
THE ORIGIN OF MAN

CHAPTER I

AN HYPOTHESIS CONCERNING OUR ORIGIN

§ 1. MAN WAS DIFFERENTIATED FROM THE ANTHROPOIDS BY BECOMING A HUNTER

THAT the human species, as we now see it, with its several races, Mongolian, Negro, Mediterranean, represents a Family of the Primates is generally agreed; and there is evidence that the Family formerly comprised other species that have become extinct. Our nearest surviving zoological relatives are the gorilla and chimpanzee, the orang and (at a still further remove) the siamang and gibbons; and in spite of the fundamental anatomical resemblance between those apes and ourselves, our differences from them are so great that we cannot wonder at the incredulity with which the doctrine of our consanguinity was first received. Even A. R. Wallace thought that the descent of the *Hominidæ* could not be explained by natural causes; yet we cannot regard our existence as a sort of miracle.

It is the differences between Man and his nearest relatives that have to be accounted for; by derivation from a common stock only his resemblance to them can be understood: heredity explains his nature only in so far as he is an ape. The differences in detail are, indeed, innumerable; but taking the chief of them, and assuming that minor characters are

correlated with these, it is the argument of this essay that they may all be traced to the predominating influence of one variation operating amongst the original anthropoid conditions. I do not deny that other causes may have co-operated, but propose to consider how far that one will carry us toward an explanation of the facts, namely, all that we know of the characteristic physical and moral nature of Man. The determining variation was the adoption of a flesh diet and the habits of a hunter in order to obtain it. Without the adoption of a flesh diet there could have been no hunting; but a flesh diet obtained without hunting (supposing it possible) could have done nothing for the evolution of our Family. The adoption of the hunting life, therefore, was the essential change upon which everything else depended. We need not suppose that a whole ancestral species varied in this way; it may have been enough that a few of the common anthropoid stock should do so, provided that the variation was advantageous and was inherited.

Such a change from the frugivorous to the hunting life must have occurred at some time, since Man is everywhere more or less carnivorous, and agriculture is a comparatively recent discovery; the earliest known men were hunters; weapons are amongst the earliest known artefacts. And it is not improbable that the change began at the anthropoid level; because, although extant anthropoids are mainly frugivorous, yet they occasionally eat birds' eggs and young birds; the gorilla is said to eat small mammals, and in confinement they all readily take flesh-food; whilst other Primates (*Cebidæ*, macaques and baboons) eat insects, arachnids, worms, frogs, lizards, birds; and the crab-eating macaque (*M. cynomolgus*) collects a large portion of its food upon the Malay littoral. Why, then, should not one ape have betaken itself to hunting? Variety of diet, moreover, is not peculiar to the Primates: it is found in other Orders—marsupials, bats, rodents; whilst amongst carnivora the bears are nearly all omnivorous—the Arctic bear feeding chiefly on seals, porpoises and fish, the grizzly and the American black bear being extensively carnivorous but

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also consuming a good deal of vegetable food, the brown bear in its many varieties adapting its diet to the region in which it lives, and the Indian sloth bear (*Melursus*) confining itself to fruit, insects and honey.

We are not to suppose that our early ancestors became at once exclusively carnivorous: so sudden a change might have put too great a strain on their digestive economy. Even amongst hunting tribes a mixed diet is the rule; and everywhere the women collect and consume fruits and roots. But if at first omnivorous, our ancestor (I conjecture) soon preferred to attack mammals and advanced at a remote date to the killing of the biggest game found in his habitat. Everywhere savage hunters do so now: the little Semang kills the tiger, rhinoceros, elephant and buffalo; and thousands of years ago, in Europe, men slew the reindeer and mammoth, the horse and the bison, the hyæna and the cave-bear. It is true they had weapons and snares, whilst the first hunters had only hands and teeth. These however were formidable weapons of aggression; and their power must have greatly increased if a number of apes cooperated in the chase, forming a hunting-pack, as a sort of wolf-ape (*Lycopithecus*).

In a friendly communication it has been said that the great difficulty of the above hypothesis lies at the beginning of the adventure, in the first change of the feeding habit and the good success of it. I admit this. The gait of a gorilla or chimpanzee upon the ground (the orang is still more arboreal) is an awkward shuffle in which they help themselves along with their long arms; in open forest they move faster, swinging themselves forward by the lower boughs of trees. But neither plan is well adapted to hunting. We cannot, indeed, confidently assume that the anthropoids of the Upper Oligocene (if our differentiation began then) had just the same mode of progression on the ground as those now extant; but these supply the only clue to their habit; and if it was somewhat similar, they were not at such a disadvantage with their contemporaries as they would be if they had to contend with the herbivora and carnivora of our day. For, according to Prof.

Osborne, animals of the Lower Miocene, both herbivora and carnivora, were clumsy and slow-moving¹. The average pace of the Mammalia, herbivores, carnivores and ourselves, has greatly improved during the last two or three million years: a natural result of competition. Again, what we know of the anthropoid style of fighting suggests that it is a poor preparation for attacking prey. Mr Hornaday says that oranges in captivity are quarrelsome and, when fighting, try (1) to seize and bite an adversary's fingers, (2) attack his face and try to bite his lips². Similarly, the chimpanzee, fighting with a leopard, tries to seize its paws and bite the claws off. If our progenitor naturally fought in this way, he must have adopted some other plan in attacking (say) one of the primitive hornless deer—must have found the throat or spine; but this he may have learnt in capturing smaller prey. It is not improbable that the adventure of hunting for animal food was attempted more than once by Primates and failed, but once, in a happy conjuncture of circumstances, was successful.

The change from a fruit-eating to a hunting life, subserved the great utility of opening fresh supplies of food; and possibly a shortage in the normal supply of the old customary diet was the immediate occasion of the new habit. If our ape lived near the northern limits of the tropical forest and a fall of temperature there took place, such as to reduce (especially in winter) the yield of fruit and other nutritious vegetation on which he had mainly subsisted, famine may have driven him more frequently to attack other animals³; whilst more southerly anthropoids, not suffering from the change of climate, continued in their ancient manner of life. In Central Europe, during the Miocene period, the climate altered from subtropical to temperate with corresponding changes in fauna and flora; hence it formerly occurred to me that perhaps the decisive change in the life of our Family occurred there and then. Good judges, however, put the probable date of the great differentia-

¹ *The Age of Mammals*, p. 240.

² *Mind and Manners of Wild Animals*, p. 272.

³ Suggested to me by Mr G. A. Garfitt.

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Excerpt

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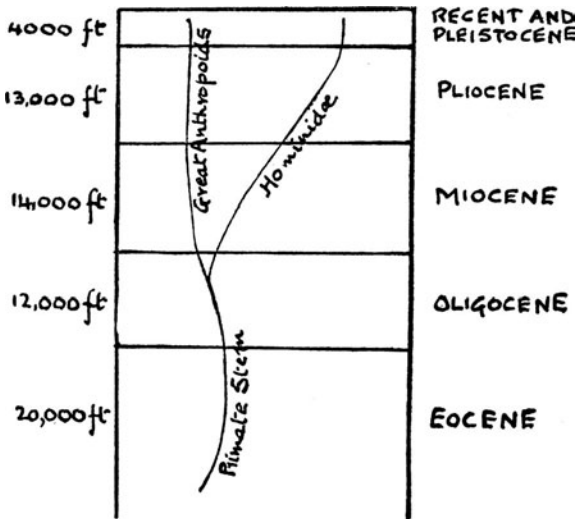
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tion much earlier, in the Oligocene¹. Indeed the occurrence of a chimpanzee (*Dryopithecus*) in a Miocene formation of Europe may be held to indicate that the anthropoid stock had already broken up. But in the Oligocene I cannot find that any extensive change of climate has been detected. As, however, not much is known of the condition of Central Asia at that time, it is possible that a considerable elevation of land took place there. The Himalayas, indeed, attained their present elevation only in the Pliocene; but the area had been rising for a very long time; and if it reached in the Oligocene the height of only five or six thousand feet, that may have sufficed to reduce in the area affected the supply of the customary anthropoid food so far as to make hunting a profitable or necessary alternative. [See Note at p. 98.]

Awaiting adequate evidence for such conjectures, there remains, in the last resort, "spontaneous" variation: that is

¹ Estimated duration of the Cainozoic Period, assuming that the thickness of the deposits is about 63,000 feet, and that deposits accumulate at the rate of 1 foot in 100 years. Drawn to the scale of 1 mm. to 100,000 years. The estimate is given and explained by Prof. Sollas in the *Quarterly Journal of the Geological Society* (1909), LXV. The "tree" is based on that given by Sir A. Keith in *The Antiquity of Man*, p. 509.

If we suppose the differentiation of the *Hominidæ* to have begun before the close of the Oligocene, about (say) 3,500,000 years are allowed for the evolution of the existing species of Man. All these reckonings are provisional.



SCALE: 1 mm. = 1000 ft.

to say, from causes which are at present beyond our knowledge, the fateful ape did in fact prefer animal food so decisively as to begin the hunting for it. That being granted, the rest of the history was inevitable. The new pursuit was of a nature to engross the animal's whole attention and coordinate all his faculties; and to maintain and reinforce it, his structure in body and mind may reasonably be supposed to have undergone rapid modification by natural selection; because those individuals that were in any organ or faculty adapted to the new life had an advantage which might be inherited and gradually increased¹.

¹ That Man was from the first a hunter has been suggested by several authors; but the consequences of the assumption have never (as far as I know) been worked out. A. R. Wallace, in *Darwinism*, p. 459, has the following passage: "The anthropoid apes, as well as most of the monkey tribe, are essentially arboreal in their structure, whereas the great distinctive character of man is his special adaptation to terrestrial locomotion. We can hardly suppose, therefore, that he originated in a forest region, where fruits to be obtained by climbing are the chief vegetable food. It is more probable that he began his existence on the open plains on high plateaux of the temperate or sub-tropical zone, where the seeds of indigenous cereals, numerous herbivora, rodents, game-birds, with fishes and molluscs in the lakes and rivers and seas supplied him with an abundance of varied food. In such a region he would develop skill as a hunter, trapper or fisherman, and later as a herdsman and cultivator—a succession of which we find indications in the palæolithic and neolithic races of Europe."

Prof. MacBride, in his popular introduction to *Zoology*, p. 84, also traces the specialisation of Man to the hunting life.

My friend Mr Thomas Whittaker has sent me the following extract from Comte's *Politique Positive*, I, pp. 604–5: "L'obligation de se nourrir d'une proie qu'il faut atteindre et vaincre, perfectionne à la fois tous les attributs animaux, tant intérieurs qu'extérieurs. Son influence envers les sens et les muscles est trop évidente pour exiger ici aucun examen. Par sa réaction habituelle sur les plus hautes fonctions du cerveau, elle développe également l'intelligence et l'activité, dont le premier essor lui est toujours dû, même chez notre espèce. A tous ces titres, cette nécessité modifie aussi les races qui en sont victimes, d'après les efforts moins énergiques, mais plus continus, qu'elle y provoque pour leur défense. Dans les deux cas, et surtout quant à l'attaque, elle détermine même les premières habitudes de co-opération active, au moins temporaire. Bornées à la simple famille chez les espèces insociables, ces ligues peuvent ailleurs embrasser quelquefois de nombreuses troupes. Ainsi commencent, parmi les animaux, des impulsions et des aptitudes qui ne pouvaient se développer que d'après la continuité propre à la race la plus sociable et la plus intelligente. Enfin, la condition carnassière doit aussi être appréciée dans sa réaction organique. Une plus forte excitation, une digestion moins laborieuse et plus rapide, une assimilation plus complète produisant un sang plus stimulant: telles sont ses propriétés physiologiques. Toutes concourent à développer

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§ 2. NATURAL SELECTION

Having thus appealed to the principle of natural selection as controlling the evolution of Man, I must explain what is to be understood by it. In the first place, it has nothing to do with the causes of variation. Much interesting and instructive work has been done by Biologists upon the structure of cytoplasm and the possible results of combination and recombination among its constituents, chromosomes and genes, and upon the conditions which increase or decrease variation in resulting generations. But that in some way variations occur is here assumed, and we are concerned only with what happens to them afterwards. Nor do the Mendelian laws of inheritance affect this problem; for in whatever way an animal is constituted by inheritance, having been born it must either live or die; and it is with this alternative that natural selection is concerned. If the animal is not sufficiently adapted to the conditions of life, interuterine, natal and environmental, climatic or biological, to live at least until the age of propagation, it must die without offspring: it is eliminated.

But it has been urged that the condition of such elimination is not well expressed by the phrase "survival of the fittest." Not only the fittest but many less fit can, and do, normally survive; for that they need only reach a certain standard of fitness. So much is plainly true. What shall be the standard of the least unfit, however, must depend upon the severity of the conditions of life, competition for food and mates, self-maintenance against enemies, rivals, disease and whatever else may be inimical to their welfare. After such a change of life as I have supposed on the part of our ancestral ape, the struggle probably was very severe, and the standard of fitness was very high.

Further, it has been urged that many characters that seem to us very important in the classification of animals, or in les fonctions supérieures, soit en augmentant l'énergie de leurs organes, soit en procurant plus de temps pour leur exercice."

For the views of Mr Ch. Morris in *Man and His Ancestors* (New York, 1900) see the Preface to this edition.

the determination of human races, cannot be shown to have any survival value, and therefore cannot be explained by natural selection; and this also seems to be true. What adaptation is involved in the distinction between long-heads and round-heads, upon which Anthropologists have done so much careful statistical work? What survival value can be assigned to the Negro's heel, or to the Kalmuck's slanting eye, or to the remarkable differences in the hair-section of our conspicuous races? But it is not with such characters that we have to do in explaining the adaptation of Man to the life of a hunter. Consider the erect gait, the modification of legs and feet, of arms and hands, social life, language, intelligence, the discipline of the pack. These are the things that I attribute to natural selection; and will anyone deny that they are adaptations to the hunting-life of Man and conditions of all his development?

§ 3. An hypothesis is an inference from the facts it is presented to explain. Hypothetical reasoning is almost universal in science and very common in every-day life; yet it is often regarded with a dull suspicion that can only result from misunderstanding. The form of such reasoning seems to be deductive; the hypothesis is stated, and the facts seem to be inferred from it; and our frequent resort to this mode of stating a case led Whewell to remark that "Man is prone to become a deductive thinker." But the truth is that the argument is inductive: the form of statement turns the psychology of it upside down; for the argument really is that the hypothesis may be inferred from the facts. What usually (perhaps always) happens, I believe, is that one or a few facts may suggest a common cause, or schema, as their explanation; then this explanation is constituted an hypothesis, and one goes on to show how, if true, it will lead to all the given facts and to as many others as possible within the sphere of investigation. But in saying that a few facts suggest a common cause, we mean that this cause may be inferred from them; and, extending it to more and more facts, we mean that it may be

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inferred from them also. The facts from which this hunting hypothesis were first inferred by me were the modification of our legs and arms from those of the simian type, the upright gait, intelligence, social organization (like that of wolves) and freedom of movement beyond the tropical forest¹. These changes are such as might be expected to follow if an anthropoid ape should have become a hunter. Then, assuming that one did so, certain other changes (as below) may be deduced; that is to say, from these further changes also the original hunting life may be inferred.

Since each of these inferences is from an effect to a possible cause, none of them is conclusive. When an effect is conceived in a general way, it often happens that it may be explained by more than one cause. But each inference raises some probability in favour of the cause, and as one instance is added to another the probability increases; and at the same time the probability that any other cause would explain all the facts equally well grows less and less. As we cannot attach any numerical values to the probabilities severally, we cannot exactly estimate their value altogether. Each reader must make his own estimate as best he can. For my part I think the total probability may fairly be put at more than a half.

It is a great advantage in verifying an hypothesis when other hypotheses to the same purpose have been advanced, and it is possible to refute them; for it may then appear that not only is the hypothesis in some degree probable, but that, as the alternatives go down one by one, it is probably the only valid one. But in the present case no such help is offered; for (as far as I know) there is no other hypothesis (limited to the natural order) that attempts to explain how the human race came to exist.

To refute the argument one may show (1) that the hypothesis cannot be inferred with any probability from this, that and the other stated fact; (2) that there are other differences between ourselves and the anthropoids (of equal weight with those I mention) from which the hypothesis cannot be in-

¹ *Metaphysics of Nature*, ch. xv, § 3.

ferred; (3) that some change other than the adoption of the hunting life, would, in the conditions of some anthropoid's life, explain all the facts equally well or better. I invite attention to these considerations.

If the problem of the causes of our differentiation is to be dealt with at all, there is no other method at our command except such an accumulation of probable inferences from the known facts of our present condition in comparison with that of the apes. The subject is not open to observation or experiment. It has been said that the true method is to compare all that we know of primitive Man, fossil Man and so forth. I have taken account of these things so far as they throw any light upon the inquiry; but consider how little we know of fossil Man and his congeners. Suppose we found in the later Miocene a complete skeleton of a Primate with human-like characters: it would be a new species; no one could be confident that it stood in the line of our ancestry. Suppose we should find a complete series of skeletons, one for every 200,000 years from the end of the Pliocene back to the Oligocene, and that experts should agree that they represented the "orthogenic" evolution of *Homo sapiens*: we should hardly be any nearer a solution of our present problem. For the remains would not show the conditions under which the differentiation began and was maintained, but would merely add to the data upon which an hypothesis might be constructed. In short nothing can be done in the matter except by thinking, by trying to think what is most probably indicated by all the facts within our knowledge. The leaders of scientific investigation do not shrink (I observe) from thinking courageously or even audaciously. But a good many people, relying too much on their own experience, adopt the sentiment of that mighty verse:

Thinking is but an idle waste of thought.