

assent. The most distinguished of these, as we have already learned, was Professor Louis Agassiz, who remained a strenuous opponent of the new doctrine until the day of his death. Indeed, in the last course of lectures he ever gave, we find a strong arraignment of the development hypothesis, a hypothesis which was fascinating indeed, but one, so Agassiz declared, that was negated by the facts of nature and misleading and mischievous in its tendencies. Even to-day the illustrious naturalist has sympathizers and followers and that, too, among the ablest and most conspicuous representatives of modern science. Among anti-evolutionists, living or recently deceased, I need instance only such recognized savants as the noted geologists, Sir J. W. Dawson, Barrande, Davidson, Grand Eury, Caruthers, and that veteran biologist—the rival of Pasteur on the importance and brilliance of his researches on the lower forms of life—the late Professor P. J. van Beneden, of the great Catholic university of Louvain.¹ In referring to the subject the distinguished Belgian professor asserts: "It is evi-

¹The distinguished French savant, the Marquis de Nadaillac, is often spoken of as an anti-evolutionist, but this is an error. So far he is neither an evolutionist nor an anti-evolutionist; he merely suspends judgment. Before the anthropological section of the International Catholic Scientific Congress, assembled last year at Brussels, he expressed himself on the subject as follows: "Pour ma part, si je ne suis guère disposé à admettre les conclusions de l'école évolutionniste, je ne puis non plus les rejeter absolument. Le jury en Écosse, outre la réponse habituelle, a le droit, sans se prononcer sur le fait en lui-même, de répondre *not proven*—cela n'est pas prouvé. Telle est la disposition de mon esprit; telle est aujourd'hui ma conclusion; et je crois qu'elle sera celle de tous ceux qui aborderont cette étude sans parti pris et avec l'unique désir d'arriver

dent to all those who place facts above hypotheses and prejudices, that spontaneous generation, as well as the transformation of species, does not exist, at least if we only consider the present epoch. We are leaving the domain of science if we take our arms from anterior epochs. We cannot accept anything as a fact which is not capable of proof."¹

At the present day, among men of science, evolutionists outnumber creationists fully as much as the latter outnumbered the former a half century ago. It is only rarely that we meet a scientist who does not profess Evolution of some form or other, or who does not at least think that the older views regarding creation and the origin of species must be materially modified in order to harmonize with the latest conclusions of science.

No Via Media Possible.

All the lines of thought which we have been following converge, then, as has already been observed, towards one point—the origin, or rather the genesis, of species, and their succession and distribution in space and time. Between the two theories, that of creation and that of Evolution, the lines are drawn tautly, and one or the other theory must be accepted by all who make any pretensions intelligently to discuss the subject. No compromise, no *via media*, is possible. We must needs be either creationists or evolutionists. We cannot be both.

à la vérité." "Compte Rendu," Section d' Anthropologie, p. 305. Cf. also "Problème de la Vie," pp. 175-178, by the Marquis de Nadaillac.

¹ Van Beneden's "Animal Parasites and Messmates," p. 106.

The theory of emanation is not here considered, it being contrary to the principles of sound philosophy as well as to the teachings of true science. How shall we, then, regard the problem of the origin of species, and what views, expressed not in general terms but carefully formulated, have been entertained by the great thinkers of the world on this all-important, and, at present, all-absorbing topic?

Dr. Whewell, the learned historian of the "Inductive Sciences," in referring to the forms of life of geological times says: "Either we must accept the doctrine of the transmutation of species, and must suppose that the organized species of one geological epoch were transmuted into those of another, by some long-continued agency of natural causes, or else we must believe in many successive acts of creation and extinction of species, out of the common course of nature; acts which therefore we may properly call miraculous."¹

Whewell, in common with the majority of his contemporaries—he wrote his masterly work over fifty years ago—and in common with the large body of non-scientific people still living, unhesitatingly accepted the doctrine of "many successive acts of creation," as against the theory of the transmutation of species, which he regards as negatived by "an indisputable preponderance" of evidence against it.

The Miltonic Hypothesis.

But even accepting the creational hypothesis, how are we to picture to ourselves the appearance

¹"History of the Inductive Sciences," vol. II, p. 564.

of new species? "Are these new species," asks the erudite Master of Trinity, "gradually evolved from some embryo substance? Or do they suddenly start from the ground, as in the creation of the poet?"

"Perfect forms
Limbed and full grown: out of the ground up rose,
As from his lair, the wild beast where he wons
In forest wild, in thicket, brake, or den; . . .
The grassy clods now calved; now half appear'd
The tawny lion, pawing to get free
His hinder parts, then springs as broke from bonds,
And rampant shakes his brinded mane; the ounce,
The libbard, and the tiger, as the mole
Rising, the crumbled earth above them threw
In hillocks; the swift stag from underground
Bore up his branching head; scarce from his mould
Behemoth, biggest born of earth, upheaved
His vastness: fleeced the flocks and bleating rose,
As plants; ambiguous between sea and land
The river-horse and scaly crocodile.
At once come forth whatever creeps the ground,
Insect or worm."¹

We have here what Huxley calls the "Miltonic hypothesis" fully developed even in its minutest details. But this view of special creation, it is but just to state, may be offset by another passage, less frequently quoted it is true, from the great bard, which as clearly tells of creation by Evolution. In both instances the archangel Raphael appears as the

¹"Paradise Lost," Book VII.

speaker. And if, in the verses just quoted, the poet is in accord with the literal interpreters of the Genesis account of creation, in the following lines he reflects the ideas of creation entertained by St. Augustine and St. Thomas Aquinas. Having spoken of "one first matter," and its subsequent progressive development, the poet continues:—

"So from the root
Springs lighter the green stalk, from thence the leaves
More airy, last the bright consummate flower
Spirit odorous breathes: flowers and their fruit,
Man's nourishment, by gradual scale sublimed,
To vital spirits aspire, to animal,
To intellectual; give both life and sense,
Fancy and understanding; whence the soul
Reason receives, and reason is her being,
Discursive or intuitive; discourse
Is ofttest yours, the latter most is ours,
Differing but in degree, of kind the same."

Book V.

Again, were these new species created by single or multiple pairs; and, if by multiple pairs, was there one, or were there many centers of distribution for the individual species?

Views of Agassiz.

According to Linnæus, the great Swedish naturalist, who voiced not only the opinion of his time, but of nearly all creationists since his time, species were created by single pairs, and the present number is equal to that which was created in the begin-

ning.¹ According to Schouw, whose views were shared by the eminent botanist, Alphonse de Candolle, in the earlier portion of his career, there was "a double or multiple origin of species, at least of some species." Professor L. Agassiz, however, went much farther. He asserted not only the multiplicity of species, but also denied that there was "any necessary genetic connection among individuals of the same species, or of any original localization more restricted than the area now occupied by the species." According to this eminent student of nature, all animals and plants have occupied, from the beginning, those natural boundaries within which they stand to one another in such harmonious relations. Pines originate in forests, heaths in heaths, grasses in prairies, bees in hives, herrings in shoals, and men in nations. He asserts that "all animals originated in vast numbers—indeed, in the average number characteristic of their species—over the whole of their geographical area, whether its surface be continuous, or disconnected by sea, lakes, rivers, or by differences of level above the sea, etc."² Elsewhere he declares: "There are in animals peculiar adaptations which are characteristic of their species, and which cannot be supposed to have arisen from subordinate influences. Those which live in shoals cannot be supposed to have been created in single pairs. Those which are made to be the food of others cannot have been created in the same proportions as

¹"Species tot numeramus quot diversæ formæ in principio sunt creatæ." "Philosophia Botanica," No. 157.

²"An Essay on Classification," p. 59.

those which live upon them. Those which are everywhere found in innumerable specimens, must have been introduced in numbers capable of maintaining their normal proportions to those which live isolated, and are comparatively and constantly fewer. For we know that this harmony in the numerical proportions between animals is one of the great laws of nature. The circumstance that species occur within definite limits, where no obstacles prevent their wider distribution, leads to the further inference that these limits were assigned to them from the beginning; and so we should come to the final conclusion that the order which prevails throughout nature is intentional, and that it is regulated by the limits marked out the first day of creation, and that it has been maintained unchanged through ages, with no other modifications than those which the higher intellectual powers of man enable him to impose on some few animals more closely connected with him."¹

According to Agassiz, therefore, not only is the origin of species supernatural, but their general geographical distribution is also supernatural. And more than this. Not only are all the phenomena of origin, distribution and extinction of animal and vegetable life, to be directly referred to the Divine will, but also, he will have it, "Every adaptation of species to climate, and of species to species, is as aboriginal, and, therefore, as inexplicable, as are the organic forms themselves." "The facts of geology,"

¹"Lake Superior," p. 337.

he tells us, "exhibit the simultaneous creation, and the simultaneous destruction of entire fauna, and a coincidence between these changes in the organic world and the great physical changes our earth has undergone." "The origin of the great variety of types of animals and plants, can never," he declares, "be attributed to the limited influence of monotonous physical causes which always act in the same way." On the contrary, it necessarily displays "the intervention of a Creator" in the most striking manner, in every stage of the history of the world.

Agassiz returns to these points time and again, and illustrates his argument in ways that are always interesting, if not always conclusive. As a résumé of his teaching respecting the origin, distribution and extinction of animals and plants, and as an indication of his spirit of reverence and piety, nothing can be more explicit or edifying than the following paragraphs taken from his profound "Essay on Classification," so frequently quoted:

"The products of what are commonly called physical agents are everywhere the same, that is, upon the whole surface of the globe; and have always been the same, that is, during all geological periods; while organized beings are everywhere different, and have differed in all ages. Between two such series of phenomena there can be no causal or genetic connection.

"The combination in time and space of all these thoughtful conceptions, exhibits not only thought; it shows also premeditation, power, wisdom, greatness, prescience, omniscience, providence. In one

word, all these facts, in their natural connection, proclaim aloud the one God, whom we may know, adore and love; and natural history must, in good time, become the analysis of the thoughts of the Creator of the universe, as manifested in the animal and vegetable kingdoms, as well as in the inorganic world."¹

Evolution.

As against the doctrine of separate and successive creations, we have, as already stated, the theory of the origin of species by derivation. But as in the creational doctrine there are different views respecting the manner in which species appeared, so, likewise are there, according to Evolution, different hypotheses regarding the origin and development of the divers forms of organized beings.

In the first edition of his "Origin of Species" Darwin expresses the belief that all "animals have descended from at most only four or five progenitors, and plants from an equal or lesser number." In the second edition of his work he arrives at quite a different conclusion and infers that "probably all organic beings which have ever lived on the earth have descended from some one primordial form, into which life was first breathed by the Creator."

The majority of evolutionists, who admit the existence of a personal God, accept the Darwinian view that all the forms of life at present existing in the world are derived, by the agency of natural forces and the influence of environment, from

¹P. 205; cf., also, chaps. x and xvi, of Agassiz' "Methods of Study in Natural History."

one primordial created form. Evolutionists of the atheistic school, however, of which Ernst Hæckel is the chief representative, contend not only that all species of animals and plants are descended from a speck of protoplasm, a simple, structureless primitive moneron, but also that this primordial speck of protoplasm was not the work of the Deity, but was the result solely of the operation of some one of the physical forces on brute matter.

But excluding the philosophical theories which have been built on Evolution, and the religious discussions to which it has given rise, let us proceed to examine the evidences for and against it as a scientific theory. Let us inquire what are the grounds for the almost universal acceptance of this theory by contemporary scientists, and see whether the arguments advanced in its support are in accord with the canons of sound logic and the principles of true philosophy. The question is entirely one of natural science, not of metaphysics, and hence one of evidence which is more or less tangible. What, then, are the evidences of organic Evolution to which modern scientists usually appeal? This is the question to which all that precedes is but little more than a preamble, and a question, too, that well deserves our closest and most serious consideration. I shall endeavor to give the answer succinctly, but fairly, in the following chapter.