority over Mousterian. Flint implements are fashioned no longer from cores, but from selected flakes, and are trimmed by careful flaking on both surfaces, not on one only as heretofore. There are special types for boring and graving, knives adapted for a drawing-cut, and chisels for push-scraping. And the uses of all these are illustrated by an increasing quantity of bone tools, some of them shaped to be hafted with wood. There are bone dress-pins, beads and pendants; and bone whistles suggest concerted signals for action at a distance. We may infer that men hunted now in a horde, and obeyed a leader; and that women took some pains with their attire.

More noteworthy still is the beginning of pictorial art; engravings on bone and eventually carvings in relief and in the round; larger drawings and paintings on the walls of caves. The subjects are the animals most hunted by man, as their remains in his settlements show, reproduced with a sympathy and accuracy of observation, and a vigour of draughtsmanship and modelling, which have rarely been equalled. Human figures are rarer; usually representing women, with rather prominent jaw, long-braided hair, and frequent steatopygy. Both men and women are usually shown very hairy, and are seldom clothed, except when they masquerade in complete hides of animals. A late and perplexing class of linear designs may represent huts or other constructions of timber.

This civilization extends in time from the beginning of the interglacial period already mentioned, until far on into the last recurrence of glacial or rather pluvial conditions, for the fourth or 'Würm' glaciation was a comparatively small affair. It passes through several phases, Aurignacian in the special sense; Magdalenian, a well-marked regional culture of the Atlantic coast plain, best illustrated in the Dordogne cave of La Madeleine, which belongs to the beginning of a late spell of austerity; and Azilian, first identified in a remarkable cave in the foothills of the Pyrenees, which shows Magdalenian art and industry much degenerated, and only retrieved in interest by its use of painted symbols to distinguish hoarded pebbles of uncertain use. It is the first advance from delineation of objects to the visual representation of ideas.

On some sites in France, between Aurignacian and Magdalenian

deposits, which in general form a continuous series of development, occur fresh and very characteristic types of implements best represented at Solutré, near Macon, where hearths and burials of their makers lie immediately over a vast deposit of horse-bones marking the climax of the dry steppe régime, and probably some kind of late-Aurignacian slaughter-ground. Their graceful 'laurel-leaf' and 'willow-leaf' blades, single edged knives, and one-shouldered points suitable for missiles, economize labour by skill in the choice and manipulation of material, and might be mistaken for a high quality of neolithic work. This use of missile weapons is itself a new invention, appropriate to the hunters of so swift an animal as the horse. Ivory beads, in country now devoid of elephants, suggest either wide range of movement, or some form of exchange. Sketches of animals, on pebble and bone, and hoards of yellow, red, and brown colouring matter, indicate artistic tastes; insignia and whistles imply organized action against swift and intelligent game. It has even been suggested that Solutrean horses were tame; but no horse-bits have been found, nor proof of any special breeding.

This Solutrean episode is noteworthy because here for the first time we have intrusion of one culture, abruptly and temporarily, into the region where another was in process of development. And as this intrusion occurs at the climax of a cycle of dry continental climate when conditions were most uniform and the obstacles of forest, river, and morass were minimized, it has been commonly interpreted as due to the intrusion of fresh people of the tall heavy-built long-headed stock represented by individuals from Brünn and Predmost in Moravia. Whence these people and their culture originated is not yet clear, as no human remains can be identified as theirs. Their flint technique, as has been already noted, suggests that they inherited Acheulian tradition, and it is possible that this tradition survived somewhere further east, while central Europe and parts of the west were passing through the Mousterian decadence and receiving Aurignacian culture from the south-west. So severely continental a climate in western Europe suggests austere drought further inland, and accords with the deep accumulations of loess over the greater part of the northern flatland, during late palaeolithic times. It was certainly a good country to leave. The lack of Solutrean remains south of the Pyrenees (except one isolated find at Altamira), and their comparatively frequent occurrence in lower Austria, Bohemia, Hungary and eastern Poland, almost preclude the alternative of a southern origin, which was formerly thought possible; and the striking resemblance of

certain Nile valley implements, which has been adduced in favour of this, must be taken in connexion with the similar workmanship of the earliest implements of neolithic Susa (which will be discussed on p. 85); and would be explicable by just such an exodus southward from the north-eastern steppe, as has brought nomad raiders more than once from Turkestan to Mesopotamia and the borders of Egypt within historic times. We shall see reason to suppose, later on, that the earliest neolithic people of the south Russian steppe, and probably also of the Danubian region, may be descendants of these Solutrean hunters, withdrawn as rapidly as they had come, when the Magdalenian climate reafforested the western plains, and restricted their hunting grounds. Another small group of Solutrean remains is notable as the first indication of man's presence in Scandinavia, the southern promontory of which must therefore have been released at least temporarily from the ice-grip; and there seems reason to believe that there may be Solutrean blood in the earliest men of that region whose remains have been preserved; though their date is very much later. Indeed, at any period when the forest zone was restricted to the foothills of the Carpathians and the central German highlands, there was no physical obstacle to the movements of hunting hordes between the shores of the Black Sea and Caspian, and those of the Baltic, or the margin of the Scandinavian ice-sheet.

VIII. THE CLOSE OF THE OLD STONE AGE

On the other hand, the steadily increasing moisture of the Magdalenian climate restricted the habitable areas; for the forest encroached on the hunting ground, and horde-hunting tribes do not easily adapt themselves to forest life. Arts and industries degenerated, especially when the antlers of the reindeer gave place to the less workable tines of the forest-ranging deer, as the material for harpoons and spearheads. The barbed harpoons themselves betray the growing importance of fishing, as the rivers increased in size. The abundance of miniature flints, at Tardenoise and many similar sites, suggests that wooden clubs or spears were armed with them, as was customary later in the Alpine lake-dwellings; and indicates that timber was more plentiful.

Then, for causes which are still obscure, the distinctive 'Capsian' type of culture, which we have already seen to have been best and earliest represented near Gafsa in Tunis and widely distributed from Tripoli to Morocco, spread northwards through Spain

and France (where its local varieties have been commonly known as 'Campignian') into Belgium: it shows a revived interest in flint work, and some of its forms recall a far older technique, which had certainly lasted long in north-west Sahara, and apparently also all across north Africa. This early African style has some resemblance to the Mousterian; and we may compare the relation already suggested between the Acheulian and Solutrean techniques. In any case the Campignian style was of southerly origin, and marks a last palaeolithic attempt to reoccupy the west of Europe, perhaps during some spell of drier weather. But this adventure failed, like the Solutrean irruption, and Campignian survivors merged in the disorganized remnants who harboured in cave shelters in Spain and the south of France, in open settlements on the downs along the Marne and Somme and in Belgium (where there is some reason to believe that at Flénu and Spiennes there was also immigration of rude tribes from the north-east), and in fishing and hunting stations along the Atlantic coast from Portugal to Scotland and Denmark.

Here immense refuse-heaps of shells, bones, and implements mark a last stage of collapse of the old hunting folk, like the modern Yahgans of Terra-del-fuego and the 'Strandloopers' of Cape Colony. These 'kitchen-middens' represent a long period, during which the interior of the continent was for the most part forest or swamp, and men hunted or gathered shellfish along the strand without wandering far, except occasionally seaward for fishing. Only three almost accidental acquisitions betray some overlap between the desperate state of these survivors of the Old Stone Age and the new world which was coming into being within the dreaded oak-forest. The dog, in this extremity, became man's messmate and fellow-hunter; occasional implements of neolithic fabric were acquired somehow, and refurbished by flaking as if in mere ignorance of their proper handling; and the clay linings of old leathern cups and bowls, accidentally burned at first and thereby hardened in the fire, gave a first notion of pot-making, to be imitated by degrees, but without improvement of form. All three discoveries suggest contact, at least occasional, with some other kind of man, to whom forest and swamp were familiar, and habitable. And both forest and swamp contained such men, as we have now to see.

Further north, the swamp, engulfing by degrees much that had been tundra and cold steppe, north of the central German highlands, had long since been assisted in its dreary advance by considerable subsidence of the whole of north-west Europe, so that

the period during which the Scandinavian ice-sheet shrank finally back, and exposed the south promontory of Sweden, was one in which the Baltic was an open gulf of an enlarged North Sea that washed the 'hundred-foot terrace' of its Scottish coast. The silt set free by the annual thaws varied slightly in quality, as the season changed, and the banded clays which it formed in this Baltic gulf form an uniquely continuous record, so minutely graduated that it has been possible to reckon within a few centuries the interval between then and now. From this vast natural chronometer it would appear that the coast of Scania was released about 12,000 years ago, and northern Sweden about 5000 years later. The release of the north German lowland was of course rather earlier, perhaps about 15,000 B.C. These inshore 'Yoldia' clays, so called from the chief marine shell which they contain, were later raised above water so far that the Danish archipelago became dry land, and the Baltic a lake wherein *Ancylus* and other freshwater shells superseded the marine *Yoldia*.

This rise greatly increased the swamp-covered area, and seems to have permitted the westward spread of a peculiar culture, best illustrated by the Maglemose settlement in eastern Denmark. Afloat or stranded, according to the season, a raft was constructed of pine trunks from the coniferous forest fringe which encroached on the swamp margin as it rose and dried; and from this precarious home men fished and hunted, of a distinct breed which seems to have moved westward from the cold steppe of northern Eurasia, and may have been of ultimately Mongoloid origin. At its greatest extension, this type may have made touch with the Magdalenian hunters of France, if it be admitted that one of its men has been found with them in the Chancelade cave. But it borrowed little from them, and only in its retreat, when the forest restricted its swampy hunting grounds, did it absorb something of the Magdalenian artistic spirit, perhaps from hunting parties out of the west who had wandered onto the north flank of the forest and remained there. With the Maglemose culture may be connected other swamp-land settlements round Lake Ladoga and in the coastlands east of the Baltic; and it seems likely that a Mongoloid element among the modern Finns, and probably the main strain of the Lapps, are descendants of these people.

What forced the retirement of the Maglemose culture was no less the aggression of the sea than that of the continental forest. The Baltic became open gulf again, rather more so than at present, for it is to this phase that the '50-foot terrace' of Scotland belongs. Marine shellfish entered, such as the periwinkle, which gives its

name to this *Litorina*-stage; and following them the shellfish-eating folk of the kitchen-middens wandered along the north German coast as far as Lettland, where the pine forest closes upon the shore. Here they persisted long; and the miserable Fenni described by Tacitus in the first century A.D. may well be a last remnant of them.

The swamp-culture of the north-east, as will be seen from this sequence of events, coexisted with a considerable part of the palaeolithic decadence. At least two minor advances of the snow-cap of the Alps can be traced during the long withdrawal of the Scandinavian ice-sheet, and the general mitigation of the climate of western Europe was to this extent delayed and interrupted. It would probably be safe to place the Maglemose culture at about the same period as the spread of Campignian influences northwards over France, and it is certainly older than the kitchen-middens, since these crowd closely on the modern coastline, which was submerged in the Maglemose period.

The part played in north-western Europe by the swamp-culture, and by those alien men from the north-east who are its representatives, was but slight and of short duration. The continental forest on the other hand, which had been spreading intermittently across Europe, northward and westward in the wake of the retreating ice-sheet, fringed by birch, hazel and pine, but itself composed mainly of oak and other deciduous trees, with the zone of beech, walnut, and chestnut following on an average some five hundred miles behind the pines, had reached and smothered all country where trees could grow, as far as the Atlantic seaboard, and southern Britain at least, by a date which may roughly be estimated not far short of 7000 B.C. The palaeolithic remnant had retreated before it till only the kitchen-midden folk survived on the very strand-line, and discontinuously even there. In the interior, a few exceptional moorlands, bleak downs, and the larger expanses of thirsty loess in the Rhine and Danube basins and in the north German plain, remained comparatively treeless oases where hunting folk might live. And if this had been all, the Old Stone Age might have passed out of human experience, a withered branch of the 'Tree of Life.'

That this was not so is due essentially to two factors. One is the sequence of climatic belts already noted, which provides that a northward shift of the westerly winds is accompanied by commensurate though not necessarily equal shift of the 'Mediterranean' and 'desert-zone' climates, and consequently by ampler accommodation for human activities of the Eurafrican type. The other

is the circumstance, not so generally appreciated, that the forest zone itself is nowhere untenanted by man, and that in favourable circumstances within that zone other solutions were found for the problem not merely of maintaining life but of acquiring reserves of vitality which permitted aggressive exploitation, and engendered a culture appropriate to the forest régime.