

knit together, and carries the mind from premise to conclusion without a break. The descriptions of phenomena are clear and intelligible to the unscientific mind. And the argument for the doctrine of evolution by natural selection is not less powerful than the argument for "creative power, directive mind, and ultimate purpose" in the process of evolution.

Paley's famous illustration of the argument for design furnished by a watch may be conceded to be somewhat antiquated. But it is so simply because nature is now seen to be, not a machine which a Great Mechanic has made, wound up, and set a-going under the operation of its own forces, but a vitalized mechanism pervaded by intelligence and directed in its every movement to a predetermined end. It is, in other words, far more like a human body than a watch; and the relation of the Great Architect to nature far more nearly resembles the relation of the spirit of man to his body than it does the relation of a watchmaker to a watch. Thus science, so far from weakening the argument from design, has immensely strengthened it; has, in brief, made it almost impossible for the unprejudiced student of nature to reach any other conclusion than that reached by Mr. Wallace and thus stated by him: "Not man alone, but the whole World of Life, in almost all its varied manifestations, leads us to the same conclusion—that to afford any radical explanation of its phenomena we require to postulate the continuous action or guidance of higher intelligences; and, further, that we have probably been working towards a single end, the development of intellectual, moral, and spiritual beings." In such an article as this it is impossible to present any summary of the accumulated facts which point to this conclusion. We must content ourselves with selecting two illustrations and giving, somewhat at length, a graphic argument of the author in his own words.

One of these illustrations is furnished by the bird's wing, the structure of which "most clearly implies the working out of a preconceived design in a new and apparently most complex and difficult manner." After describing with an illustrative diagram the mechanical structure of the wing, which is so constructed as to give a maxi-

THE GREAT ARCHITECT

There is no question in philosophy more fundamental than the one which Dr. James Martineau has put with admirable brevity and admirable distinctness in the following alternative:

There are but three forms under which it is possible to think of the ultimate or immanent principle of the universe—Mind, Life, Matter: given the first, it is intellectually thought out; the second, it blindly grows; the third, it mechanically shuffles into equilibrium.¹

In his recent volume, "The World of Life,"² Alfred Russel Wallace has given striking illustrations of the scientific evidences which support the last of these alternatives. The book may be criticised from the literary point of view. It appears to be made up of essays on correlated subjects, published at different times and here hung together somewhat loosely upon a connecting thread. It thus lacks coherence and continuity. But this criticism does not apply to the separate chapters or essays of which the volume is composed. Each one of them is closely

¹ "A Study of Religion," Vol. I, p. 336.

² *The World of Life. A Manifestation of Creative Power, Directive Mind, and Ultimate Purpose.* By Alfred Russel Wallace. Moffat, Yard & Co., New York.

mum of power with a minimum of weight, and to oppose the greatest resistance to the air in the downward stroke with the least resistance to the air in the upward stroke, a contrivance somewhat clumsily imitated by the oarsman when he "feathers" his oar, Mr. Wallace goes on to point out the related fact that the feathers are not, properly speaking, a part of the living organism, but a mechanical instrument which the organism has built up for its use. As the feathers wear out they are dropped, at molting, but the successive pairs are replaced by new ones, and this replacement takes place so gradually that the bird never loses its power of flight. In this replacement not only is every feather the size and shape characteristic of the species, but, in addition, "each of the often very diverse feathers grows in its right place and reproduces the various tints and colors on certain parts of every feather which go to make up the characteristic colors, markings, or ornamental plumes of each species of bird." And Mr. Wallace puts the question well: "What is the nature of the power which determines that every separate feather shall always 'grow' into its exact shape? . . . What *directive* agency determines the distribution of the coloring matter (also conveyed by the blood) so that each feather shall take its exact share in the production of the whole pattern and coloring of the bird, which is immensely varied, yet always symmetrical as a whole, and has always a purpose either of concealment, or recognition, or sexual attraction in its proper time and place?"

The other and not less striking illustration of a "directive mind" in nature is afforded by the metamorphoses of insects, and these furnish an even more striking illustration of the "creative power;" for in these metamorphoses the process of creation—that is, of the upbuilding of organization and of disorganized matter—is witnessed. Mr. Wallace traces the process by which the caterpillar or other grub is formed "a living machine, which at first appears to exist for the sole purpose of devouring leaves and building up its own wonderful and often beautiful body. . . . When fully grown, it ceases to feed, prepares itself for the great change by various modes of concealment—in a

cocoon, in the earth, by suspension against objects of similar colors, or which it becomes colored to imitate—rests a while, casts its final skin, and becomes a pupa. Then follows the great transformation scene, as in the blow-fly. All the internal organs which have so far enabled it to live and grow—in fact, the whole body it has built up, with the exception of a few microscopic groups of cells—become rapidly decomposed into its physiological elements, a structureless, creamy, but still living protoplasm; and when this is completed, usually in a few days, there begins at once the building up of a new, a perfectly different, and a much more highly organized creature both externally and internally—a creature comparable in organization with the bird itself." This description gives a new significance to the butterfly as a symbol of immortality, since it shows not merely a new life growing out of the entombment of a prior life, but a new organization growing out of the disorganization and apparent decay of the entombed body which preceded it.

We hope that these illustrations may send some of our readers to Mr. Wallace's book. Here they must take our word for it that they are only two instances out of a number cited to maintain his thesis that in the world of life there is manifested a creative power, a directive mind, and an ultimate purpose—a thesis which he thus admirably states in what he calls a "physiological allegory:":

For an imaginary parallel to this state of things, let us suppose some race of intelligent beings who have the power to visit the earth and see what is going on there. But their faculties are of such a nature that, though they have perfect perception of all inanimate matter and of plants, they are absolutely unable either to see, hear, or touch any animal *living* or dead. Such beings would see everywhere matter in motion, but no apparent cause of the motion. They would see dead trees on the ground and living trees being eaten away near the base by axes or saws, which would appear to move spontaneously; they would see these trees gradually become logs by the loss of all their limbs and branches, then move about, travel along roads, float down rivers, come to curious machines by which they are split up into various shapes; then move away to where some great structure seems to be growing up, where not only wood, but brick and stone and iron and glass in an infinite variety of shapes, also move about and ultimately seem

to fix themselves in certain positions. Special students among these spirit inquirers would then devote themselves to follow back each of these separate materials—the wood, the iron, the glass, the stone, the mortar, etc.—to their separate sources; and after years thus spent, would ultimately arrive at the great generalization that all came primarily out of the earth. They would make themselves acquainted with all the physical and chemical forces, and would endeavor to explain all they saw by recondite actions of these forces. They would argue that what they saw was due to the forces they had traced in building up and modifying the crust of the earth; and to those who pointed to the result of all this “motion of matter” in the finished product—the church, the mansion, the bridge, the railway, the huge steamship or cotton factory or engineering works—as positive evidence of design, of directive power, of an unseen and unknown mind or minds, they would exclaim, “You are wholly unscientific; we know the physical and chemical forces at work in this curious world, and if we study it long enough we shall find that known forces will explain it all.” If we suppose that all the smaller objects, even if of the same size as ourselves, can only be seen by microscopes, and that with improved instruments the various tools we use, as well as our articles of furniture, our food, and our table-fittings (knives and forks, dishes, glasses, etc., and even our watches, our needles and pins, etc.) become perceptible, as well as the food and drinks which are seen also to move about and disappear; and when all this is observed to recur at certain definite intervals every day, there would be great jubilation over the discovery, and it would be loudly proclaimed that with still better microscopes all would be explained in terms of matter and motion! That seems to me very like the position of modern physiology in regard to the processes of the growth and development of living things.

This is more than an allegory. It is more than an analogy. It is an interpretation. The argument for a directive mind in the operations of nature is precisely the same as the argument for directive minds in the works of man—the same in kind, stronger in degree. For we do not *see* any directive mind in the works of man. We see material bodies, moving material tools, and producing material effects. We see the picture produced on the canvas by the painter's brush, or the piece of furniture produced by the cabinet-maker's saw and plane. But in neither case do we *see* a directing mind. We are conscious in ourselves of a directing mind, when by similar material tools we produce similar material results,

and we attribute to the workman the intelligent direction of which we are conscious in ourselves. Precisely the same reason leads us, or should lead us, to attribute an intelligent direction to the material forces using material tools to accomplish material results in the processes of nature. The evidence of design in the colors of a flower or a bird is the same as the evidence of design in the color of a painting on a canvas; there is the same evidence of design in the structure of a beehive as in the structure of a tenement-house. In the one case as in the other from the result produced we attribute intelligence to the forces which produce it. The argument is that suggested by Professor Huxley, who closes his classic description of the development of a salamander with the conclusion that “after watching the process hour by hour, one is almost involuntarily possessed by the notion that some more subtle aid to vision than an achromatic would show the hidden artist, with his plan before him, striving with skillful manipulation to perfect his work.”¹

This hidden artist is the Great Architect.