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MR. DARWIN ON THE DESCENT OF MAN.\*

In these volumes, which have been expected with the greatest interest, Mr. Darwin has at once carried to the furthest possible extent his famous hypothesis of Natural Selection, and has developed for the first time an important supplement to that hypothesis. In his work on the *Origin of Species*, he maintained the theory that all Species, instead of having been independently created, and possessing an independent existence, had been gradually developed out of other forms. This theory in itself was not new, having been previously put forward by Lamarck, besides other naturalists. But Mr. Darwin gave it a new character and vitality by his proposed explanation of the method of development. Lamarck had attributed the gradual variation of Species to the direct operation on organized beings of the circumstances and conditions of life in which they were placed. Mr. Darwin added the observation that the individuals who at any moment happened to develop an adaptation to such circumstances would be more likely to succeed in the struggle for existence, and would thus leave a greater number of offspring. Lamarck, for instance, supposes that the long neck of the giraffe was acquired by the original animal having been impelled by circumstances to seek for its food in branches of trees, and thus to have extended its neck by constant use. Mr. Darwin assumes a similar tendency, but adds that, from the moment it began to operate, the giraffes which, from the greater length of their necks, were more successful in gathering food, would become more vigorous, would survive in greater numbers, and, by the ordinary laws of inheritance, would transmit their peculiarity to their offspring. The offspring would, in turn, carry the development further, and transmit it in a more extended and more permanent form to their successors. Just as man, for his own uses or fancies, selects for breeding purposes those particular animals which have the specialities of construction he desires, and is thus able to increase such specialities and render them permanent, so Nature, by gradually eliminating from time to time the individuals least adapted to the circumstances of the country or period, and proportionately favouring the propagation of the better adapted, has indefinitely diversified and improved an original and simple stock. Now Lamarck, as is well known, did not hesitate to apply his theory to the case of Man, and asserted that Man had similarly been developed by the mere force of circumstances from an ape. Mr. Darwin sufficiently indicated in his former book that he was prepared to make a similar application of his own enlarged hypothesis. He said that by his speculations "light would be thrown on the origin of Man and his history." He refrained, however, for the time from publishing the

arguments he had prepared on this subject, as he thought he "should thus only add to the prejudices against his views." But he thinks that with most naturalists, and especially the younger and rising ones among them, his theory has now made good its claims to acceptance, and he no longer hesitates to push it to its final conclusion. That conclusion is clear and definite. It is that "at a remote period, Man, the wonder and glory of the Universe, proceeded" from the stem of Old World Monkeys.

This proposition will not, we think, in the minds either of the mass of men or of the learned, lose its first character of enormous and painful improbability by any amount of that preparatory exercise in cognate speculations on which Mr. Darwin relies. Even had it been rendered highly probable, which we doubt, that the animal creation has been developed into its numerous and widely different varieties by mere evolution, it would still require an independent investigation of overwhelming force and completeness to justify the presumption that Man is but a term in this self-evolving series. There are some instincts which, so far as we can see, are ultimate facts, and an instinct of this nature, except where it is obscured by the prejudices of speculation, impels us to a profound conviction of the essential difference between man and the rest of the animate creation. We are intimately sensible of a difference which is not one of degree, but of kind. We share their nature in a multitude of points, but we are conscious of an additional nature, which not only distinguishes us from them, but practically places us in another world from them. Our characteristic objects and motives are invisible, mental, and ultimate; theirs are visible, corporeal, and immediate. For this reason, though we often become attached to them, it is impossible for us to feel sympathy with them. We cannot conceive even the lowest savage having any real companionship with the highest possible brute. A huge chasm separates the two, over which no sentiments of union could pass. Robinson Crusoe could make a friend of his man Friday, and was no longer quite alone as soon as he had found him; but he would have been in the most absolute solitude, though the scene of the shipwreck had been the tropical island of which Mr. Darwin dreams peopled by the most intelligent anthropomorphous apes. If the instinctive sense of diversity thus indicated is ever to be overthrown, it can only be by a process which amounts almost to demonstration. Mr. Darwin says truly that the opinions of philosophers, however antagonistic to popular conceptions, ultimately attain general acceptance. But this is only when by detailed and minute application they are found to harmonize with the facts of daily experience. Difficult as the investigation of the theory of gravitation may be, the theory lives in the ordinary mind as much as in that of the philosopher, because when once realized it falls in with our everyday observation and sensation. We own we cannot conceive that Mr. Darwin's theory of the Descent of Man could ever acquire this harmony with ordinary feelings. Every visit to the Zoological Gardens, every day's observation of dogs and horses, would refute it by a kind of direct perception. These are the prejudices, and not, as Mr. Darwin seems to think, mere theological theories, which

he has to overthrow, and we cannot conceive a task which demands a more elaborate and close argumentation.

For this reason we must needs express our disappointment with the more important part of Mr. Darwin's book. His discussion of the faculties of Man in comparison with those of animals appears to us utterly inadequate to the subject, independently of its being insufficient to sustain his theory. As it seems to us, he has not merely failed, but he has not duly grappled with the essential difficulties of the question. He has thought it possible to leap, by the aid of a few illustrations, over the momentous and arduous questions respecting the mental powers of men and animals, and the moral nature of Man is dissected with a most rapid and an unpenetrating hand. We can only express our conviction on this point by saying that all these subjects Mr. Darwin appears quite out of his element. As an observer of natural history, on the other hand, he is as admirable as ever, and in this respect his present work will enhance the great reputation he already enjoys. As we have said, in addition to his speculations on the origin of Man, his present work contains an important investigation in those paths of natural history which he has made his own. Further consideration has led him to perceive an imperfection in his hypothesis of Natural Selection, which he owns with philosophical candour. He had not, he says, "sufficiently considered the existence of many structures in animals which appear to be, as far as we can judge, neither beneficial nor injurious," and this he believes to be one of the greatest oversights yet detected in his work. In other words, the action of Natural Selection will not, of itself, sustain the theory of the continuous evolution of all organized beings from inferior forms. To take a simple instance, it will not explain the development of the peacock's tail. In reference to the more special subject of this new work Mr. Darwin finds that he cannot explain the differentiation of the various races of man by the mere agency of Natural Selection. He believes, however, that he has found the requisite explanation in the agency of Sexual Selection. He thinks that females have entertained a preference for males, or males for females, possessing certain specialities of form either for use or ornament, and have thus exercised an unconscious but continuous selection in favour of such peculiarities. To support this theory he passes in review the whole animal kingdom, and points out what he deems the operation of this law in developing many peculiarities and beauties of animal structure for which Natural Selection cannot account. This part of his work occupies the greater portion of these two volumes, and is full of the most diversified interest. It is one of the most delightful studies in natural history ever written. It possesses, indeed, almost the charm of a new romance. His grandfather, Erasmus Darwin, wrote an amusing poem

\*The Descent of Man, and Selection in Relation to Sex. By Charles Darwin, M.A..F.R.S., &c 2 vols. John Murray, 1871.

on "The Loves of the Plants," but Mr. Charles Darwin has written a history of "The Loves of the Animals" far more enchanting than such a poem. Whether or not his conclusions be valid, at least to the full extent in which he applies them, must be a matter for prolonged

discussion among naturalists, and we observe that his brother-philosopher, Mr. Wallace, believes that, in some respects, they are carried too far. But as a record of observation of fact this part of the book possesses the greatest possible value. It forms the real substance of the work, and might, as Mr. Wallace has observed, have been advantageously issued as a separate publication. It applies only to a subordinate point in the theory of the descent of Man—namely, as we have said, to the development of varieties in an already existing human race. The actual evolution of such a race is ascribed to the more potent agency of natural selection; and the present two volumes would have afforded none too large a space for the complete investigation of this cardinal proposition. As it is, one of the most momentous inquiries ever propounded appears loosely attached to a great work on Natural History, and receives, as it seems to us, only a secondary treatment.

We must confine ourselves mainly to Mr. Darwin's speculations in relation to Man, and explain the points of failure to which we have referred. Mr. Darwin is sensible that any such difference in kind as we have noticed between the mental faculties of men and animals would offer an insuperable obstacle to his conclusions. He says:-

"If no organic being excepting man had possessed any mental power, or if his powers had been of a wholly different nature from those of the lower animals, then we should never have been able to convince ourselves that our high faculties, had been gradually developed." But he thinks "it can be clearly shown that there is no fundamental difference of this kind." If this is ever to be clearly shown, it must be by a much more accurate and philosophical analysis than Mr. Darwin has attempted. His chapter on this subject appears a mere evasion of its real difficulties. He notices, for instance, the objection that "no other animal but Man has the power of abstraction or possesses general ideas." How does he reply to it? "It would be useless," he says, "to attempt discussing these high faculties, for hardly two authors agree in their definition." This is merely to avoid the question. Mr. Darwin does not dispute the fact that an enormous distinction in this respect does exist between Man and the brutes, and it was his business, if he wished to rebut the presumption thus raised, to enter into a close examination of these faculties, and if possible afford us a definition of them in consonance with his theories. This is the course he always pursues in reference to the physical differences between various species. The excellence of his work as a writer on Natural History consists in the minute and close observation with which he defines such differences, pursues them into all their gradations, and thus frequently shows how forms apparently very distinct may have been developed from each other. To decline such an inquiry because others have been unsuccessful in it is simply a contemptuous abandonment of the task he had set himself. The only observation he vouchsafes on the subject leaves it still more confused. "Such faculties could not have been more fully developed in Man until his mental powers had advanced to a high standard, and this implies the use of a perfect language." But the development of a perfect language itself implies the use of such faculties. A language, even in its least imperfect form, is at once the expression and the instrument of

thought, and no general term would possibly have been used without the presence in the mind of a general notion to correspond with it. Mr. Darwin throws us back from the development of thought to the development of language, and from this we are of necessity again thrown on the development of thought.

We are not surprised, indeed, that Mr. Darwin has hastily dismissed this point, for we believe that here, at all events, a distinction is to be discerned between men and brutes which amounts to an absolute difference in kind. It is closely connected with the use of language, which Mr. Darwin admits to be "one of the chief distinctions between man and the lower animals." He urges, however, that the rudiments of this essentially human art may be discerned in the varying sounds and cries by which animals express their emotions, and sometimes excite similar emotions in other animals. Articulate language is, he allows, peculiar to man, but man "uses in common with the lower animals inarticulate cries to express his meaning." This is another instance of the manner in which, in this part of his work, Mr. Darwin continually runs away from a difficulty he recognizes. If articulate language be a peculiarity in man, how does it remove the fact of the peculiarity that in another point man is not peculiar? He proceeds to observe with more accuracy that "it is not the mere power of articulation which distinguishes man from other animals, for, as every one knows, parrots can talk; but it is his large power of connecting definite sounds with definite ideas; and this obviously depends on the development of the mental faculties." Here it is evident Mr. Darwin has again landed us in that insuperable difficulty which he declines to encounter. What is the nature of those mental faculties which render definite ideas possible? The chief characteristic of language is, as Mr. Darwin sees, not the mere power of articulation, but its relation to reasonable thought, and this admission renders the whole of his discussion on the growth of the art of giving vent to emotions in sound entirely beside the mark.

The cardinal element in speech is not the expression of a single emotion or idea, but the expression of a relation between two emotions or ideas. Its essential characteristic, if not its primary unit, is not the noun, but the sentence or the verb. Now, however perfect the vocal utterances of any lower animal, there is not the slightest trace of their approaching to the utterance or to the conception of a proposition. The sentences which a parrot will learn to utter are, of course, mere imitation for no one supposes that they correspond to intelligible ideas in its brain. This broad distinction in external expression points us at once to that cardinal difference in mental faculty which we have in view. The reference, or, in strict language, the attribution of one notion to another, presupposes the possibility of forming general notions, classes, or abstractions, and, perceiving their mutual relations. Mr. Darwin speaks of savages who use "no abstract terms." But to a certain extent every term is abstract. The savage cannot utter a sentence, however simple, without asserting of one thing that which belongs to many other things. If he calls any one thing by a name which applies to other things, he at once betrays the notion of a class of things. This is probably connected with another point of distinction which Mr. Darwin dismisses with characteristic brevity. The

Duke of Argyll has remarked that the fashioning of an implement for a special purpose is absolutely peculiar to man, and he considers that this forms an immeasurable gulf between him and the brutes. Mr. Darwin admits that it is a very important distinction, but he thinks there is much truth in Sir J. Lubbock's suggestion that when primeval man first used little stones for any purpose, he would have accidentally splintered them, and would they have used the sharp fragments. "From this step it would be a small one to intentionally break the flints, and not a very wide step to rudely fashion them." This is a good instance of the steps Mr. Darwin is always making on this subject. If the latter step be not a very wide one, it is at least singular that not a single instance can be adduced of it having been taken. Monkeys have been observed to break open nuts with a stone, but never to attempt to fashion the stone. The reason, as it seems to us, may be found in the distinction just noticed. To fashion the stone, however rudely, implies the possession of a general notion of the shape according to which it is to be formed. It implies, in other words, the power of abstraction, or of forming the notion of a class of stones. The case of the bees' cells will not, at least by Mr. Darwin, be adduced as a contrary instance; for he has himself attributed these wonderful constructions to the operation of Natural Selection, upon a simple primary instinct, without any design on the part of the bee. Whether the instinct has been thus perfected or not, Professor Haughton, in his *Manual of Geology*, has given strong reasons for the belief that bees construct hexagonal cells for the simplest of all reasons—because they cannot help it. Given the primary instinct of building cells in the closest possible contiguity to each other, and the simple laws of mechanical pressure would force them to assume a hexagonal form. If a number of spheres be contained within a cylinder, and the cylinder is made gradually to close upon the spheres towards its axis, the spheres will all assume the form of elongated hexagonal prisms. The newest approach to reasoning which Mr. Darwin can adduce is furnished in two analogous stories respecting dogs. "Mr. Colquhoun winged two wild ducks, which fell on the opposite side of a stream; his retriever tried to bring over both at once, but could not succeed; she then, though previously never known to ruffle a feather, deliberately killed one brought over the other, and returned for the dead bird." The case is certainly remarkable; but it appears to us a very hasty conclusion that the act was rational. The retriever possesses the instinct of not permitting a bird to escape as well as the instinct of not injuring it, and her act would seem simply an instance of one instinct overpowering another. This interpretation is strongly confirmed by the other story. In that case two partridges were shot, one being killed, the other wounded. The latter ran away, and was caught by the retriever, who, on her return, came across the dead bird; "she stopped, evidently greatly puzzled, and after one or two trials, finding she could not take it up without permitting the escape of the winged bird, she considered a moment, and then deliberately murdered it by giving it a severe crunch and afterwards brought away both together. This was the only known instance of her ever having wilfully injured any game." "Here," says Mr. Darwin, "we have reason, though not quite perfect, for the retriever might have brought the wounded bird first, and then returned for

the dead one, as in the case of the two wild ducks." Precisely so; if she had really reasoned she would not have killed the duck. But two distinctive impulses were working in her—one impelling her to bring both birds, the other impelling her not to let either bird escape; and, not being able to reconcile the two by means of reason, the latter instinct overpowered her habit of not injuring the game. It is not by such instances that the result of a wide induction respecting the difference between the faculties of men and brutes can be overthrown. We should have been, indeed, in no way surprised if Mr. Darwin had been able to adduce cases far more difficult of explanation. Nothing is better recognized than that inferior faculties, when acting alone, acquire a perfection of development which enables them in many cases to act even more efficiently than higher faculties. A blind man will perceive by the more sense of touch that which the philosopher could only observe by the aid of a microscope; and a dog, by his acute sense of smell, will surpass the utmost exertions of human sagacity in tracking his prey. Consequently, even if it could be shown that animals perform certain actions which Men could only perform by the aid of reason, it would by no means necessarily follow that animals perform them by its aid. It would be perfectly conceivable that their power was derived from the development of a lower and diverse faculty to an extent of which Men have no experience. Such a consideration is alone enough to show that the question needs to be treated with infinitely more care and research than Mr. Darwin has thought worthwhile to bestow upon it. We fear the truth is that the study of mental philosophy, under the disastrous influence of one or two popular writers, has of late years become extremely loose and superficial, and Mr. Darwin does but illustrate the general vagueness of thought which prevails on small subjects.

If Mr. Darwin has thus failed to show that Man's mental powers are similar to those of the lower animals, his speculations on the Moral Sense cease to have any bearing on the question of Man's development from the Brutes; for as he observes, this Sense is only possible where human reason exists. His cardinal proposition in his chapter on this subject is, that "any animal whatever, endowed with well-marked . social instincts, would inevitably acquire a moral sense or conscience as soon as its intellectual powers had become as well developed, or nearly as well developed, as in Man." The social instincts, he says, lead an animal to take pleasure in the society of its fellows, to feel sympathy with them, and to perform services for them, and he gives some interesting examples of such sympathy between monkeys, and even between animals of different kinds, as dogs and cats. But as the words we have just quoted imply, the impulse to act in a social or moral way is wholly diverse from a conscious appreciation of the character of such actions, and it is the latter which constitutes the Moral Sense. Mr. Darwin adds, accordingly, that—

"As soon as the mental faculties had become highly developed, images of all past actions and motives would be constantly passing through the brain and that feeling of dissatisfaction which invariably results from any unsatisfied instinct would arise, as often as it was perceived

that the enduring and always present social instinct had yielded to some other instinct, at the time stronger, but neither enduring in its nature nor leaving behind a very vivid impression." This influence would be augmented by the use of language and the distinct expression thus afforded of the wishes of the community, while habit would strengthen the acquired social tendency. It will again be seen that the whole of this process depends on the capacity, not merely for recalling individual past impressions, but of referring them to distinct classes, and observing their generic characters. But, considered merely as an account of the development of the Moral Sense in man, it nevertheless leaves the essential peculiarity of that sentiment wholly unexplained. The point to be explained is not that a sense of dissatisfaction arises when the social instinct has been disregarded, but that the dissatisfaction in this case is wholly different from that which arises from the disappointment of other instincts. To feel that we have done wrong is utterly diverse from the feeling that we have made a mistake, however grievous. Conscience is distinguished from other faculties, not in its mere strength or permanence, but in its authority. The most complete development of Mr. Darwin's social instinct could only lead to a feeling that it is desirable to act in a given way; but the whole problem of the Moral Sense lies in the distinction between Desire and Duty. The coincidence between the two feelings is the ultimate perfection of virtue; but to the last they remain distinct; they act together in the mind; though they may lead to the same ends we have a distinct consciousness of each, and we experience a double gratification in the performance of one and the same act. Mr. Darwin quotes with approbation Kant's words, -" Duty! wondrous thought, that workest neither by fond insinuation, flattery, nor by any threat, but merely by holding up thy naked law in the soul, and so extorting for thyself always reverence, if not always obedience; before whom all appetites are dumb, however secretly they rebel." Mr. Darwin, however, has described a sentiment the very reverse of this. His moral instinct is one which works only by insinuation and by the threat of dissatisfaction, and acts not as a naked law, but as a law embedded in a most complex mass of circumstances, experiences, and inherited tendencies. He has described a highly-developed appetite, but not a supreme and self-asserting-authority. The former is conceivable in animals, of the latter there is not a trace among them.

(to be continued.)

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We have followed Mr. Darwin in placing in the forefront of his argument the difference between man and the brutes in respect of the mental and moral faculties. As he himself allows, if there be in this point such a vast chasm between them as is generally and, we believe, rightly supposed, it is scarcely possible to conceive that any mere physical facts could demonstrate man's development from them. As Mr. Froude recently observed at St. Andrew's, even if our bodies, could have been developed by Natural Selection to such a degree of perfection as to render them fit for our use, the soul still remains distinct from its



bodily habitation, and it would be none the less a mystery by what means this spiritual inhabitant appeared in its animal abode. This difficulty is aggravated in an infinite degree when we take the whole of Mr. Darwin's hypothesis into account. To say that he maintains the self-development of man from an ape is to put his proposition in a most exceptionally favourable light. He maintains at the same time that the ape has been developed by a continuous process out of the lowest known form of animate, or at the least vertebrate life. The evolution of man from an ape is but the last step in the series. To say, therefore, that Mr. Darwin asserts the development of man from a monkey is as imperfect a statement of the theory as to say that he asserts our development from savages. The theory, fully stated, is no less than this: that "man, the wonder and glory of the universe," has directly descended from a kind of jellyfish. Mr. Darwin vouchsafes us an outline of the complete genealogy of man. His "most ancient progenitor apparently consisted of a group of marine animals resembling the larvae of existing Ascidians." 'An Ascidian, it may be necessary to explain - so grossly ignorant are many of us of our blood relations - is "an invertebrate, hermaphrodite, marine creature, permanently attached to a support. They scarcely appear like animals, and consist of a simple, tough, leathery sack, with two small projecting orifices," and their larvae somewhat resemble tadpoles in shape. It has been lately discovered that these larvae "are related to the Vertebrata in their manner of development, in the relative position of their nervous system, and in possessing a structure closely like the chorda dorsalis of vertebrate animals." The observation of this distant resemblance is supposed at length to have revealed the source whence the Vertebrata have been derived. "We should thus," says Mr. Darwin, "be justified in believing that, at an extremely remote period, a group of animals existed resembling in many respects the larvae of our present Ascidians which diverged into two great branches - the one retrograding in development, and producing the present class of Ascidians, the other rising to the crown and summit of the animal kingdom by giving birth to the Vertebrata." These animals "probably gave rise" to a group of fishes like the Lancelet; from these the Ganoids "must have been" developed. From such a fish "a very small advance would carry us on to the Amphibians. "No one," unfortunately "can at present say by what line of descent" mammals, birds, and reptiles were derived from Amphibians and Fishes. But these slight gaps are no difficulty to Mr. Darwin. Once in the class of mammals the steps "are not difficult to conceive" which led up to the Lemurs, and the interval "is not wide" from these to the Simiadae. The Simiadae then branched off into two great stems, the New World and the Old World monkeys, and from the latter, "at a remote period," man proceeded.

"Thus," Mr. Darwin concludes, "we have given to man a pedigree of prodigious length, but not, it may be said, of noble quality." Prodigious, indeed I and, as for the nobility, it would seem to be reflected backwards, on the Chinese system, according to which persons who distinguish themselves ennoble, not their children but their ancestors. But we particularly wish the reader to observe what this genealogy involves with respect to the higher faculties

of the human soul. Mr. Darwin admits no break in the series, and, consequently, if he has shown anything, he has shown that "the difference is certainly one of degree and not of kind" between the mind of man and the sensations of an Ascidia. There is nothing in the brain of a Newton which does not exist in an undeveloped form in the "tough, leathery sack" of that "invertebrate, hermaphrodite, marine creature." We think it will be generally admitted that Mr. Darwin has here supplied the refutation of his own theory by reducing it to an absurdity. At all events we would advise him, if he wishes to corroborate his hypothesis, to commence by experimenting on some superior kind of Ascidian and see whether, by patient selection, he can induce any of them to split themselves in half, and abandon their permanent support for a vagrant oceanic existence. If such a creature, however, has any sentiments at all-and it ought, on the hypothesis, to have some rudimentary apprehensions-it would, we should think, entertain a preference, as simple and tough as its own leathery sack, to "rest and be thankful." Plato, in the "Symposium," broaches the fancy that men and women were originally united, and went about with four legs and four arms; but that the gods, for their sins, split them in half and that if they did not take care they would be split up again, and sent hopping about the world in four quarters, or revolving like the mysterious multiple leg which meets our startled eyes on hoardings. It would seem there was a germ of Mr. Darwin in Plato.

It is impossible to maintain unbroken gravity in discussing such a dream. But let us turn to Mr. Darwin's investigation of the physical basis of his conclusion, which appears to us scarcely less unsatisfactory than his inquiry into its mental and moral bearings. He simply accumulates a variety of points of similarity between the human frame and that of animals. He dwells on their liability to similar diseases, similar parasites, on the correspondence between their embryos, their skeletons, and particularly on the presence of many rudiments representing organs which exist in other species, and on the tendency of such rudiments occasionally to develop into more complete instances of such organs. Mr. Darwin gives a drawing of the embryos of a man and a dog; but the inference he suggests from their general resemblance is utterly unworthy of a philosopher. We are not sure but that his readers will be struck by the apparent difference as well as by the apparent correspondence between the two. But for a natural philosopher to appeal to such superficial resemblances is much the same as for an astronomer to appeal to the apprehension of the vulgar with respect to the motions of the heavenly bodies. His special task consists in looking beneath the surface, and there is eminent need for such investigation in this case. We know, as a matter of fact, that these embryos develop into very different forms, and we cannot but conclude that there must be some radical difference in their primary elements which is not apparent to an ordinary eye. It should be the work of science to reveal this difference, not to construct theories on its mere apparent magnitude. But Mr. Darwin urges that this "homological construction of the whole frame in the members of the same class is intelligible if we admit their descent from a common progenitor, together with their subsequent

adaptation to diversified conditions. On any other view the similarity of pattern between the hand of a man or monkey, the foot of a horse, the flipper of a seal, the wing of a bat, &a., is utterly inexplicable. "We fail to see the inexplicability. What is there unreasonable in the supposition that they have all been formed on the same general plan t Mr. Darwin's only objection is, that "this is no scientific explanation." But this is simply to beg the question. If Mr. Darwin starts with two preliminary assumption that every fact in Nature is capable of scientific explanation- in other words, that no causes have ever operated except natural causes, he will, of course, reject any other causes. But this assumption is the very point to be proved. To argue from it is to assume the whole doctrine of Evolution. The assertion in question is scientific or not, according as it is true or not. The only scientific quest is whether, as a matter of fact, Species have been developed by force of circumstances out of other Species, and Man out of an Ape. It is certainly no scientific argument to assume that they must have been. Does the investigation of the various forms of Nature lead us up to a number of distinct points of departure? That is the question at issue. Mr. Darwin, unless he believes the world to be eternal, must admit a single point of departure, and there is nothing more essentially unscientific in the recognition of

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dozen co-ordinate points of departure than in the recognition of one.

But the truth is that Mr. Darwin's argument is at every point supplemented by these, enormous assumption. To utmost he proves, not merely in his present but in his former book, is not what has been, but what may have been, and he converts the "may" into a "must" by the sole force of the ever-present assumption that all forms of Nature have been developed out of other forms. To our minds, the book bears in its very mode of expression, of which we have given some illustrations above, a character which is wholly unscientific. The proper scientific mood is the indicative. Science tells us what has been, what is, and what will be. But Mr. Darwin's argument is a continuous conjugation of the potential mood. It rings the changes on "can have been." "might have been," "would have been," "should have been," until it leaps with a bound into "must have been." There is a most extraordinary instance of this hypothetical form of argument in the chapter which applies to the development of Man the principle of Sexual Selection. The operation of this principle would, of course, be impossible unless the union of the sexes were regulated by distinct choice. But Mr. Darwin relying on the authority of Sir John Lubbock and others, allows that "it seems certain that the habit of marriage has been gradually developed, and that almost promiscuous intercourse once prevailed throughout the world." How does he deal with this difficulty, which, to him, is the difficulty of an ascertained fact?" Nevertheless" he says, "from the analogy of the lower animals, more particularly of those which come nearest to man in the series, I cannot believe that this habit prevailed at an extremely remote period, when Man had scarcely attained to his present rank in the zoological scale." What is the scientific value of a mere "belief " respecting the unknown habits of an unknown creature at an unknown period? What would

Mr. Darwin himself think of an opponent who dismissed any awkward facts he adduced by the simple assertion, "I cannot believe but that other facts exist, although I have no certain knowledge of them, which would alter the case?" Mr. Darwin's only reason for his "belief " is that " Man is certainly descended from some ape-like creature," and that some monkeys are monogamous, others polygamous, others live promiscuously together. The certainty, unfortunately, is hypothetical, and the particular monkey unknown. We are at a loss to understand the value of all this complicated guesswork. It represents a kind of Ptolemaic theory of creation, heaping supposition on supposition, and multiplying cycles of action as each supposition requires to be supplemented. It is the most conspicuous example yet afforded of that "use of the Imagination in Science" on which Professor Tyndall dilated with such unscientific enthusiasm last autumn. Mr. Darwin's imagination is inexhaustible, and his power in this respect contributes greatly to the charm of his strictly philosophical writings; but he does not hesitate, in accordance with Professor Tyndall's advice, to let it take the place of science when the means and methods of science fail.

We need not rely on our own impressions in asserting broadly that Mr. Darwin has failed to prove, as a matter of fact, that any clearly distinct species has ever been developed out of another distinct species. Professor Huxley, an ardent supporter of the theory of Evolution, in a series of Essays he republished last year, expresses the following remarkable opinion:- "After much consideration, and with assuredly no bias against Mr. Darwin's views, it is our clear conviction that as the evidence stands, it is not absolutely proven that a group of animals, having all the characters exhibited by species in Nature, has ever been originated by selection, whether artificial or natural. Groups having the morphological character of species, distinct and permanent races in fact, have been so produced over and over again; but there is no positive evidence, at present, that any group of animals has by variation and selective breeding given rise to another group which was even in the least degree infertile with the first. Mr. Darwin is perfectly aware of this weak point, and brings forward a multitude of ingenious and important arguments to diminish the force of the objection. We admit the value of these arguments to their fullest extent - nay, we will go so far as to express our belief that experiments, conducted by a skilful physiologist, would very probably obtain the desired production of mutually more or less infertile breeds from a common stock in a comparatively few years; but still, as the case stands at present, this little 'rift within the lute' is not to be disguised nor overlooked."

Now it appears to us that this "little rift within the lute" is more than sufficient to spoil the music. If Mr. Darwin has only shown that certain types of species possess a continual tendency to approximate in form towards each other, he has brought to light, no doubt, a remarkable fact in Natural History, but he has done nothing conclusive towards showing that they ultimately coincide. The law of Natural Development may for all we know, be a law of indefinite variation and approximation within certain limits, and nothing can justify us in assuming the contrary except the ascertained fact that such limits have really been passed.

As the case now stands, by the admission of such an authority as Professor Huxley, no absolute proof has been afforded of the limits between good and true species having been transgressed. This amounts to an admission that the views of those who assert the independence of Species are consonant with the facts of our present knowledge, while the viewers of those who maintain the doctrine of Evolution are, in a vital point, unsupported by experience.

It is most surprising that, with such a complete flaw in the argument, a man of science like Mr. Darwin should speak, as we have seen, of Man having "certainly" descended from an ape, and we can only attribute it to a radical misapprehension of the force of the argument from approximation. It seems tacitly assumed on all sides that mere approximation, provided it can be carried sufficiently close, of itself implies ultimate coincidence. This is a complete misconception, and until the conditions of this line of argument are better understood, some of the most interesting researches of modern times must remain in a very unsatisfactory position. The significance of an observed approximation depends entirely on its mode and on the circumstances under which it takes effect. Newton was the first to apply the argument with scientific precision, and its successful employment since his time has advanced the mathematical sciences to their present degree of perfection. But in his first Lemma, which is the foundation of everything else, he lays down a qualification which modern philosophers entirely neglect. Quantities, he says, ultimately coincide which may be proved to approach each other indefinitely, within a finite time. There are lines in geometry which are always approaching each other, but which never meet, and there are operations in arithmetic by means of which, though we can indefinitely approximate to a finite quantity, we can never reach it. The observation is, in effect, as old as the sophism respecting Achilles and the tortoise, the fallacy of which consists simply in a false assumption with regard to the mode by which Achilles approaches the tortoise. The solution of Diogenes is the only true one, and is identical with the qualification of Newton. *Solvitur ambulando*. We know, as a matter of fact, that after a given time Achilles will have passed the tortoise. This is precisely the solution which Mr. Darwin is unable to apply to his instances of approximation between species. If he could say in a single instance, "*Solvitur ambulando*," "Here is a case of one true species having passed into another," we should have a practical proof that the kind of approximation he brings to light is of such a kind as to end in coincidence. But this, as we have seen, is what he has not done. It is, in fact, not a little curious that the finite time which Newton demands is the very condition most energetically repudiated by Mr. Darwin and his followers. They place no limit whatever to the amount of time which their process requires. Six millions of years are mentioned by - Mr. Darwin in his *Origin of Species* as a casual item in the total. But we should not be particular about a million or two, or even a milliard or two, if they would only give us some definite amount. In other physical sciences time is recognized as an essential element of natural operations. A doctor, in giving an account of a disease, is careful to specify the precise periods which its various phases occupy. But when

Mr. Darwin is confronted with the extremely remote and uncertain nature of the agencies on which he relies, he continually falls back on what "might have been" in the lapse of unlimited periods of time. Such a style of argument is, to say the least, destitute of any scientific value. It is impossible to say what might or might not have been during periods so vast that we have no experience of them. For all we ever know, the vitality of Species might wear itself out in the lapse of ages, or by some law of cyclic change they might assume new forms. To call in aid such an indefinite agency is a mere veil for ignorance. It may even be doubted whether to assert that a process takes effect in an infinite time be not simply a roundabout way of saying that, so far as our knowledge extends, it never takes effect. That, at all events, is the practical result for all the purposes of life. , as seems to be admitted even by the most advanced Evolutionists, Species be so permanently fixed that millions of years would be necessary to transform them, it follows that for all human purposes they must be treated as permanently independent. The knowledge of so prolonged a process would have been of no practical avail even to Methuselah.

We are reminded, in fact, by such speculations, of the famous story which Corporal Trim endeavoured so ineffectually to recite to Uncle Toby." There was a certain king of Bohemia," said Trim "but in whose reign, except his own I am not able to inform your honour." Uncle Toby was more accommodating than we are able to be from a scientific point of view. But we recommend the gracious permission he accorded to the Corporal as a most appropriate motto for speculations of this kind. "Leave out the date entirely, Trim," said my Uncle Toby." In almost similar language:" There was a certain Monkey," says Mr. Darwin; of that he is quite sure, and he\* frequently reiterates the assurance. " There was a certain Monkey, but in what period or country, except his own, I am not able to inform my readers." Probably, however, if hard pressed, he would again imitate Trim, and tell us it was about the time when geological "giants left off breeding." Starting from the unsubstantial presumption just indicated, Mr. Darwin proceeds to speculate on the manner of Man's development, without being able to adduce the slightest evidence that facts correspond with his hypothesis. The history, however ingenious, is purely imaginary from beginning to end. We are told how, as soon as, "some ancient member of the Primates came, owing to a change in its manner of procuring subsistence, or to a change in the condition of its native country, to live somewhat less on trees and more on the ground, its manner of progression would have been modified," and, consequently, it " would have had to become either more strictly Quadrupedal or Bipedal." If, further, it be an advantage to Man to have his hands and arms free, then Mr. Darwin "can see no reason why it should not have been" advantageous to the progenitors of Man to have become more erect. The reader will observe that we are again conjugating the potential mood, and so we continue to the end of the chapter. Mr. Darwin does not seem able even to make up his own mind respecting the scene in which his romance should be laid. On the one hand some hairy animals seem to have a tendency to diminish their hairy covering when exposed to hot climates; on the other hand, monkeys live in hot climates and prefer

retaining their hair. When pressed with the argument that the supposed progenitors of Man, being probably very helpless and defenceless; would have been exposed to great risks Mr. Darwin suggests that they "would have been protected from any special risk" if they had inhabited some warm continent or large island." On the other hand, "the fact" of our progenitors belonging to the Catarrhine stock of monkeys "clearly shows that they inhabited the old world; but not Australia, nor any oceanic island, as we may infer from the laws of geographical distribution." And again we read, in considering another difficulty, that Man does not appear to have aboriginally inhabited any oceanic island. We are as much puzzled about the original domain of this primeval monkey as Trim was about the maritime advantages of Bohemia. After all has been said and imagined, "an unexplained residuum of change, perhaps a large one, must be left to the assumed uniform action of those unknown agencies which occasionally induce strongly marked and abrupt deviations of structure in our domestic productions." Is this scientific? and is this the kind of evidence on which a professed man of science is justified in asserting that "Man is certainly descended from some ape-like creature?"

If, in short, in its general application, Mr. Darwin's hypothesis is utterly unsupported by observed facts, it is still more destitute of such support in its application to Man. Mr. Darwin himself admits two things - first that the difference is immense between the highest monkey and the lowest savage; and, secondly, that "this great break in the organic chain cannot be bridged over by any extinct or living species," or, as he again expresses it, that "the connecting links between Man and some lower form have not hitherto been discovered." No monkey has been discovered which is even comparable with Man; no race of savages, however degraded, can be regarded as on a level with monkeys. If Mr. Darwin's hypothesis were true, it is almost incredible that no evidence should be producible of the existence of ape-like creatures closely allied to Man, and showing a tendency to further development. On the other hand, we have the undoubted and recorded experience of at least four thousand years of history, during which many races of Man have been subjected to influences the most diversified and the most favourable to the further development of their faculties. After the lapse of that time Man remains as distinctly Man as he was before, just as all the animals with which he is acquainted have preserved their specific characteristics. It is more than questionable whether his faculties have in any degree improved. He has accumulated knowledge, he has increased the instruments of his thought and action, and his power has thus been augmented. But there is some reason to think, with Plato, that these numerous aids have actually debilitated his natural vigour of body and mind. At all events, it is in glaring contrast with Mr. Darwin's theory of continuous development to observe that the earliest known example of Man's most essential characteristics exhibit his faculties in the greatest perfection ever attained. No poetry surpasses Homer; no religious sentiment is more sublime than that in the book of Genesis; no art is more perfect than that of Greece; no specimens of the human form are more beautiful than the models which Greek sculptors

have preserved for us. History is a continuous refutation of the theory that faculties are gradually called into existence by circumstances. On the contrary, they seem to start fully formed from the brain of Man, and to work out their inherent power for the modification of circumstances. Race after race appears on the scene the Egyptian, the Jew, the Greek, the Roman, the German, can with some special endowment working, as it were, in its blood with inexhaustible vigour. The endowment is applied in various ways, and its forms are multiplied; but it seems to lose, rather than to gain, in fulness and fervency by the lapse of time and the course of experience. The real problem of life lies in that mysterious fertility, at once a constant and so variable, by which the same nature is constantly reproduced, but by which from time to time germs of new energy seem developed. The solution of this problem is to be sought, not in Mr. Darwin's facile method of observing superficial resemblances, but in the difficult task of penetrating into hidden differences. It is a problem which will be solved, if at all, not by romances in human and natural history, but by minute investigations with the microscope and in the laboratory.

We wish we could think that these speculations were as innocuous as they are unpractical and unscientific, but it is too probable that if unchecked they might exert a very mischievous influence. We abstain from noticing their bearings on religious thought, although it is hard to see how, on Mr. Darwin's hypothesis, it is possible to ascribe to Man any other immortality or any other spiritual existence, than that possessed by the Brutes. But, apart from these considerations, if such views as he advances on the nature of the Moral Sense were generally accepted, it seems evident that morality would lose all elements of stable authority, and the "ever-fixed marks" around which the tempests of human passion now break themselves would cease to exert their guiding and controlling influence.

Mr. Darwin is careful to observe that he does not wish "to maintain that every strictly social animal, if its intellectual and social faculties were to become as active and as highly developed as man, would acquire exactly the same moral sense as ours." If this be the case, why should our existing moral sense be deemed a permanent standard? "If, for instance," says Mr. Darwin, "to take an extreme case, men were reared under precisely the same conditions as hive-bees, there can scarcely be a doubt that our unmarried females would, like the worker bees, think it a sacred duty to kill their brothers, and mothers would strive to kill their fertile daughters, and no one would think of interfering." What is this but to place every barrier of moral obligation at the mercy of the "conditions of life" Men, unfortunately, have the power of acting not according to what is their ultimate social interest, but according to their ideas of it; and if the doctrine could be impressed on them that right and wrong have no other meaning than the pursuit or the neglect of that ultimate interest, Conscience would cease to be a check upon the wildest, or, as Mr. Darwin's own illustration allows us to add, the most murderous revolutions. At a moment when every artificial principle of authority seems undermined, we have no other guarantee for the order and peace of life except in the eternal authority of those elementary principles of duty which are independent of all times and all



circumstances. There is much reason to fear that loose philosophy, stimulated by an irrational religion, has done not a little to weaken the force of the 3s principles in France, and that this is, at all events, one potent element in the disorganization of French society. A man incurs a grave responsibility who, with the authority of a well-earned reputation, advances at such a time the disintegrating speculations of this book;. He ought to be capable of supporting them by the most conclusive evidence of facts. To put them forward on such incomplete evidence, such cursory investigation, such hypothetical arguments as we have exposed, is more than unscientific - it is reckless.