

Marsupials; and from these to the early progenitors of the *placental mammals*, we may thus ascend to the *Lemuridae*; and the interval is not very wide from these to the *Simiidae*. The *Simiidae* then branched off into two stems, those of the *New World* and of the *Old World*; and from the latter, at a remote period, MAN, the wonder and glory of the universe, proceeded.

Man thus has a pedigree of prodigious length: the world, it has often been remarked, appears as if it had long been preparing for the advent of man; and this is strictly true, for he owes his birth to a long line of progenitors. If any single link in this chain had never existed, man would not have been exactly what he now is.

In regard to bodily size or strength, we do not know whether man is descended from some small species like the Chimpanzee, or from one as powerful as the Gorilla. An animal possessing great size, strength and ferocity, and which, like the gorilla, could defend itself from all enemies, would not perhaps have become social; and this would most effectively have checked the acquirement of the higher mental qualities, such as sympathy and the love of his fellows. Hence it must have been an immense advantage to man to have sprung from some comparatively weak creature.

The early progenitors of man must have once been covered with hair, both sexes having beards; their ears were probably pointed, and capable of movement; and their bodies even provided with a tail, having the proper muscles. The foot was then prehensile, judging from the condition of the great toe in the human fetus; and our progenitors, no doubt, were arboreal in their habits, and frequented some warm, forest-clad land. The males had great canine teeth, which served them as formidable weapons.

It has long been known, that, in the vertebrate kingdom, one sex bears rudiments of various necessary parts, appertaining to the reproductive system, which properly belong to the opposite sex; and it is now ascertained, that, at a very early embryonic period, both sexes possess true male and female glands. Hence some remote progenitor of the whole vertebrate kingdom appears to have been hermaphroditic or androgynous. Man alone, of all the animals, has become a biped: man could not have attained his present dominant position in the world without the use of his hands, which are so admirably adapted to act in obedience to his will. But the hands and arms could hardly have become perfect enough to manufacture weapons, or to hurl stones and spears with a true aim, as long as they were habitually used for locomotion, and for supporting the whole weight of the body, or so long as they were specially fitted for climbing trees. For these causes alone it would have been an advantage to man to become a biped; but for many actions it is indispensable that the arms and whole upper part of the body should be free; and he must for this end stand firmly on his feet. To gain this great advantage, the feet have been rendered flat, and the great toe has been peculiarly modified, though this has entailed the almost complete loss of the power of prehension. With some savages, however, the feet have not lost their prehensile power. As the progenitors of man became more and more erect, with their hands and arms more and more modified for prehension and other purposes, with their feet and legs at the same time transformed for firm support and progression, endless other changes of structure would have become necessary. The pelvis would have to be broadened, the spine peculiarly curved, and the head fixed in an altered position, all of which changes have been attained by man. The early male fore-fathers of man were, as stated, probably furnished with great canine teeth; but as they gradually acquired the habit of using stones, clubs, or other weapons, for fighting their enemies or rivals, they would use their jaws and teeth less and less. In this case, the jaws and teeth would become reduced in size; and a great reduction of the canine teeth in the males would affect the teeth of the females through inheritance. As the various mental faculties gradually develop themselves, the brain would certainly become larger; and the gradually increasing weight of the brain and skull in man must have influenced the development of the supporting spinal column, more especially as he was becoming erect. As this change of position was being brought about, the internal pressure of the brain will also have influenced the form of the skull; for many facts show how easily the skull is thus affected.

EVOLUTION OF THE INTELLECT. Up to a certain point the brain and the rest of the body are alike alterable by natural selection, and the other agencies concerned in the slow modifications of organisms. But when the brain has reached a certain point in size and complexity, the rest of the body ceases to change, save in a few slight particulars, and the agencies forwarding evolution seem to confine themselves to the brain, and especially to the cerebrum,—the result being marked cerebral development, unattended by any notable physical alteration. When an animal has once appeared, endowed with sufficient intelligence to chip a stone and hurl a weapon, natural selection will take advantage of variations in this intelligence, to the comparative neglect of purely physical variations. So soon as the intelligence of an animal has, through ages of natural selection and direct adaptation, become so considerable that a slight variation in it is of more use to the animal than an variation in physical structure, then such variations will be more and more constantly selected, while purely physical variations, being of less vital importance to the species, will be relatively more and more neglected. We may now understand why man differs so little, in general physical structure and external appearance, from the chimpanzee and gorilla, while, with regard to the cerebral structure and its correlative intelligence, he differs so vastly from these, his nearest living congeners, and the most sagacious of animals save himself. The ongoing comprehensive truth, ranking as one of the most brilliant con-

tributions ever yet made to the Doctrine of Evolution, and for which we are indebted to Mr. Wallace, goes far to bridge over the interval, which formerly seemed so impracticable, between brute and man. Since the period during which man has possessed sufficient intelligence to leave a traditional record of himself is but a small fraction of the period during which he has existed upon the earth, it is but fair to conclude that, during those long ages of which none but a geologic record of his existence remains, he was slowly acquiring that superior intelligence which now so widely distinguishes him from all other animals.

GENESIS OF MORALITY.—It is an undeniable fact, that, while the nervous connections accompanying a simple intelligence are already organized at birth, the nervous connections accompanying a complex intelligence are chiefly organized after birth. Thus there arises the phenomena of infancy, which are non-existent among those animals whose physical actions are purely reflex and instinctive. Infancy is the period during which the nerve connections and correlative ideal associations necessary for self-maintenance are becoming permanently established. Now, this period becomes longer and longer as the intelligence increases in complexity. In the human race it is much longer than in any other race of mammals, and it is much longer in the civilized man than in the savage. Throughout the animal world the period of infancy is correlated with feelings of parental affection, sometimes confined to the mother, but often shared by the father. Where there is no infancy, as among the lower animals, there is no parental affection. The prolonged helplessness of the offspring must keep the parents together for longer and longer periods in successive epochs; and where at last the association is so long kept up that the older children are becoming mature while the young ones still need protection, the family relations begin to become permanent. This, long enough continued, must inevitably differentiate and intergrade a troop of gregarious ape-like men into a number of small family communities such as are now found among the lowest savages. In these communities, as the parent dies, the headship of the family thus established devolves upon the oldest, or bravest, or most sagacious male remaining. Thus the little group gradually becomes a clan, the members of which are united by ties stronger than those which ally them to members of adjacent clans, with whom they may, however, combine to resist the aggressions of yet further outlying clans. We thus cross the chasm which divides animality from humanity, gregariousness from sociality, hedonism from morality, the sense of pleasure and pain from the sense of right and wrong.

Sympathy, or the power of ideally reproducing in one's self the pleasures and pains of another person, is manifested in a rudimentary form by all gregarious animals of moderate intelligence. Not infrequently a laborer has been known to risk his life to save that of a comrade; and the higher apes habitually take under their care young orphans of their own species. It is evident that this power of sympathy must be strengthened and further developed when a number of individuals are brought into closer and more enduring relationships. Given this rudimentary capacity of sympathy, we can see how family integration must alter and complicate the emotional incentives to action. While the individual may still exercise his brutelike predatory instincts upon strangers and the lower animals, there is a curb upon his exercise of them within the limits of the clan. There is a nascent public opinion which lauds actions beneficial to the clan, and frowns upon actions detrimental to it. There will gradually be produced in him feelings of inclination or repugnance towards lines of conduct that have become established or interdicted, because they are beneficial or injurious to the tribe; though neither the young nor the adults know why they have become established or interdicted. In these ways, the establishment of permanent family relationships generates new incentives to action, unknown in the previous epochs of gregariousness, which must often, and in some instances habitually, over-rule the mere animal incentives comprised in personal pleasures and pains. The good of the individual must begin to yield to the good of the community. Enduring from birth until death, the permanent relationships of the most rudimentary human family group acquire a traditional value which passes on from generation to generation; and thus there arises reciprocal necessities of behavior between parents and children, husbands and wives, brethren and sisters, in which the requisite conditions for the genesis of those ego-altruistic impulses which, when further modified by the expansion of the sympathetic feelings, give birth to moral sentiments. The very state of things which made mental variation more advantageous to the progenitors of mankind than physical variation, simultaneously conspired to enhance the progressiveness of primeval man and to prolong his period of infancy, until the plastic or malleable parts of his life came to extend over several years, instead of terminating in rigidity in four or five months, as with the orang outang. Amid the entanglement of all the causes conspiring to elude humanity from animality, is the fact that this prolongation of infancy was manifestly the circumstance which knit these permanent relationships, giving rise to reciprocal necessities of behavior, which distinguishes the rudest imaginable family group of men from the highest imaginable association of gregarious non-human primates. In this new suggestion as to the causes and the effects of the prolonged infancy of man, for which the world is indebted to Mr. J. M. Fiske, of Harvard University, we have a suggestion as fruitful as the one which we owe to Mr. Wallace, and adverted to in the preceding section. From of old we have heard the maxim, "Except ye be as babes, ye cannot enter into the kingdom of heaven." The latest science now shows us—though in a very different sense of the words—that, unless we had been as babes, the ethical phenomena which give all its significance to the phrase "kingdom of heaven" would have been non-existent for us. Without the circum-