

The Evolution of Man

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[The installment in last issue contained an account of the finding of skeletons of human beings of very primitive times, the skulls of which showed a marked divergence from the skull of man during later times. The account closed with a description of the remains of the so-called Pithecanthropus or monkey-man, discovered among ancient volcanic deposit of the Tertiary period at a place known as Trinil in the island of Java.]

IT was in 1735 that Linnaeus, a great scientist, performed a monumental work. He then gave us the first comprehensive system of nature's forms. He arranged these forms in three great kingdoms, minerals, plants, animals. And within these kingdoms he arranged the various forms in systematic succession. In this way, he furnished us with a system of plants, and of animals, which, in spite of its defects, gave us the first foundation for a comparative view and logical sequence by which we could hope to discover the natural connections of these forms in their main outlines.

In performing this necessary work of genius, Linnaeus naturally had to solve the question: Where am I to place man? He did not hesitate for one moment. He placed man in the animal kingdom on account of his physical structure, which showed that he belonged to the mammals, and more definitely in the group of monkeys. Indeed, if we wish to build up any system even in our day, that is the only logical conclusion at which we can arrive. Man is not a simple mineral, he is a living being. Unless he is fed, he dies; that is to say, his form of existence is that of living beings who are compelled on pain of death to assimilate food. If we pinch his arm, he cries out, in other words, he feels, and he has that peculiar faculty which we are accustomed to associate with the word "life," the faculty of subjective feeling. Furthermore his food is of a definite kind. He can not feed on pure mineral substances, he requires either vegetable or animal matter, he needs bread instead of stones, and of the elements of the air he can utilize only oxygen. This classes him with the other members of the animal kingdom in distinction from plants which feed on the soil.

Again, in the animal kingdom there are two main groups. It is true that Linnaeus himself was not familiar with this distinction, but we have learned it since then. The individual body of the animal in one of these groups consists of only one so-called cell. It is one solitary little lump of animated substance. The individual body in the other group of animals is composed of many such cells, which form a sort of co-operative association with division of labor. Well then, the body of man is built up with billions of such cells in the most wonderful manner. It consists of living building material, the cells, which make up its muscles, its blood, its skin and even its bones. In other words, man belongs to the group of animals that contain many cells. He does not belong to the uni-cellular low archetypes, he is not a microscopically small infusorium.

This higher group of animals is again divided into a number of groups, among which we must make our choice. There are the sponges, the polypi, the jelly-fish, the worms, the starfish, the echinoderms, the crustaceans, the insects, the snails, the shells, and, finally, a group which is distinguished by a spinal cord located above the digestive tract and protected by a more or less solid structure which serves at the same time for the support of the body, a backbone. We call this last group the vertebrates. No other group has this characteristic structure, and it is plain, at the first glance, that man can belong only to this group, because he has a spinal cord and a backbone. Within this group of vertebrates we distinguish the fish, which breathe in the water with gills instead of lungs; man breathes through lungs, therefore he is not a fish. Then follow the amphibians, that is to say, the newts and frogs that breathe alternately through gills and lungs. A frog, for instance, breathes through gills, when a tadpole, and acquires his lungs later on. Human beings do not have this double method of breathing. Furthermore, the reptiles, that is to say, lizards, crocodiles, turtles and related animals have blood which changes its temperature from warm to cold and vice versa. Their blood is cold when the air which they breathe is cold, but it is warm when the sun shines upon them. These animals

do not yet possess their own heating apparatus within them. The human body heats itself, it is always warm, hence man is not a reptile. The two last groups of vertebrates are always warm. These groups consist of birds and mammals. Since we have to choose between these two, we must investigate further. No bird suckles its young, but the human mother does that, and all mammals do, therefore we belong on the side of the mammals. Now these mammals are again divided into two great sections. Those of one section lay eggs, the Australian duckbills. The mammals of the other section have done away with that; the child when born is far more mature. Every human mother testifies to the fact that human beings are not duckbills, but belong to a higher class. And now we come to a final choice. We look at the hands and teeth of man. Man is not a whale, the hands of which have turned into fins. He is not a carnivorous animal which has one-sidedly developed its eye-teeth and incisors. He is not an animal with hoofs which has laid special stress upon its molar teeth. He is not a rodent, the best trumps of which are the incisors; he is not a sloth, the teeth of which have entirely degenerated, nor is he a bat, the hands of which are made into wings. There is only one single group of mammals, the teeth and hands of which resemble those of man, and that group is composed of monkeys.

Mark well: when Linnaeus placed man side by side with the monkeys in his system, he was not thinking of anything else but just an orderly arrangement, a systematic grouping of animals at a greater or smaller distance, just as a boy will stick his beetles into his collection, some closer, others farther apart. But since the days of Linnaeus a good many deep thinkers and clear heads have asked the question whether this "system" might not have a deeper meaning and relation to nature?

Now, when we remember that we arrived at a certain station in our research which we named monkey-man, the probability of a deeper meaning of that system grows apace. We were looking for some primitive disguise by which man might have concealed his identity far back in the days of the primitive world, and we must certainly say, when we think of this system, that of all the creatures of this globe, none is better fitted for such a disguise than is the monkey, that is to say, that animal which in spite of all the differences of its bony structure is still far more like us than all the other living beings of the earth together.

Remember also that we were not speaking of monkeys in a general way; but indicated a certain species, the gibbon. Systematic zoology very early accomplished the separation of some species of monkeys from others, the so-called anthropoid apes. This word indicates that these apes are still closer to man in the system than any others. No other group in the system is so close to us. We now distinguish four species of these anthropoid apes. Two of them are living in Africa, the gorilla and the chimpanzee, and two in Asia, the orang-outang and the gibbon. These four apes strangely resemble human beings, even externally. The layman is specially astonished to notice that they, like man, have not an externally visible tail. But scientists know that this occurs occasionally even among lower monkeys and so it is not considered a very convincing mark. But there is a very wonderful relation which should convince the most inveterate skeptic, and that is the following.

Whoever has looked at a drop of blood through a very strong microscope knows that this peculiar fluid is a mixture of two things, first, the so-called serum, and then the blood corpuscles floating round in it. Now when we compare the drops of blood of various animal species, we find that the red blood corpuscles have many different forms. Some of them are long, some are round, some are large and some small; in brief, they are different in fish, or newt, or bird, or mammal. This is no ground for surprise, for all these animals are very different in many other ways.

The peculiar significance of this difference is that the attempt to inoculate an animal of one group with the living blood of another group always ends fatally. It is just as if these two kinds of blood carried on a war with one another. The serum of one group destroys the blood corpuscles of another group. If an animal is inoculated with the blood of another group, it quickly feels the fatal effects of this struggle

in its veins. It falls into convulsions and finally collapses entirely, just as a conflagration consumes a city in whose streets a violent civil war is raging. And this happens often in the case of animals which are relatively close to one another, for instance, many mammals. The blood of a cat kills a rabbit which is inoculated with it, and vice versa. But finally there is a certain limit. The blood of a cat naturally does not kill another cat. Indeed, peace is guaranteed often among more distant relatives. Closely related animals may mix their blood without danger. A dog is so close to a wolf that the living blood of the one may mix with that of the other without harm. It is the same with a horse and a donkey. Now a short time ago a certain scientist, Friedenthal in Berlin, mixed human blood and monkey blood. At first one blood acted as a poison for the other; that is to say, as long as the objects of the experiment were man and a lower monkey. But when human blood came to the blood of the chimpanzee, peace was suddenly established. The boundary of antagonisms had been crossed. The blood of man and that of the anthropoid ape were so nearly akin that they agreed without difficulty. How could this be? Here it was not a question of comparing bone with bone. An answer came directly from the living. The secret of life, the most minute chemistry of the blood, testified to the most intimate relationship, a consanguinity in the most daring sense of the word.

With this fact we have made another step ahead. The probability grows that man may have been concealed once upon a time in one of these creatures which we see represented by the anthropoid apes of today. Indeed, the experiment with blood makes it almost evident that all four anthropoid apes now living are directly connected with this mysterious primeval fact. The question is only, what is this relation?

We first of all feel tempted to ask whether these anthropoid apes themselves might not represent that primitive stage for which we are looking. Are not these apes veritable primitive men that have not yet been transformed into genuine men to this day?

One thinks involuntarily of the ludicrous tales of the negroes who say that the gorilla and the chimpanzee are really men, only they are too lazy to work, and for this reason pretend that they are monkeys. And perhaps there is sufficient truth in this theory to justify the belief that these apes actually represent a type of primitive man who was arrested in his development against his will, and who went so far in his conservatism that he still illustrates the "monkey stage" of man.

Again one might ask at this point, how it is that a few of our crude and monkey-like great-grandfathers are still living in the form of isolated men of the woods, as a fixed primitive type, at a time when present-day genuine man has long arrived at his perfect form. But we meet with the same phenomenon within genuine humanity itself. Why does the native Australian with his Stone Age civilization still live in the bush, while over here civilized man has already risen to the full height of his evolution? And we have an illustration still closer at hand. In the plains where the modern metropolis steams and roars, progress walks with seven-leagued boots, while yonder in the remote mountain village ancient customs and institutions are still in full bloom. So, this would not be a very pertinent objection.

(To Be Continued)

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