ALFRED RUSSEL WALLACE

"Whatever we may define instinct to be, it is evidently some form of mental manifestation," says Wallace in his "Contributions to Natural Selection" (1871). We know little of the senses of animals; some animals may even possess senses which we have not, and by which stores of knowledge of the outside world may

[1] Ibid. p. 212. [2] Ibid. pp. 219, 220. [3] Ibid. p. 185. [4] Ibid. p. 192.

be opened that are closed to us. We do not know certainly, for instance, what is the office of the little stalked balls that are the sole remnants of hind wings in flies, or what is the office of the third joints of the antennæ in the same insects, though both these evidently correspond to some sense. How can we pretend to fathom the profound mystery of the mental nature of animals, and decide what or how much they can perceive or remember, reason or reflect? Defining instinct, then, as "the performance by an animal of complex acts, absolutely without instruction," Wallace refuses to accept the theory of such action, in any case where all other modes of explanation have not been exhausted; for "a point which can be proved should not be assumed, and a totally unknown power should not be brought in to explain facts, when known powers may be sufficient." He maintains that there is a possibility, for instance, of the instruction of young birds by old in the art of nest-building. It is quite likely that birds remember the form, size, position, and materials of the nest in which they were hatched, as it is also probable that young birds often pair with old ones who have experience in nest-building. Man's architecture is also chiefly imitative. "Birds brought up from the egg in cages do not make the characteristic nest of their species, even though the proper materials are supplied them, and often make no nest at all, but rudely heap together a quantity of materials." "No one has ever yet obtained the eggs of some bird which builds an elaborate nest, hatched those eggs by steam or under quite a distinct parent, placed them afterwards in an extensive aviary or covered garden, where the situation and the materials of a nest similar to that of the parent-birds may be found, and then seen what kind of nest these birds would build. If under these rigorous conditions they choose the same materials, the same situation, and construct the nest in the same way and as perfectly as their parents did, instinct would be proved in their case; now it is only assumed. . . . So no one has ever carefully taken the pupæ of a hive of bees out of the comb, removed them from the presence of other bees, and loosed them in a large conservatory with plenty of flowers and food, and observed what kind of cells they would construct. But till this is done no one can say that, with every new swarm there are no bees older than those of the same year, who may be the teachers in forming the new comb."[1]

[1] For criticism of these arguments, see Romanes, "Mental Evolution in Animals," p. 225, etc.; also "Animal Intelligence." In his second edition of

"Young birds never have the song peculiar to their species if they have not heard it, whereas they acquire very easily the song of almost any other bird with which they are associated." Moreover, there are failures and imperfections in the nesting of birds that are not compatible with the theory of instinct, which is supposed to be infallible, but are quite so with the theory of intelligence and imitation. Furthermore, in their manner of building, birds adapt themselves to circumstances and frequently alter and improve. The theory of instincts in man is likewise in the wrong. The sucking of the child, which is said to be instinctive, is merely one of those *simple* acts dependent on organization, like breathing or muscular motion. "So walking is evidently dependent on the arrangement of the bones and joints, and the pleasurable exertion of the muscles, which lead to the vertical posture becoming gradually the most agreeable one; and there can be little doubt that an infant would learn of itself to walk, even if suckled by a wild beast."

The theory of instinct "implies innate ideas[1] of a very definite kind, and if established, would overthrow Mr. Mill's Sensationalism and all the modern philosophy of experience."

The reason why natural selection acts so powerfully upon ani-

this book (1891), Wallace notices a few of the instances cited by Romanes in objection to his theory: such as the recognition of the hen's call by a chicken hatched in an incubator, the fear shown, on the other hand, at the note of a hawk, and the fear exhibited by most young animals at the voice or presence of their natural enemies. Of these he says, however: "But in all these cases we have comparatively simple motions or acts induced by feelings of liking or disliking, and we can see that they may be due to definite nervous and muscular coördinations which are essential to the existence of the species. That a chicken should feel pleasure at the sound of a hen's voice, and pain or fear at that of a hawk, and should move towards the one and away from the other, is a fact of the same nature as the liking of an infant for milk and its dislike of beer, with the motion of the head towards the one and away from the other when offered to it." Of two authentic cases of the building of a nest by young birds, without instruction, he says that, in one case (that of ring-doves), the nest is a very simple one, and that the birds also received some assistance; and in the other case the nest was not built with the neatness ordinarily characteristic of the species. (See "Natural Selection and Tropical Nature," pp. 108–112.) The most of Romanes' instances and arguments he does not notice or answer.

[1] In his second edition, Wallace writes "not only innate ideas, but innate knowledge."

mals, is to be found mainly in their individual isolation. "A slight injury, a temporary illness, will often end in death, because it leaves the individual powerless against its enemies. . . . There is, as a rule, no mutual assistance between adults, which enables them to tide over a period of sickness. Neither is there any division of labor; each must fulfil *all* the conditions of its existence, and therefore natural selection keeps all up to a pretty uniform standard." But in man as we now behold him, this is different. He is social and sympathetic; and in society, a division of labor takes place that leaves the physically defective still something to do by which he may sustain life, and saves him from the extreme penalty which falls upon animals so defective. By his skill in constructing for himself tools and clothing and in planting his own food, man has an immense advantage over the animals, in whom a change of structure must take place in adaptation to changed conditions. Moreover, he not only escapes natural selection himself, but "is actually able to take away some of that power from nature, which, before his appearance, she universally exercised," establishing so his supremacy by means of that subtle force we term mind. "We can anticipate the time when the earth will produce only cultivated plants and domestic animals, when man's selection shall have supplanted natural selection."

We must, in future geological study, trace back the gradually decreasing brain of former races to a time when the body as well begins materially to differ, if we would wish to reach the starting-point of the human family. Before that time man had not mind enough to preserve his body from change. From this point, however, we shall probably see that, while all other forms of animal life changed again and again, man's physical character became fixed and almost immutable, advance taking place only in his mental and moral characteristics, with which are united modifications of the brain, as well as of the head and face, parts that are immediately connected with the brain and the medium of the most refined emotions. By man's superior sympathetic and moral feelings, he becomes fitted for the social state. There is one feature, however, in which natural selection will still act upon him — namely, the color of the skin, which, as Mr. Darwin has shown, is correlated with constitutional peculiarities, liability to certain diseases being often accompanied by marked

external characteristics; so that, in certain countries, certain tints would be likely to be weeded out, and certain other tints, with which, again, color and texture of the hair seem to be associated, would be established by natural selection.

Natural selection has no power "to produce modifications which are in any degree injurious to their possessor, and Mr. Darwin uses the strong expression that a single case of this kind would be fatal to his theory. If, therefore, we find in man any characters which all the evidence we can obtain goes to show would have been actually injurious to him on their first appearance, they could not possibly have been produced by natural selection. Neither could any specially developed organ have been so produced if it had been merely useless to its possessor, or if its use were not proportionate to its degree of development. Such cases as these would prove that some other law, or some other power, than natural selection, had been at work. But if, further, we could see that these very modifications, though hurtful or useless at the time when they first appeared, became in the highest degree useful at a much later period, and are essential to the full moral and intellectual development of human nature, we should then infer the action of mind, foreseeing the future and preparing for it, just as surely as we do when we see the breeder set himself to work with the determination to produce a definite improvement in some cultivated plant or domestic animal"; we should infer a creation by law. Skull-measurement shows that the brain of the savage was, and is, larger than it needs to be, and "capable, if cultivated and developed, of performing work of a degree and kind far beyond what he ever requires it to do." In evidence of this, Wallace cites the measurements of Esquimaux skulls and the testimony of Paul Broca to the fine form and capacity of the skulls of Les Eyzies, a race of cave-dwellers undoubtedly contemporary with the reindeer in Southern France.[1] He also argues that the loss, by man, of the hairy covering so long persistent in the mammalia, cannot have taken place on account of its lack of usefulness, since even the most savage tribes show a need of it, endeavoring to replace it by artificial coverings, especially on the

[1] In the second edition of this book, Wallace maintains the same position with regard to skull-measurement as a criterion of mental capacity. Nor does he notice distinctions in skull-form or the proportions of different parts of the brain to each other, except in the one case of the Eyzies.

back. This naked skin is, however, of importance to civilization, since it leads to the adoption of both clothing and houses, and develops, through the former, the sense of modesty. The loss of the prehensile character of the whole foot, and especially of the pedal thumb, is a preparation for civilization. So, too, the capacity of the human voice for music, of little use to savages, since their singing consists only in a sort of monotonous howling, must be regarded as a preparation for the civilized man's delight in music, and probably also for a higher state than that to which we have yet attained.

Nor can the sanctity which attaches to virtue, even among savages, be explained by utility or natural selection. The "mystic sense of wrong," which, although few laws enforce truth, yet attaches to untruth, even among whole tribes of utter savages, is an example of such sanctity. Wallace adds, however, in the same breath: "No very severe reprobation follows untruth. In all ages, falsehood has been thought venial or even laudable under certain conditions." He asserts that "the utilitarian doctrine is not sufficient to account for the development of the moral sense," but seems, nevertheless, to adopt a utilitarian principle as the basis of the moral sense when he says: "Where free play is allowed to the relations between man and man, this feeling [*i.e.* of sanctity] attaches itself to those acts of universal utility or self-sacrifice which are the products of our affections and sympathies which we term moral"; and he adds: "while it may be, and often is, perverted to give the same sanction to acts of narrow and conventional utility which are really immoral, — as when the Hindoo will tell a lie, but will sooner starve than eat unclean food; and looks upon the marriage of adult females as gross immorality." The explanation of this inconsistency is, according to Wallace, that the strength of the moral feeling, in any case, will depend on the individual or racial constitution, and on education and habit; and the acts to which its sanctions are applied will depend on the extent of modification of the simple feelings and affections by custom, law, and religion. If a moral sense is an essential part of our nature, it is easy to see that its sanction may often be given to acts which are useless or immoral, just as the natural appetite for drink is perverted by the drunkard into the means of his destruction.

These phenomena of the preparation of the human being for civilization and morality can be explained only on the supposition

of a superior intelligence which has guided man's development in a definite direction, just as man guides the development of many animal forms. By a superior intelligence is not necessarily meant the supreme intelligence. The modern cultivated mind seems incapable of realizing between it and the Deity other grades of intelligence, which the law of Continuity would, however, force us to infer: and rejecting first causes for any and every especial effect in the universe, except in the sense that the action of any intelligent being is a first cause, we can still conceive that the development of the essentially human portions of man's structure may have been, in this sense, "determined by the directing influence of some higher intelligent beings acting through natural and universal laws."[1] "It is probable that the true law of this development lies too deep for our discovery." Wallace quotes, in support of his theory, some of Professor Tyndall's much-disputed statements, — to the effect that the chasm between the phenomena of mind and those of brain is impassable. "To say that mind is a product or function of protoplasm, or of its molecular changes, is to use words to which we can attach no clear conception. You cannot have in the whole what does not exist in any of the parts;[2] and those who argue thus should put forth a precise definition of matter with clearly enumerated properties, and show that the necessary result of a certain complex arrangement of the elements or atoms of that matter will be the production of self-consciousness. There is no escape from the dilemma, — either all matter is conscious, or consciousness is[3] something distinct from matter, and in the latter case its presence in material forms is a proof of the existence of conscious beings outside of, and independent of, what we term matter.

"The merest rudiment of sensation or self-consciousness is infinitely removed from absolutely non-sentient or unconscious matter. We can conceive of no physical addition to, or modification of, an unconscious mass which should create consciousness, no step in the series of changes organized matter may undergo, which should bring sensation where there was no sensa-

[1] See Wallace on "Miracles and Modern Spiritualism," "The Psychophysiological Sciences and their Assailants," and "The Scientific Aspect of the Supernatural."

[2] Wallace omits this particular clause in his second edition.

[3] The second edition reads "is, or pertains to."

tion or power of sensation at the preceding step. It is because the things are utterly incomparable and incommensurable that we can only conceive of *sensation* coming to matter from without, while *life* may be conceived as merely a specific modification and coördination of the matter and the forces that compose the universe, and with which we are separately acquainted. We may admit with Professor Huxley, that *protoplasm* is the 'matter of life' and the cause of organization; but we cannot admit or conceive that *protoplasm* is the primary source of sensation and consciousness, or that it can ever of itself become *conscious* in the same way as we may perhaps conceive that it may become *alive*."

Wallace then reaches, without further preliminary discussion, the conclusion that "matter is essentially force" (arguing that we may draw this conclusion from the preceding considerations); that "matter, as popularly understood, does not exist, and is, in fact, philosophically inconceivable. When we touch matter, we only really experience sensations of resistance, implying repulsive force; and no other sense can give us such apparently solid proofs of the reality of matter as touch does." Wallace considers it a great step in advance thus "to get rid of the notion that matter is a thing in itself which can exist *per se*, and must have been eternal, since it is supposed to be indestructible and uncreated, — that force, or the forces of nature, are another thing given or added to matter, or else its necessary properties, — and that mind is yet another thing, either a product of this matter and its supposed inherent forces, or distinct from and co-existent with it"; and to be able to substitute for this theory "the far simpler and more consistent belief, that matter, as an entity distinct from force, does not exist; and that FORCE is a product of MIND."

"If we are satisfied that force or forces are all that exist in the material universe, we are next led to inquire what is force." We are acquainted with two kinds of force — our own will-force, and the forces of nature. Freedom of the will cannot be disproved, for it cannot be shown that there is not one-thousandth of a grain's difference between the force exerted by the body and the force derived from without. "If, therefore, we have traced one force, however minute, to an origin in our will, while we have no knowledge of any other primary cause of force, it does not seem an improbable conclusion that all force may be will-force; and thus,

that the whole universe is not merely dependent on, but actually *is* the *will* of higher intelligences, or of one Supreme Intelligence."

But though Wallace declares "natural selection, as the law of the strongest, inadequate" to account for man's mental and moral development, since the finer feelings and capacities could have been of no use to human beings in the early stages of barbarism, and further maintains that it is also difficult to understand how "feelings developed by one set of actions could be transferred to acts of which the utility was partial, imaginary, or altogether absent," he nevertheless has other passages like the following: "In proportion as physical characteristics become of less importance, mental and moral qualities will have increasing influence on the well-being of the race. Capacity for acting in concert for protection and for the acquisition of food and shelter; sympathy, which leads all in turn to assist each other; the sense of right, which checks depredations upon our fellows; the smaller development of the combative and destructive propensities, self-restraint in present appetites; and that intelligent foresight which prepares for the future, are all qualities that, from their earliest appearance, must have been for the benefit of each community, and would, therefore, have become the subjects of natural selection. For it is evident that such qualities would be for the well-being of man; would guard him against external enemies, against internal dissensions, and against the effects of inclement seasons and impending famine, more surely than could any merely physical modification. Tribes in which such mental and moral qualities were predominant would therefore have an advantage over other tribes in which they were less developed, would live and maintain their numbers, while the others would decrease and finally succumb." "From the time, therefore, when the social and sympathetic feelings came into active operation, and the intellectual and moral faculties became fairly developed, man would cease to be influenced by natural selection in his physical form and structure. As an animal, he would remain almost stationary, the changes of the surrounding universe ceasing to produce in him that powerful modifying effect which they exercise over other parts of the organic world. But from the moment that the form of his body became stationary, his mind would become subject to those very influences from which his body had escaped; every slight variation in his mental and moral nature which should enable

him better to guard against adverse circumstances, and combine for mutual comfort and protection would be preserved and accumulated; the better and higher specimens of our race would therefore increase and spread, the lower and more brutal would give way and successively die out, and that rapid advancement of mental organization would occur which has raised the very lowest races of man so far above the brutes (although differing so little from some of them in physical structure) and, in conjunction with scarcely perceptible modifications of form, has developed the wonderful intellect of the European races." "When the power that had hitherto modified the body had its action transferred to the mind, then races would advance and become improved, merely by the harsh discipline of a sterile soil and inclement seasons; under their influence a hardier, a more provident, and a more social race would be developed." And especially: "If my conclusions are just, it must inevitably follow that the higher — the more intellectual and moral — must displace the lower and more degraded races; and the power of natural selection, still acting on his mental organization, must ever lead to a more perfect adaptation of man's higher faculties to the conditions of surrounding nature and to the exigencies of the social state. While his external form will probably ever remain unchanged, except in the development of that perfect beauty which results from a healthy and well-organized body, refined and ennobled by the highest intellectual faculties and sympathetic emotions, his mental constitution may advance and improve, till the world is again inhabited by a single nearly homogeneous race, no individual of which will be inferior to the noblest specimens of existing humanity.

"Our progress towards such a result is very slow, but it still seems to be a progress."

In "Darwinism" (1889), Wallace advocates Weismann's theory of heredity. With regard to instinct, he uses arguments similar to those of his earlier work. He says of the hunting instincts of dogs: "At first sight it appears as if the acquired habits of our trained dogs — pointers, retrievers, etc. — are certainly inherited; but this need not be the case, because there must be some structural or physical peculiarities, such as modifications in the attachments of muscles, increased delicacy of smell or sight, or peculiar likes and dislikes, which are inherited; and from these,

peculiar habits follow as a natural consequence, or are easily acquired." So that he thus defines instinct, by implication, as he does also in his former book, as inherited habit which has no correlative in physical organization, and is unconnected with feelings of liking or disliking. He further says: "Again, much of the perfection of instinct is due to the extreme severity of the selection, any failure involving destruction"; and adds that, even if we admit the inheritance of the effects of the direct action of the environment on the individual, the effects are so small in comparison with the amount of spontaneous variation of every part of the organism, that they must be quite overshadowed by the latter.[1] In his theory of a higher intelligence guiding human development, Wallace seems, in this book, to have abandoned all his former arguments except those from the mental and moral faculties, and it is perhaps due to a perception of the inconsistencies of his former utterances on the subject of the moral sense that he barely touches upon it in this book. On the other hand, he has elaborated his arguments from the mathematical and artistic faculties, and added an argument from wit and humor, none of which are found, he urges, among savages, except in their very rudiments, and none of which could have been developed by natural selection, since none could have been a cause of man's conquest in his struggles with wild beasts or with other tribes or nations. In answer to the objection that the law of Continuity, which he has quoted as favoring the belief in the existence of grades of supernatural beings between man and the Deity, tells against the introduction of new causes in man's development, Wallace maintains that there are certainly two other points in evolution where such new causes come into play, — namely, at the beginning of life and at the beginning of consciousness. "Increase of complexity in chemical compounds, with consequent instability, even if we admit that it may have produced protoplasm as a chemical compound, could certainly not have produced living protoplasm, — protoplasm which has the power of growth and reproduction, and of that continuous process of development which has resulted in the marvellous variety and complex organization of the whole vegetable kingdom, or, that is, vitality."[2]

[1] Pp. 442, 443.

[2] This is contradictory of the passages on the subject of life above noticed as occurring in the "Contributions to Natural Selection," and retained in the second edition of that book.

"All idea of mere complication of structure producing" consciousness is "out of the question." "Because man's physical structure has been developed from an animal form by natural selection, it does not follow that his mental nature, even though developed *pari passu* with it, has been developed by the same causes only."[1] Yet, in assuming Weismann's theory, Wallace asserts: "Whatever other causes have been at work, Natural Selection is supreme, to an extent which even Darwin himself hesitated to claim for it." "While admitting, as Darwin always admitted, the coöperation of the fundamental laws of growth and variation, of correlation and heredity, in determining the direction of lines of variation, or in the initiation of peculiar organs, we find that variation and natural selection are ever-present agencies which take possession, as it were, of every minute change originated by these fundamental causes, check or favor their further development, or modify them in countless ways according to the varying needs of the organism."[2]

In the opening portions of this book Wallace introduces a teleological argument to the effect that the pain which we ordinarily conceive as connected with the struggle for existence among lower species is mostly a figment of our imagination. Periods of suffering are comparatively short, since death speedily and without anticipation puts an end to those animals in any way incapacitated. Livingstone describes how, when seized by a lion, a sort of stupor succeeded the first shock, so that he felt neither fear nor pain; it is probable that terror induces this same condition in animals seized by beasts of prey, and that their end is therefore painless after the first shock. Cold is generally severest at night and tends to produce sleep and painless extinction. Hunger is scarcely felt during periods of excitement, "and when food is scarce, the excitement of seeking it is at its greatest." Nor is the gradual exhaustion and weakness of slow starvation necessarily painful.