

# The Story of the Evolution of Life

BY T. F. PALMER.

THE story of Adam and Eve, our supposed first parents, was almost universally accepted throughout Christendom until the day of Darwin. The legend of the creation of plants and animals contained in the Book of Genesis was, until the year 1859, received as the inspired utterance of "God" by all save a few exceptionally thoughtful men and women. But with the progress of scientific discovery in many departments of Nature, this time honoured tradition was seen to be untrue.

The deepest of all the students of animate Nature was Charles Darwin who, in 1859, after prolonged and patient reflection over the problems presented by the world of life, at the age of fifty, submitted to the judgment of mankind the results of his stupendous labours. These results were published in his now world-famous volume the "Origin of Species."

The testimony of all the various branches of science to the truth of the new evangel which Darwin, his fellow-workers, and disciples, made manifest to men, produced a revolution in human thought which is certainly without parallel in the history of civilisation. Although Darwin and his adherents were denounced, hated, and bespattered with evil reports by clergy and laity alike, the large browed author of the "Origin of Species" serenely continued his enquiries, and in less than half a century the entire educated public was prepared to acknowledge the truth of the theory of evolution. When Darwin died in 1882, his body was laid to rest in Westminster Abbey, where he lies by Newton's side; his statue was placed in our magnificent British Museum in Bloomsbury, and it now occupies the seat of honour in the main staircase of the more recently erected Natural History Museum at South Kensington.

Our object is to state, in clear and easily understood language some of the arguments, and to submit a few of the very numerous evidences of the truth of the doctrine of modified descent. Some of these most remarkable testimonies are met with in the remains of extinct plants and animals discovered in the rocks. Those rocks which yield traces of past life are termed stratified rocks, and consist of substances which have been slowly laid down by the action of running water, or through the influences of the atmosphere. Embedded in these, are found the remains of the animals and plants which lived in the period when they were formed. The fossils preserved in these rocks carry us back for many millions of years, in most cases to times before men, apes, birds, or even mammals, such as the dog, elephant, ox, and horse had come into existence. In the rock record we are able to trace, to some extent at least, the marvellous changes in the living world which have been proceeding from the dawn of life to the day in which we dwell.

This treasury of vanished life is far from complete, but as the years roll by, very many of the gaps in the geological deposits are being filled in, and every new discovery lends added support to the vast array of evidence already possessed relating to the transformations that time and circumstance have wrought in the plant and animal domains.

Nor need the imperfection of the geological history of the earth's past population awaken astonishment. The vicissitudes to which the earth's fossil bearing crust has been subjected have blotted out so many priceless records of the past that it is perhaps surprising that our information is so great. And, above all, when we are reviewing the imperfection of this record, we must remember that vast volumes of the earth's history lie buried fathoms deep below the level of the sea, and that huge masses of our rocks have been so transformed by the ceaseless action of running waters, and the internal movements of the globe itself, that the simplest and most primitive forms of life have entirely disappeared. Again, the preservation of the earliest modes of life has been prevented by the perishable

nature of the substances of which they were composed. The plants and animals which first appeared on the planet's surface consisted of soft materials and even in later and more solid organisms, as a rule, only the harder parts such as the wood and seeds of plants, and the bones and shells of animals have survived in fossil form. Moreover, thousands of feet of sedimentary strata are practically inaccessible to the seeker after fossil remains, as these rocks lie so deep below earth's surface. Yet, fragmentary as these fossil relics are, the light they throw on the story of life's progress leaves no reasonable doubt as to their real meaning. Considering the extremely small percentage of our planet's deposit so far examined, and the richness of the results already obtained, we may confidently await future discoveries as certain to furnish much fuller evidence than at present possessed.

The facts so far gleaned from the rocks establish the general conclusion that there has been from the genesis of life to the present period a gradual and upward development of organic forms. When Darwin propounded his theory, his critics seized upon the admitted absence of many links in the chain of development as the most powerful objection to evolution. Many of the links then missing have since been found, and all the arguments originally urged against evolution have long since been abandoned. But it was said that at least some instances of transmutation in plants and animals should be forthcoming, and eminent scientists in several parts of the world began to explore the rocks for the demanded evidence. In this they have succeeded beyond the most sanguine expectations, and scarcely a season now passes without important and far-reaching discoveries being brought to light.

As already said, the hard parts of organisms are those most likely to be preserved. Horns have been found in abundance, and these appendages characterise animals that chew and cud—the Ruminants. The sheep, the ox, the antelope, and the deer are well known representatives of this group. The distant ancestors of these animals were without horns. Now, at a later stage, in what are termed Miocene Times, there lived, as their remains prove, antelopes possessed of puny horns; and these horns have been shown to have increased step by step, among the ever increasing species of antelopes, from that far distant period to our own age. Evidence even more conclusive concerning the progressive increase in the size and shape of horns is provided by the deer family. In the early part of the Miocene Period the deer were quite destitute of horns. A little later, small two-pronged horns had been evolved, and arising from these, deer with three-pronged horns were developed, while in the still later Pliocene Period, deer bearing four-pronged horns came into being. Next in succession appeared deer with five-pronged horns, while in the deposits of our own Norfolk forest beds, the horns of deer as stately as those of living forms have been unearthed. The ancestral history of the stag is not yet so complete as the early single-horned form remains to be discovered, but the consecutive stages of development from an ancient two-pronged stag to the richly spread antler of the modern stag have been demonstrated from remains recovered from recent deposits.

Among other excellent illustrations of progressive change, Professor Le Conte adduced the evolutionary growth of the tails in fishes. The tail fins of fishes are of two kinds. Some possess even lobed tails, while others carry appendages of an uneven form. The even tail is found in our bony fishes such as the mackerel and salmon, while fishes with uneven tails like the sharks and others, are far more ancient in origin. In the modern bony fishes the backbone ends where the tail begins, and this organ is spread out like a fan. Now with the primitive sharks and sturgeons, in whose bodies cartilage occupies the place of bone, this cartilage is prolonged through the back fin or tail to its extreme end, tap-

ping to a point. It is significant that the modern bony fishes with even tails betray their ancestry by passing, in the course of their development from the young to the adult state, through a condition in which their tails resemble those of long extinct ancestral species. There are solid reasons derived from the study both of the fossil records, and the development of living fishes from the egg stage to maturity, to satisfy the scientist that the tails of fishes were first vertebrated and even, and then some assumed the uneven form we find in the shark and others, while in the later and more specialised fishes the tail is composed of fin rays which extend beyond the termination of the backbone. The facts revealed by an examination of the fossil remains with those disclosed by the studies of embryologists, who watch the growth of animals from their procreation to their birth, suffice to prove that this forms the true story of the fish tribe. As Le Conte puts it: "The family history is repeated in the individual history."

(To be continued in next issue.)

## REVOLUTIONS, POLITICAL AND SOCIAL

(Continued from page 6)

the struggle when they received Cavaignac's summons to surrender.

"Workers and all who are yet in arms against the Republic; for the last time I exhort you in the name of all that is respectable, holy and sacred to man . . . . .

"You have been told that cruel vengeance awaits you. Only your enemies and ours speak thus. You have been told you will be sacrificed in cold blood. Come to us, come as expectant brothers submitting to law: the arms of the Republic are open to receive you."

The white flag was hoisted a few hours later, and the workers laid down their arms.

Following which Cavaignac again addressed himself to Paris:

"This morning the emotion of a struggle was proper and inevitable. Now be great in peace as you have been in war. In Paris I see conquerors and conquered: may my name be accursed if I ever consent to see victims."

Brave words, but how can we qualify the deeds? The insurgents were shot indiscriminately for days, crowded into small rooms, in the sweltering heat, tormented by guards as though they were wild beasts, and the happiest fate awaited them in transportation to tropic penal settlements.

In all some fifty thousand were killed and wounded during the four days' struggle. And after—the workers shot and transported, dying of disease and by suicide, soon solved the unemployed problem. When Cavaignac addressed the Assembly on July 3rd, his eloquence is somewhat subdued, but his sincerity unquestioned. The Minister of Finance would shortly lay before them a series of decrees, some of which were intended to restore confidence in the government's sincerity to, among other things, "afford labor to the operating classes." What princely generosity! What a god-like atonement!

After four months of semi-warfare the final battle had been fought and lost. Not alone were the workers of Paris defeated in that desperate four days' battle; all Europe went to defeat with them. The attempt to seize political power had been forced upon them and they had failed. Had they been successful in that grim strife they would still have had some thirty millions to conquer before proclaiming themselves masters of France. But they did not weigh the matter; they were forced by a series of culminating events to stage that great working class tragedy. And whether we like it or not we find the same circumstances prevailing on every page of history: the onus of battle does not rest with us, but with our masters. And for those supercilious snivellers, supreme in their cheap and unwarranted superiority who exclaim "The dirty swine won't fight," we recommend a review of the history of their class.

Eastern Europe in our next, to follow the events there and see the effects of the disastrous struggle we have very briefly retold.