

# The Emergence of Man

The Kingdom of Man - 1907

by Ray Lankester

As to how and when man emerged from the terrestrial animal population so strictly controlled and moulded by natural selection is a matter upon which we gain further information year by year. There must be many here who remember, as I do, the astounding and almost sudden discovery some forty-five years ago of abundant and overwhelming evidence that man had existed in Western Europe as a contemporary of the mammoth and rhinoceros, the hyaena and the lion. The dispute over the facts submitted to the scientific world by Boucher de Perthes was violent and of short duration. The immense antiquity of man was established and accepted on all sides just before Mr. Darwin published his book on *The Origin of Species*.

The palaeolithic implements, though not improbably made 150,000 years ago, do not, any more than do the imperfect skulls occasionally found in association with them, indicate a condition of the human race much more monkey-like than is presented by existing savages. The implements themselves are manufactured with great skill and artistic feeling. Within the last ten years much rougher flint implements, of peculiar types, have been discovered in gravels which are 500 feet above the level of the existing rivers.

These Eoliths of the South of England indicate a race of men of less-developed skill than the makers of the Palaeoliths, and carry the antiquity of man at least as far back beyond the Palaeoliths as these are from the present day.

We have as yet found no remains giving the direct basis for conclusions on the subject; but judging by the analogy (not by any means a conclusive method) furnished by the history of other large animals now living alongside of man such as the horse, the rhinoceros, the tapir, the wolf, the hyaena, and the bear, it is not improbable that it was in the remote period known as the lower Miocene, remote even as compared with the gravels in which Eoliths occur that Natural Selection began to favour that increase in the size of the brain of a large and not very powerful semi-erect ape which eventuated, after some hundreds of thousands of years, in the breeding-out of a being with a relatively enormous brain-case, a skilful hand, and an inveterate tendency to throw stones, flourish sticks, protect himself in caves, and in general to defeat aggression and satisfy his natural appetites by the use of his wits rather than by strength alone.

Probably this creature had nearly the full size of brain and every other physical character of modern man, although he had not as yet stumbled upon the art of making fire by friction, nor converted his conventional grunts and groans, his screams, laughter, and interjections into a language corresponding to (and thenceforth developing) his power of thought.

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The Enlarged Brain. The leading feature in the development and separation of man from amongst other animals is undoubtedly the relatively enormous size of the brain in man, and the corresponding increase in its activities and capacity. It is a very striking fact that it was not in the ancestors of man alone that this increase in the size of the brain took place at this same period, viz. the Miocene. The great mammals such as the titanotherium, which represented the rhinoceros in early Tertiary times, had a brain which was in proportion to the bulk of the body, not more than one-eighth the volume of the brain of the modern rhinoceros. Other great mammals of the earlier Tertiary period were in the same case, and the ancestors of the horse, which are better known than those of any other modern animal, certainly had very much smaller brains in proportion to the size of their bodies than has their descendant.

We may well ask to what this sudden and marked increase in the size of the brain in several lines of the animal pedigree is due. It seems that the inborn hereditary nervous mechanism by which many simple and necessary movements of the body are controlled and brought into relation with the outer world acting upon the sense-organs, can be carried in a relatively small bulk of brain substance. Fish, lizards, and crocodiles with their small brains carry on a complex and effective life of relation with their surroundings.

It appears that the increased bulk of cerebral substance means increased 'educability', an increased power of storing up individual experience, which tends to take the place of the inherited mechanism with which it is often in antagonism. The power of profiting by individual experience, in fact educability, must in conditions of close competition be, when other conditions are equal, an immense advantage to its possessor. It seems that we have to imagine that the adaptation of mammalian form to the various conditions of life had in Miocene times reached a point when further alteration and elaboration of the various types, which we know then existed, could lead to no advantage.

Four casts of the brain-cavities of a series of large Ungulate Mammals in order to show the relatively small size of the cerebral hemispheres of the extinct creature from which A is taken.

A is that of Dinoceras, a huge extinct Eocene mammal which was as large as a Rhinoceros; B is that of Hippopotamus; C of Horse; and D of Rhinoceros.

The variations presented for selection in the struggle for existence presented no advantage - the "fittest" had practically been reached, and was destined to survive with little change.. Assuming such a relative lull in the development of mere mechanical form, it is obvious that the opportunity for those individuals with the most 'educable' brains to defeat their competitors would arise. No marked improvement in the instrument being possible, the reward, the triumph, the survival would fall to those who possessed most skill in the use of the instrument. And in successive generations the bigger and more educable brains would survive and mate, and thus bigger and bigger brains be produced.

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It would not be difficult (though not, perhaps, profitable) to imagine the conditions which have favoured the continuation of this process to a far greater length in the Simian line of the pedigree than in other mammalian groups. The result is that the creature called Man emerged with an educable brain of some five or six times the bulk (in proportion to his size and weight) of that of any other surviving Simian. Great as is this difference, it is one of the most curious facts in the history of man's development that the bulk of his brain does not appear to have continued to increase in any very marked degree since early Palaeolithic times.

The cranial capacity of many savage races and of some of the most ancient human skulls is only a little less than that of the average man of highly civilised race. The value of the mental activities in which primitive man differs from the highest apes may be measured in some degree by the difference in the size of the man's and the ape's brain; but the difference in the size of the brain of Isaac Newton and an Australian black-fellow is not in the remotest degree proportionate to the difference in their mental qualities. Man, it would seem, at a very remote period attained the extraordinary development of brain which marked him off from the rest of the animal world, but has ever since been developing the powers and qualities of this organ without increasing its size, or materially altering in other bodily features.