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The Genesis of Mind. By HENRY MAUDSLEY, M.D.

As it has ever been the custom of man to act as if he were eternal, and lavishly to scatter the limited force which he embodies as though the supply were inexhaustible, it produces no unaccustomed surprise to witness the useless expenditure of force which is so frequently made at the present time. It may even, perhaps, be deemed a token of some modesty, that the being, who since his first formation has been continually occupied in metaphysical regions with the investigation of the origin of all things, should be content for a while to amuse himself with physical theories concerning his own origin. That which is to be regretted in the new and comparatively praiseworthy occupation is the old evil of hasty theorizing on the one hand, and on the other hand, the evil, scarcely less ancient, of an impetuous eagerness to demolish any theory, however plausible, which comes athwart a favourite prejudice. What though the anatomist does discover a very close resemblance and very slight differences between the structure of a gorilla and the structure of a human being; there is no need, on that account, that mankind in a feeling of injured dignity should angrily rouse up and disclaim the undesired relationship. Whatever may be said or written, it is quite plain after all that a man is not a gorilla, and that a gorilla is not a man; it is furthermore manifest that gorillas do not breed men now-a-days, and that we have not the shadow of any evidence to guide us in forming an opinion as to what they may have done in times past. The negative testimony of Du Chaillu, who says that he searched in vain in the gorilla region for any intermediate race or link between it and man, scarcely adds anything to the conviction of the non-existence of any such link, which has long been universally entertained.*

Science, it is true, has made known to us that a law of progression

* It is true that Dr. Krapf ('Trav., Research., and Miss. Lab. during eighteen years residence in East Africa,' by Rev. Dr. J. L. Krapf, p. 52), learned from the natives, that to the south of Kaffa and Susa there is a country, very sultry and moist, covered with bamboowood, that is inhabited by a race of Dokos—a people no more than four feet in height, of dark olive complexion, who live in a completely

pervades the kingdoms of organic existence. On the strata which form the crust of the earth, it is written that the lower forms of existence have preceded those of a higher development; and the records of nature, as far as they have been studied, prove that, notwithstanding the absence of particular links in the chain of progress, there has been through the geological periods a general advance in life up to man, who at present crowns the mighty fabric. But, though thus alone on the pinnacle of existence, he is placed there by steps of successive gradation; and the fact of a close structural relationship to the animals cannot possibly be denied, whatever be said of any so-called explanation thereof. As far, indeed, as visible structure is concerned, there is evidently no need of, or place for, an intermediate being between man and the monkey; and this fact, in the absence of any evidence whatever of any relation of descent, must really be regarded as adding force to the presumption against any such descent. It seems not altogether improbable that before long the theory of Darwin, which is as little satisfactory, will be as little remembered as those, not unlike it, which were successively put forward on the same subject by Lamarck, and by the author of the 'Vestiges of Creation.' Whether one so-called species has in the process of time given origin to a higher species, is, in the absence of evidence, of comparatively little import; inasmuch as it is just as difficult for us finite beings to conceive of a cause determining such an important change upwards, as it is to conceive the creation of a new species. The occurrence of a wonderful series of changes in the external conditions, capable of producing so regular an advance in animal life, is an assumption as causeless and as much needing explanation as the circumstances which it is created to account for. Time, again, which is everything to mortals, is nothing to nature, and the long period which must have elapsed in the supposed transmutation of a higher species, it is impossible for beings so conditioned in time to realize; and the conception being impossible, the fact, however it was brought about, is as good as miraculous.

Were it really true that man was descended from the monkey, as it is true that he is closely allied to it in structure, it would still be undeniable that he had advanced immeasurably beyond his immediate brute ancestor; and that his history, short as it yet is in nature's chronology, has already presented certain examples of nobly lived lives, which, as events, are of quite a different order from any other

savage state like the beasts. They go quite naked, and allow the nails on their hands and feet to grow, for the purpose of digging up ants and tearing to pieces serpents, on which they chiefly live; they have no houses, but climb trees like monkeys; they do not marry, and the mother nurses her child only for a short time, accustoming it, as soon as possible, to eat ants and serpents, and then leaving it. He professes to have actually met with a slave who agreed with this description. But missionaries are oftentimes credulous; and Dr. Krapf's authority is not very highly esteemed by Major Burton. ('Lake Regions of Central Africa.')

events in nature, and which, therefore, remove their actors from the category of any other living creatures. While it is in its structure that we recognise the degree of development of the brute, it is in his *life* that we justly recognise the development of man. Moses, Socrates, Plato, Shakespeare, and many other great men have lived; it is, therefore, in the capability of mankind to produce such again. What Socrates has uttered and has been, other men well-born may utter and may be; what Plato has thought, others may think; and even what Shakespeare has written, another may write. Great as these heroes were, they were not of a different species from other men; they only struggled upwards with success, as it is in the beneficent purpose of nature that all should do. But a considerable amount of mischief is done by the complacent vanity with which man demonstrates his superior relation to other animals, in place of labouring earnestly to develop those relations to something higher which undoubtedly exist potentially in him; for the progression which has been observed in nature, should rightly be realized in the events of every human life—in the history of mankind, as well as in the history of the individual.* We may rise step by step from the lowest forms of organic matter up to man, and when we have arrived there, we are only on the threshold of a new path of progression, the term of which, as it proceeds in human development through the ages, only the Omniscient can discern.

It requires but small consideration to affirm that no mortal does his duty who does not improve; and what advantage it is to any one to be higher than the troglodytes niger in structure when this function is not evolved, is certainly not evident. A higher type may by a low grade of development be brought to a condition not higher than, if not inferior to, that of a lower type which has attained to a high grade of development. For the position of any being in the universe is determined, as Von Baer has shown, not by the type alone, nor by the grade of development alone, but by the product of the type and the grade of development. Scientifically speaking it is, then, the solemn duty of mankind to realize the possibility of its type, and thus to exalt its condition. It is error, sin, ignorance, disease, or whatsoever else we call it, when, by base indulgence of passions or indolent neglect of his faculties, man degrades himself to a position below that which he should justly occupy, and thus makes the degeneration of a race. He cannot surely then boast himself over the gorilla which, doing faithfully its gorilla duties in the gloomy forests of equatorial Africa, is plainly more worthy, more true to its destiny, than the miserable human being, who, by per-

* Were it not that all men are only too glad to pull down the mighty to their level, 'to pare the mountain to the plain,' one might wonder that no one has tried to prove these heroes of a different species from the common ruck of mortals.—*Ὅτι δὴ οὐκ ἴμῃθεοι εἰ ἦρωες*, as Socrates says." (Cratylus, ch. xxxii.)

sistent sensuality, has reduced himself or his posterity to a condition of demented disease, such as nature presents not amongst her own immediate works. The degeneration of a noble type is a pitiable spectacle, for it is a retrogression in nature; while the faithful development of a humble type is full of hope and encouragement; it is prophetic of immortality.

In the domain of organic existence, every being may be said to contain in itself all those beings that are of a lower type. It appears as though nature condensed into the narrow compass of the individual all those processes which up to the time of the new appearance she had exhibited on the large scale of general life; as if, indeed, each advancing creature was the microcosm of the macrocosm whence it came.

An account of the animal kingdom reads like a history of innumerable efforts on the part of nature to improve successively on every work from the beginning, and discloses a series of regular advances up to man; it is an interesting reflection that, in the formation of the individual, the same gradual stages that have preceded the appearance of the race on earth, are more or less distinctly passed through. So strikingly is this illustrated, that it has been said by a comparative anatomist of much celebrity in his day, that man is a fish when he is in the liquor amnii! It would seem, however, to be as correct to say that man is a protozoon in the ovary, or something even lower than the protozoon, when in actual condition he is very much like the simplest vegetable. Few will be found at the present day seriously to maintain that the human body in its development passes through an exact succession of stages each of which has its permanent representative among the lower animals. Von Baer showed the fallacy of such a fancy, but he at the same time proved that there was one general plan of development, and that the changes in the human embryo, up to a certain period, were precisely similar to those which take place in the development of the vertebrata. In organic nature, development is, as he pointed out, uniformly a progress from the general to the special, from the one tissue answering every purpose, or the one organ fulfilling manifold offices, to a differentiation of tissues and organs, and a specialization of function. As in the fossil animals of the successive strata of the earth's crust, we trace life, first manifesting itself in the simple zoophyte, as it passes through the different invertebrata into the much higher organization of the fish; and from this latter again, through the intermediate Batrachian organization, into the more special and complex form of the higher reptiles, until at last, through successive gradations, the most complex and delicately organized body of all has appeared; so at the present time, the existence of every living being commences in the form of a simple cell, advances at first by multiplicate subdivision thereof, and proceeds in time, by differentiation of tissue and part, to that condition which is its destined permanent one.

Though, in accordance with such a law of development, the human body must pass in part through the same stages as the animal's, and resemble at certain times the permanent states of some of them, yet it is evident that the road it traverses is emphatically its own, and leads nowhere but to its own completion; while the lower forms of being stand a little aside from the main path, as though they were milestones, marking the distance. For the history of the development of each class of the vertebrata does really disclose an increasing departure from the general type and an assumption of more special characteristics; the branch springs from the trunk, but gradually gets farther and farther away from it, and puts out secondary branches of its own. Thus, for example, in all the palæozoic fishes, the notochord was persistent; and, although it precedes the formation of true bony substance in all vertebrata, and is, therefore, of the general plan of development, yet there are but two genera of fishes which exhibit the notochordal structure at the present day, the *Protopterus* of Africa, and the *Lepidosiren* of South America. In all the rest it is hardened into bone.* The stem of life throwing out, as it were, the different branches of the animal orders ascends into man; and even if we consider human structure only, but most palpably if, as we are philosophically bound to do, we consider human history, it will be apparent that he also is gradually developing more special characteristics and standing out more markedly from the general plan.†

The law which formularizes the method of development of the whole body is found to govern the development of each organ thereof, and is especially remarkable in the growth of the human brain—that “end and fruit of Nature's greatest efforts,” as Geoffroy St. Hilaire calls it. Different, as it unquestionably is, from the corresponding organ of any animal when full-grown, it nevertheless passes through stages of development in which it closely resembles the permanent brain condition of certain animals. The foetal brain of the fish, and the foetal brain of any young mammal, at the earliest period of their formation, cannot be distinguished; and at the sixth week of embryonic life the human brain resembles that of the higher full-grown fish, in which the rudiment of a true cerebrum first appears. The brain of the reptile surpasses but little that of the fish; that of birds is, however, remarkable for the increased size of the cerebral hemispheres, and may justly be compared

* Owen's 'Palæontology.'

† Inasmuch then as it appears from such considerations that the more fully developed the monkey type, the more it recedes from the human type however imperfectly the latter is developed, the highest monkeys will be least likely to supply any connecting link between themselves and man. So that if man did spring from the monkeys, it must have been when the latter were very young; and as we may say, the same of the monkeys, the animals from which they sprang, and so on downwards, even to the protozoon, we shall have all animals nearly clustered together at their origin, on the supposition of a transmutation of species.

to the human brain at the twelfth week of embryonic life. The Marsupialia, being the lowest division of the mammalia, do not advance much beyond the birds, but as we pass upwards in the mammalian scale, the cerebral hemispheres increase in size, convolutions appear on their surface, and the monkey arrives at the dignity of a brain that most nearly resembles that of man. In fact, the human brain, which is Marsupialian at the third month, corresponds during the fourth, and the early part of the fifth month, to that of the higher Ruminantia, and has last of all the important posterior lobes pushed backwards, as in the monkey, so as to cover the cerebellum; it then differs only from that of the monkey in the height, breadth, and depth of the hemispheres, and in the complexity and unsymmetrical character of the convolutions.* With the increasing size of the cerebral hemispheres correspond increased manifestations of intelligence; birds are more intelligent than fishes, and monkeys more intelligent than birds; and throughout the function progressively reveals the growing power of the organ. Here, however, the comparison can no longer be continued between the human and animal brain; for though at a certain period there may be a resemblance in structure, the former has not commenced its proper function while the latter is in active exercise.

That there is no manifestation of mind during life in utero is generally admitted. The embryo cannot be supposed conscious even of a sensation. As it is subject to a uniform temperature, and is surrounded by a fluid in which it floats, there is so far no difference in the impressions on its surface, and there can, therefore, be no sensation; for a sensation supposes the comparison of a present and a past, and to live in one sensation would be equivalent to having no sensation at all. But it may be said that the foetus strikes against the walls of the womb, and that such contact would be a sufficient cause of sensation. The measure of the impression in this case would be, as Bichat observes, the difference between the density of the womb and that of the fluid therein; and as this difference is but little, the sensation anyhow would be very obtuse. Even the movements which undoubtedly take place in the foetus cannot, in the possibility of a simpler explanation, furnish any evidence of sensation; the highest category to which they can be justly referred is that of reflex actions. But it may be asked, reflex to what, seeing that there is almost no outer impression possible? and although the great sensitiveness of a growing nervous system, largely developed in proportion to other organs, might legitimately be supposed to respond to very slight impressions, the objection is of some importance.† It

* Respecting human and simian brains, the curious may consult 'Natural Hist. Reviews,' Nos. 1, 2, 3, in which are articles by Prof. Huxley, Dr. Rolleston, and Mr. Marshall.

† That the embryo moves there can be no doubt. Wrisberg has seen one of five

will not appear necessary, however, to regard the movements of the fœtus as reflex to impressions on its surface when we reflect that it is but a part of the organic life of the mother, and liable, therefore, to be influenced by the same forces which affect that. Now it is well known that the passions influence powerfully the organic processes, so much so as to have induced Bichat to locate them in the organs of organic life; they increase or diminish a secretion, and sometimes alter the character of it; they interfere with the processes of nutrition, aiding or impeding them, and they involuntarily affect the muscles. It seems, indeed, that every emotion when excited in early life, before the circle of its action has been limited by self-formation, passes like a wave through the whole body; and when in later life, from a defective education or other circumstances, its habitual action has not been determined into the evolution of ideas and thus confined to a small circle, or where, from some cause, it has become excessive, we have ample evidence of its wave-like expansion through the organism, and through that which for the time being is a part of the organism. Mindful of the principle of the conservation of force we confidently expect every force to be accounted for somewhere, and believe that even a violent emotion only disappears in certain positive effects. Observation also forces to the conclusion, which on general principles we should anticipate, that just as man embodies his finer emotions in beautiful works of art, so nature sometimes embodies the strong feelings of the mother's mind in the nervous organization of the child which she bears in her womb.* This diffusion of emotion, which seems to be in some degree explanatory of the effect produced in the character of the child by the mental condition of its mother during her period of gestation, may be supposed also to account for the foetal movements. They are either (A), the direct discharge of superabundant emotional force in the parent; or, (B) they are reflex acts on the part of a highly charged foetal nervous system. In the latter case they may be supposed to be reflex, either (a) to some passing state of the mother's mind, or (b) to some derangement in her organic life, or (c) to such slight impressions as are made on the surface of the

months extend its limbs; and Burdach cites a similar case. ('Développement de l'Homme,' Bischoff, p. 475.) That the movements are not consensual is proved by a case described by Dr. Ollier. ('Compt. Rend. de la Soc. de Biologie,' ii, p. 106, 1850.) In this case there were strong movements of the child in utero, while a mere band represented the spinal cord, and there was no brain; it was anencephalic. ('Central Nerv. System,' Dr. Brown-Séquard, Appendix.)

* Müller denies ('Physiology,' Dr. Baly's translation, vol. ii, p. 1405), that ideas in the mind of the parent can be realized in the structure of the fœtus. The only way, he thinks, in which the mind of the mother can affect the fœtus is by a sudden emotion in the former affecting the organic actions, so as to produce an arrest of development in the latter. The remarks is doubtless true of the so-called mother's marks; but the evidence of observation and analogy is certainly in favour of the permanent influence of maternal *emotion* on the child.

fœtus. It is quite in accordance with such explanation that, in those rare cases in which infants have been born maniacal, great pain has been experienced by the mother during gestation, by reason of the great restlessness of the fœtus. Whoever fairly considers the evidence, will at any rate recognize the life of the fœtus in utero as a part of the organic life of the mother, and, as Locke observes, "will perhaps find reason to imagine that a fœtus in the mother's womb differs not much from the state of a vegetable, but passes the greatest part of its time without perception or thought, doing very little in a place where it needs not seek for food, and is surrounded with liquor always equally soft, and near of the same temper; where the eyes have no light, and the ears so shut up, are not very susceptible of sounds, and where there is little or no variety or change of objects to move the senses."*

But when at the appointed time the completely formed fœtus enters into the relations of a new life on its own account, are we bound to suppose that a brain which has previously passed through stages of development represented by the permanent brain condition of certain animals, must at once manifest an intelligence beyond that displayed by any of them? Certainly not; the analogy of nature rather prepares us to expect that the same progress from the general to the special, should be exhibited in the development of intelligence which we find exhibited in the development of the organ thereof. And, in truth, though the brain is formed during embryonic life, its real development only takes place afterwards, for it is eminently the organ of man's relations with the rest of nature, receiving its necessary nourishment through the inlets of the senses from the impressions of surrounding objects, and attaining its designed end in the establishment of an intimate and true relationship between the individual and nature. It is not, like the liver, the heart, or other internal organs, capable from the beginning of all the functions to which it ever ministers; while, in common with them, it has a certain organic function to which it is born equal, its high special functions in man as the organ of animal life, are developed only by a long and patient education.† For though the mind exists potentially in the individual at birth, it cannot be said to exist in full actuality any more than the chicken can be said actually to exist in the recently-dropped egg, or the plant actually to be present in the seed. Mental action is developed gradually from the relations of the individual and his surroundings, and is a result to which one element is as

* 'On the Human Understanding,' Bohn's ed., vol. i, p. 221.

† The brain does not attain to its full growth till some time after birth. Sæmmering believed that it did not increase after the third year, while the brothers Wenzel, limited its time of growth to the seventh year; but Gratiolet affirms positively, that it increases, though slowly and slightly, after that period, and has its form modified. ('Anat. Comp. du Système Nerv. : considérée dans ses rapports avec l'Intelligence,' par Leuret et Gratiolet, ii, p. 302.)

necessary as the other. There is, without doubt, a much higher potentiality in the brain of the youngest infant than there is in that of the highest, oldest, and most experienced quadruped or quadrumanous animal; but before such potentiality develops into actuality, so much time must elapse, and certain conditions be present, just as time and conditions were necessary in the geological epochs before the potentiality of a higher brain, which there manifestly was in that organ of a quadruped, was developed into the actuality of the first monkey's brain. There is no necessity to suppose, and certainly no reason to assume, that in the gradual development of human intelligence nature has departed from that law which she has so consistently followed in the development of animal intelligence. We must only remember that, inasmuch as in the latter case the process is diffused over ages, and the stages thereof marked by countless individuals, whilst in the former it is condensed into the short period of a few years, we cannot justly expect the same well-marked distinction of stages.

"He that will suffer himself to be informed by observation and experiment, and not make his own hypothesis the rule of nature, will find few signs of a soul accustomed to much thinking in a new-born child, and much fewer of any reasoning at all;"* he will, if he have candour and insight, probably agree with Majendie that, for several hours after birth, sight, hearing, and taste, do not exist.† Touch alone seems to be then in exercise, and to precede the action of the other senses in the child like as it does in the order of development of the animal kingdom; for a sort of tactile sensibility appears to be the only sense with which those humble creatures are endowed that are destitute of the simplest kind of organs of the special senses.‡ Even should it be thought probable that the special senses are in action in man from the first moment after birth, it must be admitted that they do not convey any definite information; that they are at first confused and general, and require to be educated to their full functions just as much as does the brain. It would really be a profitless word discussion to attempt to establish a distinct line in the development of sensation, when nature has drawn none; for whatever names we may choose to describe the process by, and

* Locke.

† Note to 'Bichat sur la Vie et la Mort,' p. 196.

‡ It is in the Echinodermata that the small spots, supposed to be eyes, are first observed; in the tunicated Molluscs that auditory bodies are first recognised; but there is no certainty in the matter. (Carpenter's 'Comp. Phys.'). It may be presumed, however, that the sensibility which animals lower than these have, may be able to communicate information such as higher animals only receive through special organs. There is some probability that the impressions on all the senses are produced by certain undulations; and it is not unlikely that the sensibilities of these humble animals may respond generally to the various undulations of light, of heat, of sound, &c., and thus communicate what higher beings only obtain by special organs devoted to particular undulations. This would be in accordance with the progressive law of development.

whatever differences in stages we may find it convenient to make, it is quite evident that man does not wake from utter unconsciousness to consciousness save in the most gradual manner—that he passes from a vegetative life to a life of sensation by no recognizable leap. As we are unable to decide in organic life where actual sensation begins, as we cannot positively assert that the sensitive plant reacting to a stimulus has not sensation, or that the polype closing in its tentacles upon its prey has, so we are incapacitated by our ignorance from pronouncing with any certainty on the time when sensation is first developed in the human being.

It has recently, indeed, been maintained by Mr. Bain,* that movement precedes sensation, and is independent of any stimulus from without; that there is, in fact, a spontaneous tendency to execute movements without the stimulus of sensation or feeling, and that it is in this spontaneity that the will arises. A somewhat similar notion appears to have been entertained by Muller,† who was reduced by it, in view of the facts that the anencephalic fœtus, and the puppy deprived of its brain, will both suck when the nipple is placed between their lips, to the unfortunate necessity of supposing that the medulla oblongata was the seat of volition.‡ Nevertheless, the evidence seems to be decidedly in favour of movement preceding sensation; but this is quite a different thing from saying that the first movements of infancy are independent of any stimulus from without. When we call to mind the entirely changed relations into which the newborn infant is introduced, and reflect that it by constitution is destined to react in them, it certainly seems somewhat hazardous to affirm that the earliest movements take place quite independent of any stimulus from without. The first respiration is by many supposed to be excited by the contact of the air with the surface of the child's body; and, at any rate, it is certain that, in cases of so-called suspended animation, the infant may enter the world motionless and to all appearance dead, and yet be revived to movement by the persistent application of a stimulus from without. Inasmuch, then, as the external stimulus may produce the movement where there is no spontaneous tendency thereto, and inasmuch as whenever the spontaneous tendency operates, there is always a universe of external stimuli around, it may be the most legitimate to say that there would be no spontaneous tendency but for the external stimuli, and, on the other hand, that the external stimuli would be inoperative without some spontaneous tendency or inherent potentiality. It must be remembered, that

* 'The Emotions and the Will,' p. 327.

† 'Elements of Physiology,' vol. ii, pp. 935, 936.

‡ But reflex action was not understood at that time. That such actions are reflex has been shown by many writers. Grainger, 'Observ. on Struct. and Funct. of Spinal Cord,' p. 80; J. Reid, 'Physiol. Anat. and Pathol. Researches,' p. 183; Brown-Séquard, 'Experim. Research. app. to Physiol.,' p. 5; Simpson, 'Edin. Med. Journ.,' July, 1849; Bischoff, *op. cit.*

every phenomenon of life is a relation of which the correlatives are the individual and external nature.*

It is, in fact, at the earliest period in its life that what is called reflex action enters into the infant's history, and bridges over the chasm between a vegetative existence and one of the lowest sensation. What it is most important continually to keep in mind is, that an individual is not an incoherent or even a coherent aggregation of several distinct forces, but that he is the embodiment of one force which expresses itself in consciousness as the unity of the ego, and which manifests itself outwardly in different modes of action. When, therefore, we speak of the organic force, of reflex action, of instinct and so forth, we intend to express the operations of the same force constantly acting according to an intelligent plan in the growth, development, and conservation of the organism. Every organism, vegetable or animal, being constructed with reference to a definite purpose, cannot, by beings constituted as we are, but be supposed to realize a certain divine idea, and to exhibit the intelligence of such idea in the various displays of its force. We have no more cause, then, to be surprised at the wonderful adaptation to ends in the reaction which we designate reflex, than we have to marvel at the intelligent reaction of the organic force evidenced in the construction and maintenance of the organism. The same observations may be made with regard to instinct, which has no special seat in any organ of the body, and which cannot justly be separated from the creative force of the organism. When the humble little creature that has just sprung into existence enters at once upon all the actions which the oldest member of its class can accomplish, and executes them as successfully in its first attempt as it does after a life-experience, the circumstance, whether referred to reflex action or to instinct, furnishes an example of the same fundamental reaction under different conditions with that which has been before evinced by the construction of the delicate organism in nature's more secret chambers. It seems, indeed, as if, throughout the organic, intelligence were striving for evolution, painfully struggling to express itself; for it is hardly acknowledged under the thick veil of what are called the

* Brown-Séquard has tried to prove ('Experiment. Research. applied to Physiol. and Pathol.,' pp. 101—113) that nerves and muscles may be excited to act by blood containing a great quantity of carbonic acid; and he supposes that the respiratory movements, and also the apparent spontaneous movements of the infant, normal or anencephalic, may be produced by that cause. If this be so, it may be said that the first movements do take place independent of a stimulus from without. But (1) it is the withdrawal of a certain influence from without that causes the accumulation of carbonic acid in the blood, and the carbonic acid is really an external stimulus; and (2), according to the metaphysicians, the nervous organism, "in reference to consciousness in general and the personal self, properly so-called, must be regarded as belonging to the object." So that any stimulus to the organism must be external as regards mind whence the spontaneity flows. (Mansel, 'Phenomenal and Real Consciousness.')

organic processes ; it is dimly visible through the mists of the reflex acts that are immediately above the organic ; but as we follow upwards the development of living nature, the bud, as it were, begins to open in the dawning of self-consciousness and the correlative world-consciousness, and ultimately expands into the full flower of the highest conscious intelligence, and that freedom of a completely fashioned will which is the reaction thereof. It is quite in accordance with this plan of development that the reflex movements of early infancy should be irregular and appear purposeless ; for although the humble creature in its little sphere is so constructed as to react definitely to the impression as soon as it comes into being, yet it is conformable to the developmental law of progression from the general to the special that reflex action should not be all-sufficient in the higher animal, but that, though still holding an independent position in some things, it should, in others, be resolved into, subordinated to, or superseded by those higher manifestations of force which potentially exist in the nobler being at birth, and by the education of favorable circumstances are developed.

Irregular though the earliest movements of infancy may be, they are certainly not purposeless, for they imperceptibly waken sensation. In the infant's limbs or body certain movements first take place by reflex action, and the infant has no consciousness of producing those movements ; but it does not thence follow that it has no consciousness of them when produced. It is probable, indeed, that the effect becomes the cause of a new reaction, and that, whether on the first occasion or after some time, the moving limb excites in the child a sensation of a part of its own body. To this sensation there is a respondent movement, which is not yet voluntary, but may be justly described as consensual ; and it is this movement which, bringing the limb or other part of the body in contact with some external object, and thereby under the condition of a new sensation, excites the first consciousness of a not-self ; it is the reaction to the consciousness of self that gives the first dim consciousness of a not-self. And as the excitation of the same parts will produce the same sensation, there follows in time an association of certain movements with certain sensations, so that to the sensation excited from without there may be a conscious exercise of the motion that has been connected with it. Such a conscious movement reveals the first appearance of will in the child's mental history, the fundamental reaction arriving at this evolution through the preliminary stages of reflex action and consensual action. An examination of the succession of living animals would show that there are many which remain permanently in each of these stages—some whose whole existence appears to be reflex, others whose activity is consensual, and others again in which there is the trace of voluntary action. By way of illustration may be selected one process common to the vegetable and animal kingdoms,

namely, that of fertilization. This in plants, and some of the lowest animals, is a vegetative or organic process; in beings a little higher in the scale it becomes reflex without sensation; then, as we still ascend, reflex with slight sensation, reflex with more acute sensation and commencing perception, and so rises in dignity till the highest emotions and ideas are connected with it; and yet under its highest form, reflex and consensual action have an important part in it. Again, in the processes of the human body, we cannot but note the intimate way in which sensation and the higher mental phenomena are connected with reflex action at their origin. Thus the food at one period of its passage through the body is entirely under the control of reflex action; at an earlier period the action is reflex with slight sensation; in a still earlier stage the empire is, as it were, divided between reflex action and conscious action; and the beginning of the process is entirely under the domain of the will. Every consideration seems to justify the assertion, that in the developing mind of man, as everywhere else in nature, sensation is gradually and imperceptibly evolved out of reflex action.

There appears to be a short period in the infant's early history—a moment, as it were—in which, not yet awakened up to a reaction with the world around, its existence may be described as sensational; when an impression on its limb produces only the feeling of a body that is part of itself; when it may have the sensation of sound without any perception of an external cause of it: in this state it reflects, as it were, the purely sensational life of a certain portion of the invertebrata. The fact, which experience daily reveals, that every sensation which is produced by an external cause may be excited by internal causes, giving rise to some change in the condition of the particular nerve,—as, for instance, when flashes of light are caused by some change in the optic nerve, and sounds are produced by some affection of the auditory nerve—proves unquestionably that it is quite possible for the child to have, and adds to the probability that it has, sensations even of the special senses without any apprehension of the external causes which have excited them. The subjective stage seems indeed to be more or less marked in the education of every sense, although the time of its occurrence, and its duration in each, by no means correspond. The sense of touch has apparently advanced to the recognition of a not-self, even before sight and hearing exist at all, as it may perhaps be supposed to do in the animal kingdom, where the organs of the latter are so late in appearance. As there are multitudes of animals which are not conscious of any sensation, and which correspond to the reflex activity of man, so there appear to be multitudes more which are conscious only of a sensation, which feel the affections of their own organisms, without any consciousness of an external cause, and which correspond to the sensational stage of early infancy. In

accordance with this method of progression we find that in man the senses of sight and hearing, which have been called the objective senses on account of their fixing attention more upon the object than upon the subjective affection, do not come into exercise till after the more subjective senses. So rapidly, however, does an infant pass to some kind of recognition of an outer world, that it is not possible to fix in the order of time a stage which we seem compelled to acknowledge in the order of existence.

The next stage in the development of mind, as we trace it upwards through the animal kingdom, is that in which the animal appears to have a dull consciousness of something without it as causing the one or two sensations of which it is capable, but in which it nevertheless forgets the sensation the moment it is delivered therefrom. The snail as it crawls over the grass may have a different sensation from that which it experiences as it crawls over the gravel, and probably has, during copulation, a different feeling from what it has at any other time; but, though it may possibly have a sort of semi-conscious feeling of something without it in connexion with its sensation, there can be little doubt that when living in one sensation the snail is utterly unconscious of ever having had another.* If it be suddenly touched as it pursues its slimy course, the snail immediately contracts and rolls itself up, and remains so rolled up to be cut into morsels if it so please the experimenter; it seems to be conscious of something out of the common producing a sudden sensation, and according to the fundamental instinct of self-preservation at once shrinks from it; the movement may be deemed consensual, and compared to that which the child involuntarily makes when it first opens its eyes to the light. The powerful sensation immediately calls into action the necessary muscles for closing the eyelids and protecting the eye. As the snail always makes the same consensual movement for its protection when disturbed, it is evident that it has no knowledge of what has affected it, and no power of striving to get out of the way, as the spider has under like circumstances. So it remains contracted and quiet for a while, and then cautiously creeps out again in accordance with the law of its nature, very much as the infant gradually opens more and more its eyes till they become accustomed to the light. The gasteropod feels and forgets, as the infant does, but it cannot feel and see, as the infant very soon learns to do. But there is after all a period at which the child's perception of the external world is so general and confused as to be

* Regarding gasteropodic sensibility, it may be remarked that the common snail seems during copulation to be not nearly so sensitive to outward impressions, as at other times: then, it may be touched more smartly without rolling itself up, appearing not to feel, or unwilling to believe that it is touched. Similarly, the child when sucking may be pinched more deeply, without crying, than when not so engaged; and an acute sensation in man always renders him less sensible than usual to others produced at the same time.

little superior in actual state to that which a gasteropod may be supposed to have. There can be little doubt that when it first opens its eyes on the world, the infant is conscious of a blaze of light and nothing more, and that the information of an external world is so gradually obtained as to render it impossible to discriminate the commencing perception from sensation. It is like the dawn of day, when, on the thick darkness of night, the first glimmer of eastern light strikes, and, not yet being sufficient to define any object on earth, serves only to render the darkness visible; for, as day out of night, and as the earth out of chaos, so man springs up gradually out of unconsciousness into mental activity.

It is not long after a child has opened its eyes before it begins to discriminate objects. Its eyes may at first move from object to object, in a wandering way, but soon some particular one produces a greater impression, and attracts a momentary attention; it is the beginning of a definition of the objective, and a positive advance to a higher mental development. When there springs up the belief in an object as the cause of a particular sensation, we may say that perception has unmistakeably commenced, and the sensational reaction advances to the higher ground of incipient ideation. Of the subjective affection an objective activity is made, and the sensations are now projected outwards and deemed to be qualities or attributes of the object. It is when perception first begins in the child that a comparison might be made between its mental state and that of the fishes. Not that there is the shadow of a pretext for saying that the human mind is at any period equal only to that of the fish—no more than there is any truth in saying that the human embryo is at one time a fish; they both travel for a certain distance along the same road, both as regards body and as regards mind; but while the first stops very early on the way, and, diverging a little therefrom, has special characters stamped upon it—definite adaptive modifications for its destined existence—the human being, with his immense inherent potentiality, passes immeasurably beyond the stage of fish-resemblance to a destiny peculiarly his own.

That fishes have an undoubted, though very limited, perception, is shown by the way in which carp may be taught to come to be fed at the sound of a bell, or goldfish by a particular whistle; it is evident that the fishes have then not only the sensation of a certain sound, but a remembrance of it and of its signification; an idea of it which they have associated with the idea of food. So imperfect is the idea, so little representative of the relations of its cause, that it might at first seem sufficient to describe the process as an association of sensations, were it not that a little reflection proves that sensations are only remembered by means of ideas. The fish recognises the sensation again by means of the idea which was first excited, and which it has retained in its mind; just, in fact, as we

recognise written characters by the ideas first associated with them, and which are called up by the renewal of the sensations. The intelligent action of the fish must then be regarded as the result of an intellectual process, however humble. It seems impossible also, with any consistency in the application of words, to attribute the fish's intelligence to instinct; for the knowledge which is gained by experience, and which determines an acquired adaptation of means to ends, cannot philosophically be designated instinctive. The example illustrates the gradual way in which intelligence arises out of sensation in the process of mental development, and seems to point out the, in some degree, artificial character of the distinction commonly made between sensation and perception,—a distinction which, though it has no specific existence in nature, it may, nevertheless, be useful for us to make in our thoughts concerning the interpretation of nature. Fundamentally considered, indeed, every mental phenomena is a relation between the subjective and objective, the individual and nature; and such relation is really a *feeling* or state of a mind, one and indivisible, whether we call it a sensation, a perception, an emotion, or a volition. When, in early life, we are conscious only of the subjective affection, or when, in later life, attention is principally directed to it, the relation is called sensation; but when we begin in early life to recognise objects as associated with particular feelings, or when, in after life, attention is chiefly given to the objective element, we call the relation a perception; and by a further analysis we are able to discover the elements of three higher mental states in the original perception—to wit, a perception proper, a feeling thereof which develops into emotion, and a reacting impulse which develops into will. Though these elements are present in the perception of the fish, yet they remain, and must remain, by reason of its constitution, rudimentary in it, while in the child they very rapidly advance to a higher development. The mental condition of the fish above described may be compared, in a general way, with one of those earliest manifestations of dawning intelligence in the babe, when, as it cries out from the sensation of hunger, its mother takes it from the cradle and it becomes quiet, or when it smiles as it lies on its back and its mother's face appears before it. It has connected such appearance with the pleasant sensation that follows the gratification of an appetite, and the association of such simple ideas is all the actual intelligence which it at present exhibits.* It is an interesting and not altogether inappropriate reflection, that, as the early light of intellectual action is displayed in the natural want of the infant and its efforts for its mother's breast, so the greatest acquisition of the intellect, that which constitutes the chief glory of modern civilization, was inaugurated

* We say actual intelligence; for it is evident that in the infantile smile, whether consensual or not, there lies the potentiality of what no animal ever can exhibit; in it is foreshadowed the "moral sense."

when men were driven in the unfruitful northern climes to force, by patient labour, their nourishment from nature's sparing bosom. And the comparison might be extended by remarking that, as the rise of intelligence in the infant is a passage from sensation, which is pure self-consciousness, to perception, feeling, knowledge, call it what we may, of the relations of external objects or world-consciousness, so the greatest advance in the development of the intelligence of mankind was made when vain metaphysical investigations into the confusions of self-consciousness were abandoned, and attention was earnestly given, in the Baconian spirit, to the patient observation and sincere interpretation of nature.

It will have been for some time apparent, that, without any reference to the theory, there pervades the foregoing observations the doctrine of the old Greek philosophers, which asserts the identity of vital and mental force, and teaches that it is mind which operates in the organism from the first moment of its being. Such an opinion, which is usually called the Stahlian doctrine in Germany, was seemingly first revived in modern times by Whytt;* and it has of late done much duty in physiological psychology. In our present plan of following out mental development, there is plainly no place for the entrance at any period in a being's history of a new force such as some imagine to come into activity only after a child's birth. All the evidence points to the gradual evolution of one force, which, operating before birth as vegetative or vital force, in the new conditions of existence after birth displays itself for a time in reflex action and consensual action, but which, struggling successfully out of unconsciousness into consciousness, soon rises to the higher manifestations of perception, emotion and volition. And as man is thus supposed to embody one force, so in every mental phenomenon it must be assumed to act as one, and not by certain so-called faculties; so that when we speak of perception, of emotion and so forth, we designate a feeling or state of the whole mind, and not an affection of any particular part of it. It seems to be a matter of regret, therefore, that the term perception, which is now generally used to designate that by which we perceive the material properties of things, should have, since Reid's time, superseded the term intuition, which was of old used to express our perceptions of all the truths of external nature; the beauty, the harmony, and the various relations of objects as well as their material properties.† Now, we are compelled to use such words as feeling, sensibility, emotion, and, on the intellectual side, conception, thought, cognition; to express those truths which perception does not embrace; and, accordingly,

* 'An Essay on the Vital and other Involuntary Motions of Animals,' by Robert Whytt, M.D., F.R.S., Edin., 1763. Also 'Physiological Essays,' Appendix.

† 'Elements of Psychology,' J. D. Morrell, where are some excellent observations on intelligence as intuition.

we make some confusion by splitting up a mind which is one, and in every kind of perception acts as one, into such a number of so-called faculties. Nothing has been gained by the change; and, whenever a man of genius appears—a Shakespeare, Goëthe, Raphaël, or Mozart—it is necessary to throw aside those artificial distinctions and to speak of his perception as intuitive—as revealing all the relations of the object. In reality, however, as before remarked, every perception is an intuition, and contains, no less in animals than in man, the element of perception proper, a feeling, and a reacting impulse.*

Although it appears, then, that the state of consciousness, known as simple perception, is, whenever it occurs, a feeling of the mind, and does really contain the elements, more or less apparent, of future emotional and volitional conditions, yet in consequence of its elementary character in fishes, it would be as unphilosophical to look for any display of high emotion in them, as it would be to anticipate that conscious exercise of developed will, which proceeds only from an advanced reason. An analysis of the nature of emotion shows that, other things being equal, emotional development can only take place in proportion to intellectual development; and we might not unjustly designate emotion as the feeling of the perception, or, as Locke says “internal sensations,” if I might so call them; for, as in the body, there is sensation barely in itself, or accompanied with pain or pleasure, so the thought or perception of the mind is simply so, or else accompanied with pleasure or pain, delight or trouble, call it how you please.† And as there is an organic effort to avoid a painful *sensation*, and to perpetuate a pleasing one, so in the higher sphere of the consciousness of an object as productive of the sensation, there is now a conscious shrinking from the *idea* that is painful, and an indulgence of the *idea* that has pleasing characters.‡ In fact the impulse of self-preservation—the *lex nostræ conservationis*, whereby every organism strives after that which is beneficial to it, and avoids what is injurious, becomes in the brain revealed to consciousness, and imparts the idea of self or individual existence; it still labours to maintain the existence of self, and to extend its

* How notable, for example, is animal intuition in the quick apprehension by some animals of man's mood of mind, from a glance at his countenance, or from the tone of his voice!

† ‘Human Understanding,’ vol. i, p. 351. Mr. James Mill (‘Analysis of the Human Mind’) has given the most philosophical account of the emotions; his views are extensively adopted by Dr. Carpenter who, in his ‘Principles of Human Physiology,’ has given a popular exposition of them, and founded on them certain physiological theories.

‡ Hobbes remarks that, “delight, contentment, or pleasure is nothing really but motion about the heart, as conception is nothing but motion in the head; and the objects that cause it are called pleasant or delightful, or by some name equivalent. The Latins have *jucundum a juvando*, from helping; and the same delight, with reference to the object, is called love.” (‘Human Nature,’ ch. vii, i.)

power of action, and that which in perceptual activity opposes its efforts or diminishes its power, produces a painful emotional idea, while that which favours its action excites an emotional idea of a pleasant character.* Ideas must have a reference, direct or indirect, to self, in order to excite emotion; and it is because the self is so deeply concerned in emotional excitement, that calm reasoning is then impossible; the ideas of the relations of external objects being so imperfect, so undefined, or, if the expression might be used, so adulterated. It is furthermore in the different quality, so to speak, of the self in different people, that emotions differ in intensity even at the same level of intellectual development; whence an interesting result in our nomenclature of mental phenomena.

When, in sensation, or rather sensational perception, the object affects all men alike, and there is no pain or pleasure present, as in the case of the so-called *primary* qualities of matter, we are accustomed to classify the latter as external or objective; but when the agreement is less general, and there is pain or pleasure present, as in the case of the so-called *secondary* qualities, we no longer consider them external, but pronounce them subjective. And yet the primary qualities of matter are evidently just as subjective as the secondary qualities, and the latter again just as objective as the former. But it is because, in one case, self is so much more consciously affected, that we establish a distinction which exists not fundamentally, which exists only in our consciousness. It is the same with emotion and the higher perceptions. When an object, or group of objects, produce an idea, or a set of ideas, which are indifferent and alike in all men, we lay stress upon the objective element, and regard them as simply representative ideas; but when the objects produce active pleasure or pain, or feeling of some kind, and not exactly the same results in all men, we do not any longer regard the results as simply representative of the attributes of the object, but, as our personality is so much involved, rather as affections of the subject, and we call them accordingly emotional. The character of the emotion will be determined by the feeling which the self has of the ideas as affecting its activity; for the self-feeling (*Eigenliebe*), both in consciousness, and out of consciousness, constantly strives for that which appears to be the advantage of the individual.

If the foregoing observations be correct, it is evident that when

* Spinoza's 'Account of the Passions,' quoted by Müller, *op. cit.*, vol. ii, p. 1375. There are two fundamental impulses, tendencies, instincts, or whatever else they are called, in all animals; one is to preserve the being, which, out of consciousness, maintains and repairs the organism, and which, in consciousness, causes men to seek pleasant emotions, useful ideas, and whatever else adds to the comfort and power of the individual; the other is to propagate the species, and this of course out of consciousness excites and maintains the sexual function; while, in consciousness, we shall hereafter endeavour to show, it impels man to labour for posterity and fame, and to believe in immortality.

the early idea in the animal, or in infancy, is so general and confused, as to render it impossible to assert positively that it does exist, the vague comfort or discomfort attendant thereupon, may almost as reasonably be attributed to sensation as to emotion, and the resultant physical reaction be described as consensual. Accordingly some physiologists speak of the early infantile smile as consensual; and whether it be so or not, is not of the greatest moment, the important fact being that emotion is so closely allied with sensation at its birth, and rises so gradually out of it, that we cannot assign any particular period for its first appearance, either in man or in the animals, and recognise it positively as distinct, only after it has attained to some development. The evidence will scarcely, indeed, justify any statement on the presence of true emotion in the fishes; for the fear which they certainly exhibit, as for instance, when sharks suspect and avoid the bait, might be supposed to be unconsciously displayed, and be attributed to the above-mentioned organic or instinctive avoidance of what is injurious, which is the law both of conscious and unconscious life. Still, if a shark has once seized the bait and escaped from the hook's treacherous hold, and, remembering such experience, on a like occasion hesitates or refuses to take the bait again, there is palpable emotion of the simplest kind.* Calling to mind the thin laminæ of nervous matter which represent the cerebral hemispheres in fishes; and reflecting that small cerebral hemispheres imply a very limited ideation, and that a limited ideation psychologically involves rudimentary emotion, we are certainly not prepared to anticipate any higher display of emotion amongst fishes. As the brain of the highest fish only corresponds to the brain of the human fœtus at the sixth week of embryonic life, its highest functional activity can only correspond with a very early period in the developing activity of the child's brain.

So gradual has been the progression in structure from the fishes to the reptiles, as to have suggested doubts of the value of the classification made between them. Professor Owen, after remarking that the structure of the *Archegosaurus* seemed to be intermediate between the ganoid fishes and the batrachians, and to conduct the march of development from the fish proper to the labyrinthodont type, while the labyrinthodonts are more saurian still, and conduct to the perocenni-branchiate batrachian type, he further observes, that "the existence of such a group shows the artificial nature of the classification which separates fishes and reptiles, and the natural character of the division 'Hæmatocrya,' or cold-blooded vertebrata, as the one unbroken progressive series."† Although, however, as such observations

* It may be interesting to add that, in accordance with the observed intellectual character of the shark amongst fishes, and the appearance of simple emotion in it, the cerebrum of the shark is larger than that of any other fish.

† 'Palæontology,' p. 198.

would indicate, the brain of reptiles does not differ much from that of fishes; what difference there is consists in an advance on the part of the reptilian brain; the cerebral hemispheres are a little larger in proportion to the optic lobe, and the cerebellum is smaller. The improvement is most gradual, for while the perenni-branchiate reptiles retain the fish-character of brain all their lives, the batrachians have that character only during their tadpole state.

As the expression of the slightly superior type of brain, there are observable higher mental manifestations amongst reptiles, which are evidenced in a wider and more definite perception, together with a more marked display of simple emotion and conscious volition. The elements of the primitive intuition are gradually unfolding themselves; and the progress is such as an acquaintance with the function of the cerebral hemispheres will anticipate, and such as observation will show that the developing mind of man follows. It has been observed that tortoises, which have very large brains among reptiles, remember persons and places, and that serpents and lizards will raise their heads and listen with delight to the concord of sweet sounds; the serpent charmers of the East are still able to make their serpents into stiff rods, as in the days when the magicians of Egypt, by their enchantment "cast down every man his rod, and they became serpents;" and that reptiles are able to profit by experience, and to act with considerable intelligence, the following example will testify. A gentleman kept a toad in his garden, and was in the habit of giving it something to eat out of the window at dinner-time: the creature appeared punctually every day at the window to receive its dinner. From some cause, the dinner-hour was changed from four to two, and as the toad was unaware of the change, and came at the accustomed time, it lost its dinner that day. It kept a sharp look-out through the following day, however, and contrived to be at the window for its dinner at two o'clock.* It is difficult to believe that the toad did not feel some disappointment when it missed its dinner; and doubtless, if we could enter into the animal's feelings, it would be evident that, according as an object originally affected it pleasantly or painfully, it did, with its manifest power of associating a few simple ideas, look forward to its recurrence on a future occasion with a pleasing or painful emotion; the character of the sensation determining the emotional character of the idea. Plainly also, the toad, in accordance with the fundamental organic law, laboured with a certain consciousness for that which was grateful to it, that which produced a pleasing sensation at the time and a pleasing emotion when recalled or anticipated. Although the perception of so humble a creature must at best be pronounced very general and imperfect, it is seemingly more special than that of

* 'Instinct and Reason,' by Alfred Smea, F.R.S.

the fishes; and the example illustrates the progress from that very general and confused perception which recognises an outer world without discrimination of objects, towards that investigation of the special relations of them, which is the activity and purpose of a higher reason. In considering perception, it must be remembered that it is only relative, and that when a young child or a Bosjesman sees any object, as, for instance, a tree, though each of them has strictly a perception of it, it is, nevertheless, a perception of a very different character from that which the profound physiological botanist has of the same object; and it would really seem as legitimate to deny perception to the Bosjesman because he cannot see the moral relations of the universe, as it is to refuse perception to the animal because it cannot see in any object all that the educated European or uneducated savage sees therein.

That it may not appear satisfactory to attribute the instances of wisdom learned by experience among the brutes to the operations of instinct, it may be desirable to record here the insuperable difficulties which appear to exist in the way of such a view. The word instinct is one of those terms which, having acquired a factitious importance from the prejudice of mankind, it is not so easily definitely to interpret; for while some look upon it as indicating a faculty altogether different from reason, and think it sufficient to dismiss the highest example of brute intelligence as merely instinctive, others, with a deeper insight into the actual facts, consider reason and instinct to be fundamentally the same. Coleridge, indeed, in his 'Table Talk,' is reported to have said: "The ant and the bee are, I think, much nearer man in the understanding or faculty of adapting means to proximate ends than the elephant;" but, with the deference most justly due to so illustrious a name, this can scarcely, on reflection, be regarded as a satisfactory dictum. That the bee surpasses the elephant in the faculty of adapting means to proximate ends in a very limited sphere is unquestionably true, and it even surpasses a great portion of mankind in the same faculty; but all that the enunciation of the proposition amounts to is, that the wisdom of the Creator is greater than that of the creature. In the constitution of the bee has been implanted the impulse to certain definite actions in a limited circle of activity, and the young bee accomplishes these as cleverly as the oldest; the organism has been impressed with the stamp of a definite reaction, and it reacts accordingly. But can we justly thereupon say that the bee has an understanding nearer to that of man than the elephant has? Can we place its mechanically constant and limited actions in the same category with that intelligent activity which the elephant displays as the result of education and experience?

There is, without doubt, the highest intelligence embodied in the bee; but it is not intelligence to the bee, which knows not whether

it is adapting means to an end, or not, and which cannot even make a mistake; it is intelligence only to us intelligent beings looking on, and finding it, just as we find it in the plant, in the animal, and in the laws of nature generally. It has been said of men, that each individual sees only in any matter that which he brings with him the faculty to see. Newton, for instance, perceives a law of gravitation where others see but the fall of an apple; and in like manner, the most ignorant clown sees a great deal more in the simplest affair than his dog, however intelligent. The hero is not a hero to his valet, Carlyle thinks, because the latter has a valet soul incapable of appreciating true nobility. Applying, as may justly be done, this principle, which is the principle of relative perception, to the animals, and measuring by it the relative intelligence of the elephant and the bee, it will be evident that while the former does profit by experience, and imbibe a little of the intelligence pervading nature, the latter is blind to anything like design, acts with a mechanical constancy, and is unconscious that it is adapting means cleverly to an end. It would surely not for a moment be deemed satisfactory to say that the cotton-spinning or calico-printing machinery is more intelligent than the workman who attends to it, although the machinery effects an admirable result which the workman's unaided efforts could never compass; for we are aware that while the machinery only embodies human intelligence, and knows not for what it is working, or that it is working, the attendant labourer surely foresees the result. In like manner, though the bee embodies Divine intelligence, it would really seem as unconscious of it as the vital force is of the intelligence which it evinces in the construction and maintenance of the organism. Wherefore, it does not appear likely that any advantage can result, while confusion must inevitably arise from describing under the same name that unconscious adaptation of means to an end, that blind impulse to accomplish an action without knowledge of the reason, foresight of the result, or modification of the process, which is properly designated instinct, and that acquired power of consciously adapting themselves to circumstances which in varied fashion is manifested by the higher animals. Even were the same name given to both processes, it would still be necessary to assume a higher adapting instinct, which, in the face of difficulties, not unfrequently modifies the mechanical processes of the humbler form; and it would then be impossible to distinguish the higher instinct from reason. In the progressive development of intelligence throughout nature, it cannot be doubted that the all-pervading reason is struggling into conscious evolution, and that reason may fundamentally be regarded as "illuminated instinct"*—*et quod nunc*

* Sir W. Hamilton. On the identity of Reason and Instinct, are some observations in a valuable paper by Dr. Laycock, in 'British and Foreign Med. Rev.,' July, 1855.

ratio impetus ante fuit; but, at the same time, in the present condition of mental nomenclature, it will conduce to nothing but confusion to designate by the same term conscious ratiocination and unconscious, but intelligent, impulse.

Those who draw a broad line between reason and instinct, and then plant the line as an impassable barrier between the mental phenomena of man and those of the animals, agree among themselves only in the words they use. If they venture upon the actual facts, there is no agreement in the connotation of the terms; and they may not unjustly be compared to those who boldly assert a so-called specific distinction in structure between the human and animal body; but who, when driven from the words to the facts, are unable even to preserve the forlorn hope of a posterior cerebral lobe. As the latter depart without scruple from the general custom, and define a posterior lobe to be exactly that which the theory of the movement requires, so the former are compelled to establish between mental phenomena an artificial distinction, the sole warranty of which are the necessities of a needless assumption. When discussing perception in his clear and interesting little work on psychology, Mr. Morrell even thinks it necessary to answer an objection that might be made to the *intellectual* character of the act, on the ground that animals perceive objects as distinctly as man; and he does so, not, as might be logically expected from the general character of his work, by exposing the futility of the objection, but by assuming a difference between animal and human perception. "While the brute perceives objects, and acts in reference to them only instinctively, either for the satisfaction of its appetites or for self-preservation, a conscious separation is instantly effected by the *human* faculty between the subject and object. . . . The animal does not think within itself, I am a dog, or a horse, and that is a hare or a cornfield; it is simply impelled by *the force of instinct* towards the object without any apprehension of its own personality as distinct from the thing presented to it. On the other hand the child or savage, without the least culture whatever, *consciously* separates self from the objective world in the very first distinct act of perception; and it is exactly here, in this very act, that the *intellectual* quality of perception is first manifested. In the separation of subject and object, all thought is primarily cradled, and wherever that distinction takes place, everything else peculiar to the human intellect is able to follow." The impediments which facts put in the way of the unregarding current of German metaphysical philosophy certainly appear at times to be subjected to extremely arbitrary measures. As, however, it would be impossible fairly to discuss so large a question in a short space, it will be sufficient for the present to suggest a few reflections thereupon. And—1. If the dog be impelled towards the hare by the *force of instinct*, what force is it which prevents it from

following the hare, when it is taught, as it may be taught, not to do so? 2. If it be true that the dog does not say to itself, I am a dog, and that is a hare, is it not just as true that the child does not say to itself in the first act of perception, I am a child, and that is an object? 3. If the child be supposed to have a consciousness of self and not-self in the first act of perception without saying to itself, I am self and that is not-self, what shadow of a warranty is there for the assertion that the dog has not a like consciousness of itself as something distinct from the hare without expressing it otherwise than in its acts? 4. When the monkey made use of the cat's paw to get the chestnuts out of the fire, had it, or had it not, an "apprehension of its own personality as distinct from the thing presented?" 5. If all thought be cradled in the separation of subject and object, is it so certain that wherever such distinction takes place everything else peculiar to the human intellect is able to follow? Is the low savage intellect capable, for instance, of all that the European intellect is capable of? Or is the child that in a year or two after birth suffers an arrest of mental development, and remains imbecile for life, notwithstanding that it has separated subject and object in the first act of perception, capable of everything else peculiar to the human intellect? Do not such examples, indeed, point to a difference in degree rather than in kind? And, 6. If the proposition be intended to apply to the general development of mind, and not to the development of any individual mind, what possible grounds are there for supposing it not applicable to the development of mind in nature, as much as to its development in man? Where, in fact, are the reasons for the forced distinction made between the sometimes distinct animal perception and the certainly indistinct early infantile perception? 7. Lastly, is it not too true that the progress of knowledge has been most seriously obstructed by the disposition of mankind to torture its self-consciousness, and unduly to neglect the objective in the too exclusive contemplation of the subjective? Is not really every state of consciousness, every act of knowledge, a relation, and the separation of the correlatives merely a fiction of the mind? Such considerations, with others that might be added, seem to prove that those who specifically distinguish the mental phenomena of the brutes from those of man by stamping the former as all instinctive, act in a much less philosophical way than those who maintain the identity of reason and instinct.

If the foregoing observations are just, they do away with certain objections to the statement, that it is amongst the lower vertebrata, among fishes and reptiles, that we first observe intelligence attaining to consciousness, the first budding of reason out of instinct; as it is among them likewise that we meet with the first appearance of that portion of the brain which undoubtedly ministers in man to the manifestation of conscious intelligence. There will then be a perfect

analogy between the development of reason out of instinct in the child—when it proceeds from the reflex acts of sucking, swallowing, crying even, and its other early movements, to the power of recognising its own mother—and the development of reason out of instinct in the animal kingdom. The acknowledgment need not excite alarm, for it is only the lowest possible exhibition of reason, its very germ, that can possibly be claimed for the lower vertebrata, while the most notable intelligence of the higher vertebrata will be comparable only to the dawning intelligence of human infancy. There can be no manner of doubt that all the animals below man live lives that are chiefly instinctive, and that even the lower orders of the vertebrata are almost solely instinctive; but what appears also to admit of no doubt is, that the latter have the potentiality of the rudiment of reason which may be displayed under favorable circumstances, as when its development is solicited by man. But even when in such case the germ shows itself, though it cannot be called unnatural, it is nevertheless quite exceptional as regards an individual that would inevitably perish if left solely at the mercy of such endowment; for exactly as the bee's unconscious intelligence was once found to surpass the mathematician's conscious intelligence, or as the reflex force in man effects results which no development of conscious volition can accomplish, so the lower animal executes instinctively much more complicated acts than it could possibly do under the influence of such powers of understanding, potential or actual, as it may have. There is, for instance, a certain Indian fish, which captures the insects that sport above the surface of the water, and this it does without itself putting its head out of water. Here is a complex problem instantaneously solved; for it is evident that not only a very sharp eye, but a very accurate knowledge of distance must be necessary under any circumstances to effect such a capture. Not only so, but in consequence of the refraction of the rays of light on entering the water, the insect must actually appear where it is not. Nevertheless, rapidly as the little object moves about, the fish spurts a drop of water at it, and surely brings its prey down. What a contrast does this afford to the experience and lapse of time which must take place before man can form an accurate idea of distance! An infant will grasp at the moon, or at the cause of any other sensation, however near or however distant, and many and many a fall takes place before it learns how far off the nearest chair is. It would almost appear as if man had not been endowed with any innate knowledge of distance, in order that he might be compelled to examine, in the education of the muscular sense and of the special senses, the relations of the objects of his sensations; thus to develop the understanding which finds its true nourishment in such investigations; and to bring the inner phenomena of psychical life into conformity with the outer relations of nature. Accordingly, man

learns to judge of distance from the size of the object, but he is then liable to be mistaken unless he has studied the relations of it to other objects as well as to himself. Were he in the fish's place, under water, he could not possibly hit the insect above it, unless he had ascertained that, on account of the greater density of water than air, the minute creature would appear in a different spot from that in which it really was; and in like manner he has to learn, that the mountain appears much nearer when the atmosphere is clear than it does when the atmosphere is foggy. Still no one doubts that the understanding of man, making a mistake, is greater than the intelligence of the fish, which does not; and there can be as little doubt that, however minute may be the conscious intelligence displayed by the fish, or other humble members of the vertebrate sub-kingdom, the primitive germ is of a higher type than the highest unconscious intelligent reaction. The development of intelligence, in animal nature as well as in man, is a progress from the general to the special; and as in man several organs and a variety of tissues accomplish the functions necessary to his being, while one organ or one tissue may serve all the purposes of the lowest animal, so likewise a number of voluntary exercises of mental force and acquired adaptations thereof are necessary to effect for him that which, by the pre-established harmony of the nervous system, the lowest intelligence implicitly contains and unconsciously effects.

The much greater development of the cerebral hemispheres in birds than in reptiles and fishes, corresponds with more decided manifestations of intelligence; and as we observe that the brain of birds resembles that of the human fœtus at the twelfth week, we may indicate generally a period during which the child does not surpass in understanding the more intelligent birds. When the head of a common sparrow is opened, a reflection must surely force itself upon the most persistent disbeliever in the conscious intelligence of animals as to what purpose those large cerebral hemispheres, lying so human-like over the sensory ganglia beneath, serve. They are not for smelling, for they cover olfactory ganglia; they are not for seeing, for they cover optic ganglia; they are not for general sensation, as beneath them are distinct thalami optici;* not for moving, for besides a portion of brain corresponding to the corpus striatum of the human brain, there is a well-developed transverse ridged cerebellum, which is supposed to minister also to their sexual passion. What then do

* Dr. Todd ('Physiology, Anatomy,' Todd and Bowman), regards the corpus striatum as the principal centre for voluntary movements, and the thalami optici as principal centres for sensation. Brown-Séquard agrees with Dr. Todd, as to corpus striatum being the principal centre for voluntary movements, but says that experiments on animals, pathological facts, and microscopic anatomy, agree in showing that the corpora striata, the crura cerebri, and the thalami optici, are all centres of sensitive perception. ('Cent. Nerv. Syst.,' p. 228.)

birds do besides see, hear, smell, feel, move and propagate? It may be said that they build nests in a very ingenious manner, and sometimes migrate to warmer climes, when winter approaches. Those actions may undoubtedly be regarded as instinctive, although when difficulties occasionally present themselves in the way of their successful completion, we have some evidence that the instinct is guided by a higher power to a successful adaptation to the unusual circumstances. But cerebral hemispheres are not necessary to the manifestation of the most wonderful instincts; for the bee which solves in the most accurate way the problem of obtaining, in the construction of its cells, the greatest space and the greater strength with the least possible expenditure of material, has no cerebral hemispheres whatever. Birds do, however, what bees never do; they profit by experience; they acquire simple ideas and compare them, thus reasoning in a primitive fashion; and it is this function which their comparatively large cerebral hemispheres subserve.

Birds must undergo a regular training before they will carry messages; they are thus made familiar with the appearance of the country, and the old birds are more skilful than the young ones. That they are capable of a considerable degree of education is strikingly evidenced in the many tricks which canaries may be taught by those who make a livelihood out of their performance; and bird-fanciers find a great difference in the readiness with which different birds may be taught; while some will learn in a very short time, and appear to acquire the knowledge almost intuitively, others seem to have a natural stupidity which no perseverance will overcome. In Persia, the falcon is trained to assist in the capture of the wild ass, which possesses such great speed that the powerful and swift greyhounds employed in hunting it would never overtake it, were it not that the falcon settles on the ass's head, and by flapping its wings in the animal's face confuses it, and impedes its progress. The united intelligence of two birds was in the following case too much for the wisdom of an animal much higher in the scale of life. Two crows observing a dog gnawing a bone, and coveting it themselves, contrived thus to effect its seizure; while one bit the dog's tail so as to make the animal turn round and snap at it, the other seized and carried off the bone.* Gratiolet would scarcely have credited the following fact, had it not been communicated to him on the most reliable testimony.† A farmer had enclosed his grapes while on the vine in bags of paper to protect them from the birds; but the precaution was of no avail, for some sparrows soaked the paper with water, which they brought in their bills from a neighbouring spring, and thus contrived to tear it easily. Out of a multitude of other examples which might be adduced to illustrate the marvellous intelligence sometimes displayed by birds, it will be

* 'Proceedings of Zoological Society,' 1855, p. 144.

† *Op. cit.*, p. 653.

sufficient to quote the well-known instance of that which had built its nest in a stone-quarry. It was accustomed to fly from its nest whenever the bell rang to give the workmen warning of an explosion; but after this circumstance had been noticed by the men, they often rang the bell merely as an experiment, for the purpose of frightening the bird. Recognising after a while the trick that was played upon it, for the future it always observed whether the workmen themselves left the quarry after the ringing of the bell; and if they did not, it remained in its nest. Here then is an example of simple inductive reasoning—the induction from the particular to the particular; the bird hears the sound of a bell, which it remembers, and experience teaches it that shortly after that sound a loud and dangerous explosion takes place; it accordingly associates in its mind the ideas of the two sounds, and acting on the conclusion of its judgment, leaves the nest whenever the bell rings. No doubt till the end of its days, the creature would have gone on believing in its induction, had it not been that an *instantia contradictoria* presented itself. The workmen rang the bell merely to frighten it, and so like a true inductive philosopher, it sets to work in the Baconian spirit to collect more instances, and to discover a new interpretation of the facts. Exercising observation, it learns that the bell sound is only of dangerous significance when followed by the departure of the workmen, and thus, instructed by experience, it amends its former inference and leaves the nest only when there is real danger. Those who would attribute such a display of intelligence to instinct, cannot logically uphold the existence of any reason in the world apart from instinct; they must surely describe the tricks of the workmen as instinctive, when they describe the intelligent reaction to them as such.

The parrot, which is so well-known for its educability and intelligence, is remarkable amongst birds for the development of its brain. In the birds immediately below it, the anterior lobes of the cerebral hemispheres are narrowed to a point, but in the parrot, they are large and rounded in front; there is a similar difference behind, and the posterior extremities of the hemispheres in the parrot extend backwards, so as to cover all or nearly all the cerebellum.* We have in such a fact, the example of an experiment provided by nature, offering the valuable evidence of a concomitant variation between the degree of development of the organ of intelligence and the manifestations of intelligence. The illustrations of parrot-wisdom are so numerous, that it will suffice to give one example, recorded by a writer whose labours have done much more

* 'Anatom. Comp. du Syst. Nerv.,' par Leuret, p. 353. It is worthy of remark, that the characters by which the parrot's brain surpasses the brains of other birds are two important characters in which the human brain surpasses that of the monkey.

for the fame of others than for his own fame.* A respectable dyer in Manchester, has for fourteen years been in possession of a parrot which I have seen and heard speak, of which he gave me the following account. When hungry she says, "Is there nothing for Poll! give Poll a bit, Jacky, give Poll a bit." And if attention be not paid to her entreaty, she raises her voice and cries, "what the devil is there nothing for Poll." On hearing the voice of a Mr. M—, who is in the habit of calling at the house, she immediately cries out, "Well Mr. M—, how are you? what news?" and then laughs heartily. To the dogs she will call out, "Turk, Turk—Juno, Juno; hie Turk, hie lad, hie rat, shake him there, shake him." If they attempt to annoy any passengers, she will cry, "come here, sirrah, come here Turk, damn you, come here!" To the poultry, she will call "chuck, chuck," and when assembled about her, she will raise her voice, and say, "Shoo, shoo," and frighten them away. When her master is scolding the servants in the dyehouse, she runs over her whole vocabulary of words with great rapidity, jumps upon her perch and down again, shakes her head and evinces many symptoms of extreme agitation, cries: "Can't you mind your business, damn you." It can scarcely be denied that the parrot attaches certain simple ideas, parrot-ideas, to the expressions which it has been taught, inasmuch as it applies the few sentences of its vocabulary on the proper occasions; but that it has anything like a human idea of the meaning of each word in the simple sentences which it utters, would not be seriously maintained by the most earnest believer in animal intelligence. It is not possible, however, to maintain that the child appreciates the full signification of the words or very simple sentences that are amongst its earliest articulate utterances, although as it associates certain simple ideas with them, they have a meaning for it and are definite manifestations of growing intelligence. What has been previously said with regard to our perceptions, may be repeated with advantage of the language by which we express them; the signs by which we objectify our ideas. Words are merely arbitrary symbols, and have not any *absolute* meaning; every mortal sees in words only the signification which his own inward development enables him to see. Though the philosophy of Plato or of Berkeley be not more intelligible to the common labourer than Greek or Hebrew is, yet it is not on that account meaningless. Or again, because the word virtue, or any other term connoting a moral abstraction, is an utterly unmeaning sound to the native Australian, it does not thence follow that there is nothing real in nature to which the word corresponds. As language is thought made objective, it can plainly have but a relative meaning, and a precisely similar signification only to two persons at the same point of mental development. So that when the ingenious

* White, 'On the Gradation in Man,' Appendix, pp. 143, 144.

European discovers in crude barbarian ideas, evidence of the conception of certain profound tenets of civilised belief, there may be as great an error as that which there unquestionably is in the supposition that no idea exists but human idea. It is quite possible that when the child babbles its earliest sentences, it has not a much higher idea of their signification than a well-educated parrot might have.

That birds have a language of their own, by which they can communicate with one another and express their different passions and simple ideas, will be denied by no one who has attentively observed a colony of rooks. The language of these birds, apparently so monotonous, has been diligently studied by M. Dupont de Nemours, and is said by him to be composed of twenty-five words.* He spent the whole of two winters in the study, and his method of learning rook language was precisely similar to that which is adopted in investigating the language of savages; he listened to the sounds, carefully retained them in his memory, and closely observed with what gestures or objects, when repeated, they were connected. In like manner, he professes to have interpreted the song which the male nightingale pours forth when perched near the female engaged in hatching her eggs, and he has translated it into French. Although perhaps even those who would most willingly believe everything possible in favour of the intelligence of animals will look with much distrust on M. Dupont de Nemours' translation, yet the most obstinate sceptic cannot but acknowledge that birds have the power of communicating with one another, not only, as might be supposed, instinctively, but also under circumstances which clearly display a comprehension on the part of one bird of the acquired ideas of another. A swallow accidentally got its leg caught in a loop of string, and of course made desperate efforts to get away. Exhausted after a time by its violent exertions, it hung down and cried out piteously. Very soon all the swallows of the neighbourhood congregated around, and, beholding the doleful plight of their companion, in great alarm lamented loudly. After some time of consideration, however, one of them—a swallow of genius—suddenly darted past the loop of string, striking at it sharply with its bill as it passed; others followed the benevolent example, and in about half an hour the band was loosed and the captive set free. Of an instance somewhat similar, Leuret has been informed on the most reliable testimony.

With the manifestations of an increasing intelligence which are observable amongst birds, we philosophically anticipate more decided exhibitions of emotion than have been noticed in the animals below them; and there are various anecdotes testifying to the existence of simple emotions in the feathered tribe. Though it may be open to

* 'Quelques mémoires sur différens sujets, la plupart d'histoire naturelle, et de physique générale et particulière,' Paris, 1813, p. 228.

scepticism to deny that the melodies with which the happy woods resound, declaring the joy of existence amongst birds, are poured forth partly from emulation, yet there cannot be any doubt of the existence of such a passion in tame birds. Bird-fanciers often make singing matches between their canaries, laying heavy wagers on the result; and it is painfully interesting to watch the little creatures swell and thrill with their great efforts to surpass one another, until they sink down quite exhausted. The intensity of the painful passion which may be excited in a bird's breast by an unhappy disappointment, is displayed in the following anecdote. A hen canary, after the usual period of laying, commenced incubation, and while this was going on nothing could exceed the affection of the male, who sang to her, and paid her every possible attention. Unfortunately, no young birds made their appearance at the proper time, as the eggs were addled; and now, completely mad with rage, the male savagely attacked the female. A severe combat ensued, nor ceased till both fell down exhausted, and died, having stripped each others breast bare of feathers.* It is related that some sparrows which had been regularly fed flew away without touching their food, when on one occasion they found one of their number dead, poisoned by prussic acid, that had been put into their food. Instinct, it is true, mostly directs animals to what food is suitable to them; but it is evident that the suspicion and fear of the sparrows in that case could not be attributed to instinct, as the dead sparrow had eaten of the poisoned food, and had died therefrom. Gratiolet has observed a like instance amongst crows; and similar facts are more or less familiar to all agriculturists. But the following anecdote, recorded by M. Dupont de Nemours, positively evinces a sort of moral feeling in birds, and discredits the commonly made statement that animals are destitute of sympathy with one another, and indifferent to one another's sufferings and joys. In a large aviary in which there were many birds of different kinds, was placed a nest of nightingales, and a small plate on which was a mess of small worms and ants, their proper food, was introduced. The father and mother could not, however, endure the confinement, but pined away and soon died. A little one was left, which cried out piteously for a mouthful of food. A female canary was much affected by the sad spectacle of the starving orphan; it had evidently noticed the difference between the food which the parent nightingales had before their death given the young one and its own food; it was desirous of feeding the young nightingale, but the worms and nasty mess disgusted it. Still there was the famishing orphan continually crying for lack of nourishment; the canary hesitated for some time, going from the plate to the little one, and back again from the little one to the plate; but at last, surmounting its repugnance, it seized hastily a billful of the worms, rushed with them to the orphan, and imme-

* Some number of 'Psychological Journal.'

diately started off to the water to wash its own mouth out. This process it repeated three times then, and for the future regularly supplied the nightingale with food until it grew up, and was able to take care of itself. But the male canary, which had quietly tolerated all this while the nightingale was young, now becoming jealous, began fiercely to attack it, so that it was necessary at last to remove it from the aviary to save its life.* It is certainly remarkable that animals of such lowly intelligence should be capable of manifesting so excellent an out-of-self feeling: fear, envy, anger, jealousy and passions of the low self grade, we do not much wonder to observe in them; but compassion, sympathy, active benevolence would have seemed of too high an order for such humble creatures. The benevolence of the canary, however, falls far short of true moral feeling, inasmuch as it is but a compassionate feeling for, and desire for the good of, a particular individual; and a little reflection will show that animal sympathies are and must be limited to one or two individuals. As their intellectual phenomena consist of the association of a few simple ideas representative of particular objects, and they have not that power of considering the relations of ideas which constitutes abstract thought, it is evident that their feelings must be limited to the extent of their ideas, and cannot embrace the good of a number of individuals. A child, on the other hand, begins with feeling, like the animal, entirely for itself; but, rightly developing, it goes on to feel for two or three persons, then for the family, then for the country, and perhaps in time for the whole human race. It is in the idea of the good of all men at all times that the truest moral feeling consists; and the nearer the conception approaches this wide and exalted character, the higher is the moral feeling connected with it. But it is obvious that even the animal desire for the good of one individual not itself, is the beginning of an affection of the mind which in its highest evolution expands into full moral feeling. Here, as elsewhere, we unfold the evidence of a gradual progression.†

It would not be very satisfactory to attempt to define any particular stage in the development of human intelligence, which might be supposed to correspond with the permanent intellectual state of birds, inasmuch as no such definite stage does exist in the most gradual progression; and although the child at one period is not superior to the birds in the actual operation of its faculties, yet we can never justly dissociate from the mental phenomena of the child, however humble they are, the potentiality of an infinitely higher display. The higher type at a low grade of development is for the time on the same level as a lower type which has attained to its full

* Leuret, *op. cit.*, p. 223.

† It might at first seem, that what is above said of the moral feeling is opposed to that which was before said of the nature of emotion; but it is not really so. Man, in the fulfilment of his mission of bringing inward development into correspondence with the complex relations of outward nature, extends the bounds of self till it embraces all humanity; and he then receives pleasure from the idea of that which benefits the whole.

development : but as in the simple forms of animal existence of the palæontological ages there lay the potentiality of the animal life which succeeded them, so in the young well-bred infant there lies the potentiality of a Socrates, a Newton, a Shakespeare, or even of a greater than these.

Those who do care to speculate upon the period in which the developing intelligence of man passes beyond the utmost intelligence of birds, will probably find it in the rapid progress which is made by the child from the particular to the general idea, and from the general to the abstract idea. Not that birds must be supposed incapable of any general idea ; for there seems every probability that those which flee from man on account of the destruction which they have learned that he commits amongst them, and those tame creatures which recognise him joyfully on account of the benefits they receive from him, have a general conception of man apart from any perception of a particular man. And as one individual, made aware of the approach of the enemy or the benefactor, man, may certainly by its cries communicate to others the present danger or the present good, it would appear that birds possess some signs which correspond to a concrete general name amongst men. Still there can be no doubt that their intelligence is chiefly concerned with the simple representative ideas of perception ; ideas which, like those of the young child, are very imperfectly representative of the relations of the objects that excite them ; and that such general ideas as they have, are of the lowest kind, and but one step above the particular. They are the foreshadowings of a process of mental evolution which, by reason of their constitution, can never take place in birds, but which is plainly traceable in man. For he, when very young, advances from the particular to the general, forms ever widening general ideas, and by the power which he has of embodying these in words, makes of them objects for future contemplation, thus creating for himself a new world into which no animal can follow him. From the general he again quickly rises to the abstract, as for instance, from the general idea of a horse to the abstract idea of swiftness, from the general idea of man to the abstract ideas of courage, virtue, and other so-called attributes. So willingly and hastily, indeed, does man advance in this direction, that his ambition runs great danger of overleaping itself, and he is apt to generalise so extensively, that he loses all the elements of the original experience ; and thus, forgetful that the worth of every idea or term depends on the concrete element in it, constructs a philosophy of unmeaning words. It is in this way that, beginning with observation, he by generalization arrives at "physics," but, not content therewith, soon passes onwards through abstractions to the fabrication of his favorite "metaphysics ;" τῶν μετὰ τὰ φύσικα, as Aristotle expresses it, that which is after physics, and which being so, is as some think, to man living in physics, merely a fiction of the imagination.

(To be continued.)