THE

AMERICAN

PRESBYTERIAN REVIEW.

JULY, 1871.

THIRD SERIES.—NUMBER 11.

ART I.—DARWIN'S THEORY OF THE ORIGIN OF SPECIES.

By Prof. JOHN BASCOM, Williams College, Mass.

FEW scientific theories have ever covered more, or more important, facts than those embraced in Darwin's view of the origin of species. Nor have any theories been presented whose intellectual and moral bearings were more extensive or more interesting than those involved in this solution of the problems of life. Moreover, its advocacy by some of the most industrious, fruitful and able minds of our time makes it a formidable agency in moulding the beliefs of men, and entitles it to frequent and careful consideration, as its growing proofs are developed. Darwin claims that it is already accepted by the majority of younger and rising naturalists. He says: "The time will before long come when it will be thought wonderful that naturalists, who are well acquainted with the comparative structure and development of man and other mammals, should have believed that each was the work of a separate act of creation." This confidence of its advocates, whether well or ill grounded, and the rapidity with which it gains favor, are reasons for candor, caution and inquiry on the part of all. We propose, in the present article, to examine the proofs of this theory, and estimate their force.

The theory is briefly this:—All forms of animal life stand generically connected: they have sprung one from another by

development, by slight changes which have occupied the geological ages of the world. The postulates of the theory are two: Every form of life is liable to present varieties, is open in successive generations to varying shades of difference. Those varieties fittest, every thing considered, to meet the conditions of life, to conquer its difficulties, will survive, while those least fitted, yielding to the pressure, will be sooner or later eliminated. This force of circumstances, discriminating in favor of all that improves life as well as against all that weakens it, is termed natural selection. Sexual selection may be regarded as included under it, in this its broad sense.

These postulates are not so much assumed, as claimed to be a succinct statement of facts, either in themselves obvious, or arising necessarily from the nature of the case.

This theory stands opposed to the theory, that distinct species have a distinct origin by special creation, while the varieties within a true species have a genetic dependence like that indicated by Darwin.

A first argument for the theory of Darwin is the new ground it opens up to second causes; the fact that it brings explanation to many phenomena before regarded as ultimate. This consideration is one of great weight, both for and against the view, with different persons. On the one side, starting points, points of creation, are resisted to the last extreme, as excluding further elucidation, and cutting science short with an ultimate, if not arbitrary, act: on the other, they are rejoiced in as giving the proper seeds and germs of growth, and removing the impalpable and painful conception, that life is an eternal and necessary evolution with no conditions or control outside of itself and its environment. Effective as these respective feelings are in influencing the judgment, they can not here be urged as furnishing proof on either hand. Their final authority, their logical weight, depends on principles of remote and difficult determination, which are, indeed, very fundamental in themselves, and in the convictions of the parties who build upon them, but whose discussion would immediately carry us into remote regions, in which there is very little common ground for the belligerents.

This case is like that of miracles, the presumption against

them constitutes the body of the argument with one party, and, at least as evidence, has no existence with the other. This proof, therefore, in behalf of the view, must be passed for the present as without force, and this the more positively, since all the efforts of the advocates of continuous development have thus far signally failed to establish a starting point, one at which development does not receive a sudden and final arrest. If initiatory forces of a special and independent nature are somewhere to be assumed, no matter at how remote a period, by both theories, it can not certainly be an argument of decisive moment in favor of one of them, that it establishes these points of creation farther back in the series of facts. The ultimate independence and interdependence of the chain are as surely lost in this case as in that. The origin of the principle of life, otherwise than as an exterior, superinduced agent, is still without proof that approaches sufficiency. Stirling's answer to Huxley as regards protoplasm is for the present complete. The Darwinians, therefore, travel a longer road to reach the same final issue with their opponents. They are still without a start for their theory, unless they make at length an assumption of the same nature with that which they, in the outset, so decidedly deprecate in the theory of special creations. However adroitly and easily they move once in motion, they begin awkwardly enough, with this piece of fortune, however, that their commencement is such a long way off, that the mental eye does not reach it with distinctness, or record its failures with exactness.

One reason why Darwinians look with such favor on the extension of second causes is doubtless found in the fact that most of them reject final causes, and hence are cut off from any solution of the origin of species except this of secondary efficient forces. They do not admit, as a tenable view, the reference of each kind of life to a Creator,—a life designed in its form and circumstances by him. Having, by the denial of final causes, closed their eyes to one explanation, they are necessarily shut up to the other, and are ready to accept it under severe burdens. That secondary and blind forces have always and everywhere in the kingdom of nature a presumptive advantage over primary, personal power, we can not admit.

The presumption, as in the case of miracles, is not absolute and universal, but restricted and special, according to the nature of the point on which it is brought to bear. The school of Darwin is not entitled as proof to this presumption against intervention, which they have helped to create, till the philosophy on which it rests has been first vindicated.

A second argument is found in the closeness of the relations which exist between the various parts of the animal kingdom. These, it is said, find a ready explanation in a genetic dependence, and without it are artificial and arbitrary. This proof gathers decided force in connection with the close coherence in structural features of large families of animals; the striking analogies between even remote members of the kingdom; and synthetic or comprehensive types, such as the Ornithorhynchus. We can not, however, regard this assertion of Darwin as true: "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, etc., is utterly inexplicable. It is no scientific explanation to assert that they have all been formed on the same ideal plan." If each distinct species has been independently created, their interdependence and relations to each other in one plan, are probable because rational and desirable. They are rational, since they present one idea or plan unfolded in various directions, and with a variety of adaptations. To start independently in each new enterprise is certainly not the method of the human mind, nor do we see any good reason why it should be of the divine mind. Reason delights in the expansion and varied application of the simple principles with which it is dealing. If, moreover, men are to follow the thought of God, be instructed by it and enjoy it, then this method becomes necessary. Without it, the animal kingdom falls apart in easy disintegration, like a heap of sand. It is desirable, since animals, by their mutual relation, receive an organic harmony which fits them for one general sort of circumstances, and makes them the complements of each other in filling up and fully occupying the area before them. Likeness of condition prepares the way for a general likeness of organization. Nutrition, inhalation, nervous influence, special sensations, are

in one, in large part, what they are in another, and bring with them like organs and like dependences. The styles of architecture have all a history of resemblances, yet no genetic connection save this of thought and purpose. It is still true, however, that a certain force and fullness of explanation are offered in many directions by the development theory, not reached by that of special creation. The connection of descent is a stronger, more controling one than that of a general uniformity of plan or style, and the facts, when close enough in their agreement to be able to bear it, seem also to demand it. In many cases, however, they have not this nearness of resemblance, and then the opposed view possesses a corresponding advantage.

If we take the four great divisions of Radiates, Mollusks, Articulates, and Vertebrates, the directions of development are so diverse, so independent, so self-consistent, that it is not easy to find a satisfactory starting point for them all,—an organism sufficiently negative in character, so little differentiated as to be common to these four points of the compass, and, at the same time, possessed of tendencies that give promise of any such fixed and permanent distinctions. The fact that these four sub-kingdoms are so firm, so diverse, have so few cross lines of union, and give so little hint of other like divisions is a puzzling fact to a theory which is able to put no restraint on the chance-tendencies with which it works, save only that their products shall be able to survive. Much of the best material of the development theory might be swept into the service of the opposite view by a better division into species, and by an extension of these groups, while the wide breaks which meet us on every hand, in passing from one portion of the animal kingdom to another, would remain to weaken the proof of genetic dependence. It is always, however, to be borne in mind, that the lines of union to be sought under this theory, between existing species, are not direct, but indirect. The connections are all of a branching, forked character. We trace back the line of descent along one limb of life to the point of union, and thence forward on another to the given species. In this process, the geologic record adds its classes to those now in existence,

and occasions, by the very inadequate and partial nature of its material, constant embarrassment, and affords constant apology for failure. This second argument then leaves a conflicting impression, and fails to yield a decided balance of proof for either side.

A third argument is derived from the distribution of the animal kingdom. Certain classes and genera have such local centers as to indicate a local dependence. Thus the marsupials abound in Australia; one class of monkeys is found in the old world, another in the new; certain kinds of birds are much varied and multiplied in South America. The fauna and flora of islands also frequently show a striking likeness, accompanied with minor variations, to those of the adjacent continent. Mr. Wallace has given this argument powerful development in connection with the Malay archipelago, showing the influence everywhere of two independent centers, that of Asia and that of Australia. This argument is one of the clearest and strongest offered by the theory of Darwin. It is very far from being completely developed as yet, and may, in its expansion, either greatly strengthen the conclusions which it now suggests, or lead to their modification. The theory of special creation has but a faint and halting explanation, as yet, for these facts. They certainly indicate an origin and dependence of adjacent species which are not true on that view. Under the present presentation of facts, we are compelled to allow this proof decided force. How far this conclusion may be modified by an extension of species, remains to be seen. That one or more species should be peculiar to a given region is a matter of no surprise, but that the entire flora or fauna of any continent or island, should show traces of independent development is a most significant fact, which we do well to see and admit.

A fourth proof urged by the genetic theory is that derived from embryonic development. "The embryo of man at a very early period can hardly be distinguished from that of other members of the vertebrate kingdom." "The feet of lizards and mammals, the wings and feet of birds, no less than the hands and feet of man, all arise from the same fundamental form." Each embryo slowly, and in its later stages,

takes on the distinctive features of its kind. Darwin, in his latest work, figures the human embryo and that of a dog, that this resemblance may be seen. In order that these facts may afford proof pertinent to the case in hand, we must suppose that this resemblance, in each instance, has been historically impressed on the embryo, organically one with those of many other animals, in that long line of descent by which it has reached its present form. I see not that it makes for either view that "man is developed from an ovule about the 125th of an inch in diameter, which differs in no respect from the ovules of other animals." Certainly, we have no reason for affirming that gestation ought to commence with larger bulk and more decided difference, on the hypothesis of special creations than on that of development. The present method is as fit and natural under the one origin of species as under the other. But if each animal does start with this identity of sensible qualities, this absolute oneness to the senses, what more natural than that this agreement should gradually disappear, and that the points most specific, most peculiar to each kind, should be disclosed latest. Indeed, the general analogies, the agreement in organic plan, which belong to the mammals, seem to necessitate this. I know not how animals are to pass from identity to difference by simple growth, with a fundamental agreement of structure and relations throughout, without appearances allied to those now presented by the embryo. The force of this answer is emphasised by the illustration given by Darwin in his "Descent of Man." The embryo of the dog is compared with that of man, and we are called upon to note the marked agreements. Very well, the dog has never been in the line of development which unites man with the lowest life, nor very near that line. The point of branching at which the two diverge, must be very far off from the dog, as far off in time, and almost as far off organically, as from man. If these resemblances of the embryos are due to their common genetic history, then they should be confined to the earlier stages of the two, while a decided diversity should arise at some intervening point, long before the specific traits of either are reached in growth. This entire argument seems fanciful, without definite force or weight.

The rehearsal of previous forms is not so exact as to give it a precise, historical character, and a general resemblance is evidently inevitable.

A fifth argument, much relied on, is that afforded by rudimentary organs. Says Darwin, "Not one of the higher animals can be named which does not bear some part in a rudimentary condition." These rudiments are of organs, of muscles, of teeth, of hair-covering. The subject is thoroughly opened up by Darwin, and can not retain its full force under an abridged statement. Rudimentary parts are very various and very numerous, and in order to understand their source "we have only to suppose that a former progenitor possessed the parts in question in a perfect state, and that under changed habits of life they became greatly reduced, either from simple disuse, or through the natural selection of those individuals which were least encumbered with a superfluous part." Darwin and his co-laborers seem on this point fairly to have the field. I know of no other sufficient explanation of the facts they present. The apparent force of their argument should be recognized, and stimulate further inquiry. The proof is also of a very weighty character, sufficient of itself alone to give color to a theory otherwise tenable.

A last argument in support of development is furnished by atavism or reversion. Characteristics sometimes suddenly appear in animals which agree with those of a different species, or a form of life quite unlike their own. Now, within the limits of recognized species, a tendency to reversion to a known progenitor is often observed, as of pigeons to the rock-pigeon; hence, it is inferred, that these more marked changes belong to the same class of facts, and are reversions to a much earlier type. This argument has a superficial force which it loses, at least in part, under fuller knowledge, according to Darwin's own showing. He says, "In my Variation of Animals under Domestication, I attributed the not very rare case of supernumerary mammæ in woman to reversion. I was led to this as a probable conclusion by the additional mammæ being generally placed symmetrically on the breast. * * * * But Prof. Pryer states that mammæ erraticæ have been

known to occur in other situations, even on the back; so that the force of my argument is greatly weakened, or perhaps quite destroyed." Yes, indeed, and not in this case merely, but in like cases. A theory that is good for only a portion of similar facts is really good for none of them. It has not yet reached the true key of the case. Darwin can not fairly urge examples convenient for his argument, and then quietly set aside other cases as merely irrelevant. He says, "Various other anomalies in man, more or less analagous with the foregoing, have been advanced by different authors as cases of reversion; but these seem not a little doubtful, for we have to descend extremely low in the mammalian series before we find such structures normally present." The whole or nothing is the law of explanation in this class of facts, if our interpretation is to have the force of proof in favor of a theory. The cautious, candid, wise-minded Darwin may often pray to be delivered from his friends. Dr. Maudsley, with a haste quite his own, explains by reversion cases of imbecility like the following:

"Pinel has recorded the case of an idiot who was something like a sheep, both in respect of her tastes, her mode of life, and the form of her head. She had an aversion to meat, and ate fruit and vegetables greedily, and drank nothing but water. Her demonstrations of sensibility, joy, or trouble, were confined to the repetition of the ill-articulated words, *bé*, *ma*, *bah*. She alternately bent and raised her head, and rubbed herself against the belly of the girl who attended her. If she wanted to resist or express her discontent, she tried to butt with the crown of her head; she was very passionate. Her back, her loins, and shoulders, were covered with flexible and blackish hairs, one or two inches long. She never could be made to sit on a chair or bench, even when at meals; as soon as she was placed in a sitting posture she glided on the floor. She slept on the floor in the posture of animals.

There is now under care, in the West Riding Asylum, a deformed idiot girl, who, in general appearance and habits, has, according to Dr. Brown, striking features of resemblance to a goose; so much so, that the nurses who received her described her as just like 'a plucked goose.' Her father died in the asylum, and her mother's sister was also a patient in it at one time. She is four feet two inches in height, has a small head, and thin and scanty hair, so that the crown of the head is partially bald. The eyes are large, round, prominent, and restless, and are frequently covered by the eyelids, as if by a slow, forcible effort at winking. The lower jaw is large, projecting more than one inch beyond the contracted upper jaw, and possesses an extraordinary range of antero-posterior, as well as lateral, movement; the whole configuration of the lower part of the face having a somewhat bill-like appearance. The neck is unusually long and flexible, and is

capable of being bent backward so as actually to touch the back between the scapulæ. The cutis anserina is general over the body, but is most marked on the back and dorsal aspects of the limbs, where it looks exactly as if it had just been deprived of feathers. The inferior angles of the scapulæ stand prominently out, and moving freely with the movements of the arms have precisely the appearance of rudimentary wings. The girl utters no articulate sounds, but expresses pleasure by cackling like a goose, and displeasure by hissing or screeching like a goose, or perhaps like a macaw. When angry she flaps her arms against her sides and beats her feet upon the floor."

He then proceeds to say: "I am not aware of any other considerations than those just alluded to—from the theory of atavism—which offer even a glimpse of an explanation of the origin of the animal traits in man."

This is simply absurd, as much so on the view of Darwin as on any other view. It misrepresents the superior mind in the same degree that it confounds common-sense. According to no theory whatever, in time near or remote, has man or woman, except in individual cases, been either a sheep or a goose. These animals are extreme branches on the geneological tree of which man is a remote and opposed branch, and if Dr. Maudsley's facts are as given, Darwin has no more explanation to offer than has the believer in special creations. Direct community on the part of man with the ovine race ended at the last junction, and that must have taken place long and long before the specific characteristics of that race were determined. All that is now foolish and sheepish in us is a nearer patrimony by far. We think we treat this entire argument of reversion kindly if we allow it to be withdrawn for the present for repairs and rearrangement.

Under the heads now presented, most, if not all, of the proofs of the Darwinian theory fall. We are well aware that they require volumes—and they have had many volumes—for their full presentation. They thus possess a plausibility and force which it is impossible to give to them in a rapid rehearsal. Most of our readers are familiar with them in their best, their appropriate presentation, and can judge, therefore, whether we have estimated them fairly. Our remaining space we shall occupy with opposing considerations.

A preliminary exception may be fairly taken to the way in which the Darwinian theory is supported, even by its most

able advocates. Facts are culled and sorted to suit the end, and kindred facts, opposed to the immediate conclusion, are not allowed their full force. Undeniable, established causes may be employed to explain a portion of a series of phenomena, even though they leave the remainder with no apparent solution. Even then such a result shows that the entire case is not understood, that other and unknown causes are at work, and that these, when disclosed, may modify the entire view. Both Darwin and Wallace, naturally enough, treat the theory of development as established, and bring it constantly to the explanation of facts, when the work it performs is, at best, very partial and halting. If the character of this method is recognized, and the effort regarded as tentative rather than sufficient and satisfactory, then we have no objection to it. That it is not, however, so employed or so regarded, we feel very sure, and hence that proof, formidable in volume, but deficient and illogical in quality, secures an influence that by no means belongs to it. A key that corresponds to a portion of the wards of a lock is not thereby shown to be the key, but quite the reverse. Its failure to respond at one point to the form required, shows it *not* to be the one sought. A theory that moves through the phenomena seeking solution with a hop, skip and jump, may, by its celerity, carry some conviction, but remains, to the safe, sober judgment, unestablished. We will briefly illustrate this deficiency of method in the argument before us.

It is said by Darwin, that the males are generally more modified than the females, and that this is due to the stronger passions of the male. These lead them to fight for the female, and to display their charms as the ground of favor. From this contention arises the greater size and strength of the males. Yet, it appears that in insects the females are generally the larger, and in spiders much larger, so that the males are compelled to approach them with much caution. The sexual dependence remains the same, but the results are reversed. In fish, which often fight fiercely for the female, the male is universally the smaller. In birds, the male in some cases is the larger, in other cases, the female is the larger. It is then said, " The females apparently have acquired the greater size

and strength for the sake of conquering other females and obtaining possession of the males." Thus we lose all traces of a law, are no sooner on an apparent trail than it turns in an adverse direction or disappears altogether.

This is also true of ornamentation. The female in some species of butterflies equals or even excels the male in decoration. This is explained in some instances by referring it to the fact, that the butterflies so colored are offensive in flavor and thus safe from the attacks of birds, and the more so as they are brilliantly marked. Very well: but what becomes in such instances of the selection of the female working its results on the ornamentation of the male? So in birds, Wallace observes that when the males incubate, they are less brilliantly marked than the females. The fact tells from one point of view in favor of the theory of selection, and from another, against it, as, in these cases, the sexual selection urged by Darwin is either reversed or comes to nothing. Thus each line of interpretation fails of completeness, and different lines cross each other in a hopeless and confused way. Darwin in one instance thus sums up the result: "Here, as in so many previous cases, we see, with species belonging to the same group, the same character confined to the males, or more largely developed in the males than in the females, or equally developed in both sexes." Moreover, if the bright colors in insects and birds are to be attributed to sexual selection, what shall be done with the like prodigal displays of colors in mollusks and the lower forms of life,—a beauty often developed beyond observation? The theory is much too narrow for the facts, and moves contentedly with none of them. Insects, a portion of the field in which Darwin applies it, are, as in the case of the beetle, often armed with the most formidable prehensile organs, which would render selection on the part of the female pretty much out of the question. Though ornamentation is attributed with great confidence to its sexual attractions, Darwin says, speaking of locusts, "Throughout the order, as the two sexes rarely differ much in color, it is doubtful whether they owe their bright tints to natural selection."

Spurs, the weapon of gallinaceous birds, that are to win

victories of love for the male, appear also from time to time in connection with the female; and the masculine bird seems to gain no ground, either for battle or flirtation, that is not liable to slip from him. So fickle and fortuitous from the beginning have been the fortunes of the sexes in their struggles for preëminence.

The stridulation of the males in several families of insects is referred to sexual selection, "since a grating sound, if it served them ever so little as a love-call to the females, might readily have been intensified through fitting variations in the roughness of the nervures." Yet, as usual, we have the fatal exception, "for both sexes of Ephippiges are said to be thus provided, and in the Coleoptera, stridulating organs are thought to belong to both sexes alike." The same conflict and confusion reappear in the explanation of the songs of birds.

Mr. Wallace refers the markings of the female butterfly, *Papilio memnon*, to natural selection, through the protection afforded it by its mimicry of the *Papilio* coon. Yet, in this species, he informs us, there are two females, the one with and the other without, these protective colors. If the second variety can survive, why does the first variety demand this extraneous aid? It would seem in this case to be superfluous, since the one class of females safely dispenses with it.

In cases of mimicry, it is said, "the imitating species are comparatively rare, while the imitated swarm in large numbers." Why should this be the law, if the imitators share to the full the impunity of the imitated insects? If the first were to increase, it would doubtless impair the safety of all, yet of all equally; nor does there seem to be any natural force to universally prevent this result, if present safety is the ruling law of multiplication on the part of the intruders. Again, Mr. Wallace gives a case of imitation among birds, in which the purpose of protection is wholly conjectural. Thus, once more, we have a new fact that requires to be included before the old facts can yield their full proof.

Mr. Wallace refers to natural selection the strong flight of the Nicobar pigeon, by which it is able to pass from island to island over broad intervening waters. He says, "This is

certainly a very curious case of adaptation to an unusual and exceptional necessity. The bird does not ordinarily require great powers of flight, since it lives in the forest, feeds on fallen fruits, and roosts on low trees, like other ground pigeons. The majority of the individuals, therefore, can never make a full use of their enormously powerful wings, till the exceptional case occurs of an individual being blown out to sea or driven to emigrate by the incursion of some carnivorous animal, or the pressure of scarcity of food." But as this emigration is a thing of rare occurrence, and must be prospered in from the very first, or be fatal, there seems to be no sufficient starting point for selection. The conditions must be habitual and urgent which are to develop by growth a decided variety, and must admit of easy gradations in their results. We admire the candor of these men, and that fullness of presentation which make these and many like criticisms so easy. We doubt not, however, that their method of reasoning often leads to hasty conclusions, and results in an overweening conviction in favor of the views presented. Mr. Darwin and Mr. Wallace are both skilful and faithful observers, disposed neither to disguise nor distort the facts; yet they seem to us to wander somewhat uncertainly amid their variety and multiplicity, to seize on the first clew of thought that presents itself, and to follow it with patience and adroitness through a portion of the phenomena, without being ablé as yet to offer a continuous and consistent solution of them all. They need often to compare notes to take even the same view of the same facts. They not unfrequently confute each other. This confusion and deficiency of the explanations offered must, for the present, make against them, must suffice at least to show, that all the causes present have not been recognized, or the cardinal principles of order disclosed. The theory of selection, as it now stands, needs, like an hour-glass, constant inversion, or it ceases to fulfil its purposes. We would not intimate that veins of truth are not constantly hit upon, but that the real direction and bearing of the facts have not been laid open.

Another difficulty we meet with in the theory of Darwin, is its inability to sufficiently account for the order and symmetry

of the animal kingdom, including both present and past species. So complete is this order, that strong lines of classification are everywhere distinctly drawn. Sub-kingdoms lie over against each other in four well-defined quarters, while classes, orders and genera divide them into provinces and sub-provinces with the settled limits of established rule. The only agency in this order which Darwin recognizes is that expressed by natural selection. This and this only rules the chance-forces at work into symmetry and system.

In estimating the probability of reaching such a magnificent result by so blind an agent, we must conceive clearly the forces on which, the conditions under which, it has to work. The forces which were gathered in the primitive germ of all animals, and later, in those of each distinct order, genus, species, are indefinitely variable, variable in all directions, with no known law of variation. Each such point, therefore, whenever established in any line of the several series, may be represented as in a condition of unstable equilibrium, as possessed of a certain mild, explosive tendency by which it sends off new forces in divergent, star-like rays. With such a series of genetic centers, beginning at once to thrust out new modified forms in all possible, supposable directions, these in turn behaving exactly as those from which they sprang, should we not shortly reach a perfect confusion of directions, and an inexhaustible diversity of present products? Diagram such forces, each new line starting from the common center, establishing instantly along its whole extent secondary centers, in turn to become the source of other divergent lines and tertiary centers, and we almost immediately reach a confusion complete and hopeless. Suppose natural selection to begin to operate on such tendencies, it does not do its work at once. Some varieties least apt may perish early, others, more apt, must linger on one, two, three generations. Life must be multiplied, and the pressure greatly increased to maintain natural selection steadily up to the working point, and, even then, it must everywhere leave traces of the confusion it is not able at once to abolish.

It may be said that this picture represents the forces expressed in new varieties as working more rapidly in throwing

off farther varieties than the theory requires, and hence issuing in a confusion wholly fanciful. But it matters not how slowly they move as regards the final result. This will be the same, whether achieved in a thousand or a million years, and, looked back on as an aggregate, will present the same disorderly appearance in the one case as in the other.

The measure of order produced will depend on natural selection; the promptitude and decision of its action, and the degree in which it works according to a plan. If we could represent it as an intelligence, quick to discern tendencies, sorting carefully, destroying promptly the false product, and retaining the sound product, it might then, with a vast waste of force, reach the present order of the world. It lacks, however, in large measure, both of these qualities, celerity and definite purpose. Slight, unfavorable changes can not tell at once fatally against the animal that suffers them; indifferent changes can not tell at all, and favorable changes can only slowly enlarge the varieties to which they belong. Now, how many varieties can at any one period be secured under these heads: slightly unfavorable, indifferent and favorable variations? Certainly, the number is very great, almost infinite. If it be said, that this multiplication in all directions will make the struggle for existence very severe, and therefore render natural selection proportionally active and rigorous, working strongly for a few highly endowed species, we answer, this can not take place, or, at least, may not, if there is no law and restraint to variation, till the confusion has occurred; and even then, there remain two inexhaustible sources of variety, indifferent changes and favorable changes. If it be urged, that everything is relative, hence that the more fortunate kinds render every other kind in a like degree unfortunate, answer may be made, that these favored ones, abolishing old competitors, do not hold the ground they have won; for instantly they begin to vary from this new, this advanced point, and thus run again the muck of advantages and disadvantages. Moreover, large variety, in and of itself, is favorable to the various species which compose it, since a single conquering genus would soon find its peculiar resources of food disappearing. We admit the pres-

ence in natural selection of an orderly force, but one so slow and dilatory in its action as to leave inevitably ten thousand traces of insufficiency and confusion behind it. It would present the spectacle of a struggle with chaos rather than of a victory over it, a struggle that, at any one time, scarcely reduces the prevalent disorder, much less banishes it altogether.

Still less has natural selection the second power, that of working under a definite plan. Why is four the fortunate number of sub-kingdoms in the struggle for existence? Why did not more, at least in a rudimentary way, find establishment? Thus, throughout, with a power to move in all directions, no sufficient reason is rendered why life has moved in any given, restricted, orderly directions, to the exclusion of these unceasing possibilities of disorder. The one solitary condition of the survival of the fittest, does not present a sufficient ground of order and arrangement. Very far from it. It is as consistent with a high degree of disorder as of order. In the wind-sown forest, the trees may cover the ground, and yield no trace of the arrangement of the orchard, in which they do the same thing. Above all, where are the remains of the endless disorder, constantly recurring, through which order has been reached,—must have been reached? If we were to admit the possibility of a finally fully-developed plan, every step toward it is one of struggle, of order abolished and restored, and no sooner restored than again swept away. Show us sufficient traces of this universal and constant reappearance of chance forces vanquishing anew the field.

An objection is also found to the theory of Darwin in the great inequality of development in the different lines of life. Compare, for instance, that which terminates in man with that still expressed by infusoria, a polyp, an earthworm. These date back as far as that. They have one starting point, but how different, not merely the result achieved, for this was to be expected under the theory, but the stages of progress passed over. How happens it that some of the lower forms of life extended far out into the geologic periods, and, with a few congeners, span the entire space, while other beings have, in their line of inheritance, passed through, touched, or pas-

sed by half the animal kingdom? There is no order, no uniformity of results. It becomes a matter of accident and caprice, whether change, variety, growth, shall proceed at one point or another, in one direction or another, or whether they shall occur at all. It can not be said that these lower forms are less liable to variations than the higher, since it is from these and other varieties that the higher have proceeded. If the earlier stocks, the initiatory points, are so stubborn, and refuse to be wiped out, how happens it that so many intervening forms have so easily disappeared? If it be urged that improved complex organisms are exposed to more accidents, require a nicer adjustment of conditions than primitive ones, and therefore have yielded more readily and generally to the catastrophies which have marked the history of the world, answer may be made, that these cataclysms must all be so ordered as to leave the progress in animal life at the time achieved, essentially unaltered, otherwise the problem of development becomes greatly more difficult than at present, or impossible of solution. Continuity is absolutely essential to it; any sweeping, general destruction would be the loss of the entire ground gained, would be a return to first principles. In each marked change, therefore, in the forms of animal life as indicated by neighboring strata, we must interject a period of farther growth, development, achieved consecutively elsewhere, but whose extreme points, whose commencement and conclusion, are registered in the rocks before us. Thus the development theory is perpetually encumbered with the suppositions necessary to make the life of the globe comparatively safe and continuous, and hence can not account for the waste and disappearance of higher types in connection with the perpetuity of lower ones, by any violence which has befallen the former. It is true, that highly developed organisms may, by that fact, be made more local, more dependent on the precise conditions of their environment, and therefore suffer more severely from secondary changes, but it is also true, that the highest organic being, man, has the most marvellous power of adaptation, the widest range, the greatest facility in encountering changes. Farther, the earth's surface presents, and has long presented, a great variety of condi-

tions, meeting the wants of the higher forms of life, and enabling them to pass through the various vicissitudes of the geologic periods. It, therefore, remains unexplained, why changes are so rapid in one direction, so slow in another; why the force yielding varieties is so vigorous here, so well nigh extinct there; why life has mounted so high in this direction, covering the steps by which it ascended, and in that held on in patient, unchangeable continuity, barnacled to the very foundations of the organic pyramid. The why and how of the precise result before us are lost almost altogether on this view, and we can only say: So it has happened. In our haste for efficient causes, we are able to assign no reason or law to their action.

Farther, why have not these lower organisms been as fruitful of change in later as they must have been in earlier times? And if they had been, would not the animal kingdom present the spectacle, not of one geneological growth, but of a series of growths? No sooner was one wave of life started on its way than it should have been succeeded by another, and this by a third, a fourth, each able to propagate into a distinct, independent system. Suppose one circle of changes to have been accomplished; that the original point of life has thrown off a certain number of varieties. These are now ready to take up and continue the movement. Why should the original germ of life remaining unabolished, content itself with its first feat? It ought rather to give rise to a new circle of varieties, unlike these already thrown off, and thus lines follow lines, like waves in the ocean, abolishing every trace of a single consecutive evolution. If now we recollect, that each form of life, the moment it is realized, is, so long as it shall exist, a new and constant and independent center of variations, we see at once that the undulations of the air are not more complex, crossed and confounded, than would soon be these unending and unguided undulations of organic forms. The arrest here, the progress there, the relation of each to all in one system, issuing from one proportionate, modified movement, remain unexplained.

A good illustration of a continuous and essentially unmodified force, and that, too, after the incipient steps of de-

velopment had been taken, is furnished by the tympanum, or stridulating apparatus of the male Locustidæ. This has been found by Dr. Scudder to belong to a fossil insect in the Devonian formation. So long, then, has a contrivance, due, according to Darwin, to sexual selection, remained permanent in character. A bright and early start was made, yet the long march has afforded no improvement. It has all been made to the music of the same harsh, monotonous note, filed out of the same simple vibration. One might have justly expected the most dulcet strains from this early and persevering want, this faithful and laborious cultivation of the germs of talent. There is a touch of sadness in the picture, when we recollect that the female locust and katydid have each given such attentive heed to the fond and faithful fiddler, waiting for the one delicious note that would conquer the coquettish heart. If sexual selection, often so efficient, could in this instance have done a little more for the patient male, what rewards awaited him. So narrowly did he miss universal conquest. In almost all directions, we put the question in vain,—Why thus much and no more? Till, reaching man, the inquiry comes in inverted form: Why this continuous, astonishing, unexampled growth?

A subordinate objection is disclosed in the fact, that when great progress is achieved in one direction, as in the ornamentation of birds, the force at work is not sufficient to explain it. In this case, as brilliant and beautifully blended colors, rich and extended plumage, do not aid in the conflict of life, but embarrass their possessor rather, their growth is referred to sexual selection, to the choice of the female. If the female appreciates their beauty only in a general way, then we have no sufficient reason for its exquisite character, its wonderful pattern, as in the Argus pheasant. If she does discern and appreciate the details of the singularly perfect product, then her conception and indirect execution equal, if they do not transcend, those of man in his best estate. The result greatly surpasses in degree the agents to which it is attributed. This insufficiency is very strongly felt, when we see, that in the higher mammals, sexual selection has accomplished very little—in man himself issuing in deformities

more frequently than in beauties: in the slit nose, the pierced lip, the distended ear, the corrugated cheek, the tattooed skin, and a general intensifying of every offensive feature. It should also be remembered, that that on which the entire argument turns, the steady, discriminating selection of the female, is very insufficiently proved; while, as usual, there are facts which decidedly contradict the supposition. The theory reflects probability on sexual selection, rather than known powerful selection on the theory.

A fourth difficulty in the theory of Darwin, which all its advocates have felt, and have labored to reduce, if not to remove, are the wide spaces frequently found between families, genera, species. The common plea with which it is met, is the great imperfection of the geologic record. To this extenuation, we think there has been attached more value than properly belongs to it. Moreover, whatever its value, it is wholly of a negative character, and leaves the entire positive proof of the theory to be made out elsewhere. The mere absence of the desired connecting forms of life in the deposits laid open furnishes no evidence to development, but simply reveals the difficulty of firmly establishing the theory, if it be true. On the other hand, this deficiency at points where we should not expect it, greatly reduces the proof offered by other considerations. Candor should lead us to allow, that the very partial nature of the record puts the development theory to serious disadvantage, but should not cause us to scrutinize the evidence presented any less carefully, or lead us to forget that there is here a serious deficiency of proof. Good-will, evoked by the embarrassments of the case, must not, in the judicial mind, take the place of argument.

How far do these great and often returning gaps in the past history of the world necessarily obscure the method, the order of its events? Not to the extent that might at first be thought. Suppose that one-half of the entire period were without any trace in the rocks of the animals that belonged to it: as this moiety is divided into many parts, and these are scattered along the whole stretch of the past history of the globe, the known portions would still have a typical and inferential force much beyond what would be expressed by

the fraction one-half. In the line of development, the several forms of life overlap each other by long periods, so that each given state of evolution tells at once much that has been, much that is to be. With the very slow changes that have taken place, single and remote points along the line of movement serve to establish its direction, and determine its character. When, therefore, a new geologic era opens, we have a right to claim that its forms shall not be widely separated from those of the preceding era, but, with minor surprises, shall show a general and close fulfillment of the promises then made.

In the appearance of man, we have a startling and extravagant result, if we consider the forms of life that have preceded him. He is not to be derived from the anthropomorphic monkeys of his own time, since these are, in reference to him, parallel not lineal developments, cotemporaries not ancestors, but from some undiscovered form that can stand as a common parent for them all. The theory of Darwin must assume at once a period for man on the earth even much beyond that indicated, not to say established, by any line of independent proof. It belongs to the theory of continuous, slight development to encumber itself at once with the embarrassments of many subordinate theories, and we quietly overlook the fact, in the magnitude of its assertions and the gigantic scale on which its solutions are propounded. Thus, the presence of the human race on the earth for an indefinite period prior to historic times, is far from being established, yet development assumes such a residence, and greatly lengthens it. The most remote point to which man is with any certainty traced, still leaves him man, without, I may almost say, a hint of the changes through which it is alleged that he has passed. Such an absolute, such a complete failure of the geologic record to yield any evidence, and that, too, in its latest periods, as regards these missing links, is a most serious objection to the theory of Darwin, not to be overcome otherwise than by supplying the defect. If it rested on very complete, very unmistakable evidence, all doubt could not be removed until this proof was furnished. The satisfaction with which such intermediate forms would be received, the

manner in which the discovery would be announced, would disclose the secret sentiment of all parties. If, in general, structural characteristics, the space between man and any animal that can be assigned as his probable progenitor, may not seem very great, yet the space judged by habits and mental endowments is immense. There are few, if any, like it in the entire animal kingdom. Nothing remains to Darwin and his co-laborers but to accept this great, and as yet invincible difficulty, which lies at the very threshold of their argument, and one which our next objection will serve largely to increase.

But this is not the only chasm. There are many, scattered everywhere among the varieties of life. Even the lowest forms are not exempt from them, where the intervening spaces have been worked over from the dawn of time, as measured on the earth's dial. The parasites of the skin and the intestines peculiar to a given species of the higher animals, are specialized as to the form and conditions of life, are separated from other like kinds in a way not easily explained by development. Trichinæ, the several grubs, which, in the skin of the horse, the sheep, and man, produce mange, scab and itch, are all differentiated in a manner that makes communication impossible with the forms that approach them most nearly. How can natural selection now reach these grubs, or how has it in time past reached them? The struggle for existence is only local, in one animal that may for the moment be swarming with them. If that animal succumb, the struggle is at an end, and all varieties perish together. A local, disconnected pressure of this sort, can not easily issue in progress, nor prepare a way for the fittest to survive. The condition of safety to parasites would seem to be the power to migrate from animal to animal, from species to species, yet this is, in whole or in part, withheld from them. If they were first general, infecting all forms of life, and then became special, peculiar to one, in this result selection brought a limitation, a restriction, not a growth of power, issued in a loss, not a gain of chances. If they were in the outset special, how came they at all into existence? Intestinal worms, as the species of tape-worm peculiar to man, present like diffi-

culties. Even the earth-worm has wriggled a long way out by itself, and holds its subterraneous galleries in pretty undisputed possession. Evidently, much work is to be done by the disciples of Darwin, and our faith waits on its accomplishment. A theory which has such a vast variety and accumulation of facts to explain as those which belong to animal life can not be considered as satisfactorily established, though it gathers up very many of them, when so large a remainder is yet behind. The charlatan even could not fail to prosper somewhat in so broad and various a field as this.

A fifth objection turns on man, not considered as a branch of natural history, but psychologically and historically. Darwin adopts, is compelled to adopt, the mental philosophy of Spencer, and thus stands opposed to a large share, the larger share, of the philosophy of the world. If a scientist justly claims something for his opinion as a man of knowledge and investigation in his own department, he should yield some deference to those of equal ability and faithfulness in other departments of inquiry. It is hardly possible that this obvious truth has ever occurred to scientists; at least their general attitude does not indicate such a fact. It seems to be a first article of their creed, so far to scorn a metaphysician as to neglect all he has to say: yet, if the theories of Bain, Spencer, miscarry—theories as purely metaphysical as any that were ever broached,—these naturalists will find, as they rush to the final assault, an unexpected moat, too broad for their leap, too deep for their climbing. The controversy now rages almost wholly in remote portions of the field, but before man can be annexed, as conquered territory under the development theory, to the animal kingdom, his mental and moral powers must be shown to be, what Darwin assumes them to be in his last work, identical in kind with those of the brute. In other words, intuitions of all sorts must be swept away, and the growth of habit, the connection of associations, be put in their place. Freedom, virtue, reason, as the intuitionalist holds these powers, must go by the board, while there are set up in their place the merest shams that philosophy has ever ventured to palm off for them.

We feel respect and deference as long as Darwin and

Huxley talk of lower life, but these emotions partially disappear when they handle our intellectual and moral structure. Here they are comparatively novices, and have lost the strength and prestige which but now attended them. Spencer commands respect as a metaphysician, but he has not yet brought forth any of his peculiar conclusions from the thickest smoke of the fray, and development must pause before it gives the final shout of victory, waiting to see how goes the battle over the real, the intellectual nature of man.

Development has not as yet quite captured the body of man. It has not made any successful approach to his spiritual powers. Let naturalists ridicule, if they will, metaphysics. As is often the case, they have most to fear from that which they most despise. We will not dwell on a point which can not be fully handled here, and has been so often urged elsewhere,—that the intellectual powers of man are divorced by a difference of kind from those of the brute.

What important psychological difficulties are left in the way by Darwin, is seen in the fact that the origin of language remains to be accounted for. If brutes attach their impression by association directly to objects, as we believe they do, they have no occasion for language. That immediate expression of feeling which the higher orders possess, is all that they require. If man, through regulative ideas, gains the power of an abstract contemplation of objects in their diversified relations, then, immediately, he finds the need of language in fixing, holding, imparting his thoughts. Language marks a transition of kind and method, not a difference of degree. The necessity of language being implanted in man constitutionally, he can not miss of it; without that necessity he could not reach it. The brute, on the other hand, can never be taught the use, the real use of language, and because he has not those ideas which language is employed to express. If he had them in the most incipient forms, language, under instruction, would become an inevitable acquisition. We invite those who believe in simple development to furnish any one animal, however labored with, that presents an intelligent use of language.

The historical progress of the race, within the periods that

lie open to our direct knowledge, has not been by chance variation and natural selection. Definite, intellectual and moral forces have wrought improvement, and when these have expended themselves, a retrograde movement has followed. The natural selection of violence in the struggle for life and dominion, has in many cases issued in a return of barbarism. So has all of the civilization of the past perished. The germs of growth have been found in social, moral forces, and when these have suffered perversion, or grown weak, violence has entered in to sweep away past results, and reopen the problem of progress under new conditions. Historic growth has not been achieved by new varieties of race, but by new intellectual forces, and a descent from race to race of moral influences. When these forces have expended themselves, the onward movement has come to an end. Natural selection has precipitated struggles in which barbarism, up to the present epoch, has been uniformly successful; and our present civilization promises a better issue only as it gives wider control to the moral law, and that considerate treatment of the masses which prevents their remaining the hiding places of untamed passions and savage impulses. The tendencies which Christian communities have now most to fear, are those which find expression in the natural selection evoked by a struggle for power, prosperity, existence. If society is thrown back upon this basis without restriction, conciliation, generous giving, its overthrow is only a question of time. An eruption is as sure to come as to a pent-up volcano.

Degradation, an entire loss of power, character, national force, have overtaken all the great races of the past. They have not been the germs of the future, save through the medium of ideas, which they themselves have lost in the transfer. Much of the known barbarism of the world finds as easy an explanation in the relative losses and debasement of sporadic tribes, as on the supposition of primitive barbarism; and none of them show the germs of an independent, self-sufficing civilization, giving promise of a commanding future. Mr. Wallace and Mr. Darwin are at variance on natural selection as applied to man; the former not regarding

the theory as applicable to him in his last rapid strides in physical and intellectual endowments. He thinks that these later powers do not proportionally increase his chances of life. Certain is it, that not till man has laid aside every struggle, both those of war and of commerce, and consents to give and to receive in kindness and with equality of advantage, can the world accept anything like the population which belongs to it. War and commercial oppression are agencies that have hitherto worked, and will continue to work, barbarism.

A final objection, which virtually underlies several of those already made, is, that the theory of Darwin rests back, in final analysis, on fortuitous forces. We have said nothing of the religious bearings of his view, important as they are, and fundamental as they are in our own mind. We have wished rather to discuss the subject on the grounds on which it rests with its advocates, and with perhaps the majority of persons. We make this point, therefore, not on religious but scientific reasons. Accident is no solution of a question; it is as unscientific as it is irreligious. The first postulate of Darwin is slight, perpetual variations in all directions. He does not, indeed, exclude the influences of the environment, neither does he regard it as the sole and sufficient cause of fitting varieties. This is rather characteristic of the early theory of development, sometimes designated as that of Lamark, and whose insufficiency is now generally conceded. For these incipient changes, on which development hinges, Darwin has no reason to render, nor does he assign them any law. It is rather a principle with him that they are lawless. This is a weak position from every point of view. It leads us by laborious reasoning to forces that act without reason, without purpose, without bent. If this first position is sound, why make any inquiry farther. Let chance complete what chance has begun. Why strive to gratify the mind with reasons, since, at the very conclusion of the whole matter, it is satisfied without reasons, with forces that act accidentally as regards the end in view? Or, if our previous inquiries are sound, and we are wise in tracing causes, how can we stop with a supposition that cuts short the entire process of thought, leaving

it with no attachment; that brings a blunt arrest without why or wherefore?

Answer may be made that this premise is rather the statement of a fact than an hypothesis, and that as such we must accept it, whatever its advantages or disadvantages. It will be said, observation shows that every species does present endless minor varieties, and this is what our theory states rather than assumes.

The difficulty now becomes subtile, since there is, undeniably, a superficial force to this explanation. It is, indeed, true that the principle of life is affected by the conditions under which it works, and as these are of infinite variety, its products are correspondingly varied, and seem, therefore, to furnish points of attachment to many lines of development. Moreover, when these conditions are themselves varied by man, in directions in which they are especially influential, and the results reached are enlarged by careful selection, new, permanent, organic varieties do appear. These facts do not, however, seem to us sufficiently broad to cover the postulate of Darwin, and start him safely on his way. No two waves that follow each other on the ocean are exactly alike, but the endlessly diversified conditions under which they arise, strip of significancy their slight modifications, and render the formation of a class of waves impossible. If such a decided variety were to appear, and to maintain itself, we should seek for it a specific, uniform cause, differentiating this particular result from the general results before witnessed. So, if a decided organic change takes place in any species, it indicates a specific cause, and, in the absence of any sufficient external reason, it shows proofs of a decided, definite variation of the life principle, to be referred for solution to the plan, purpose, power to which that principle itself finds reference. If a distinct result like this be passed by unheeded, unexplained, then let us at once abandon the idea of cause and effect, and with it all reasoning. If any effects can be so reached as to be dismissed contemptuously from our theory, certainly they are not those effects out of which we propose to make the entire animal kingdom. Nor are we any more at liberty to reach a decided, definite change by slight, successive modi-

fications, giving these no explanation, than by a single transformation. The incipient tendency to orderly change must in each case be recognized, since it is the fruit of forces determined from within in the form of their action.

This statement of the case, besides meeting the irrefutable, undeniable claims of the mind everywhere for causes, we believe better covers the facts before us. For the most part, the waves of life come and go, under fitful causes that mutually displace each other in their effects, and leave the species unaltered. Rarely, as in the Ancon sheep, a decided, organic change is indicated, finding explanation in a new, unknown force, which, under favoring circumstances, propagates itself and establishes a permanent variety. We do not meet with incipient varieties everywhere in nature, in all stages of growth, coming and expiring, in one, two, four generations, but that variety which, due to transient forces, obliterates itself as rapidly as it is established; and an occasional change of so decided a character as to indicate a permanent modification of the organic principle. We may, indeed, attribute to the accidental conditions of the environment—accidental in reference to continuous development—those varieties which are due to influences either impeding or favoring the vital forces, but hardly those which indicate a distinct modification and growth of these forces. These must be referred in the outset, and in every step of development, to a relatively independent and self-sufficient impulse, bent on a form and kind of growth normal to it. This is illustrated in the limitation to one sex of given characteristics. If such a restriction exists, it is easy for the breeder to avail himself of it; if it does not exist, there is no example of its establishment.

If this view be correct, even under a development theory, the harmony and order of the final result would be at once explained as due to the same wisdom that in each form of life presides over its modifications, and weaves them in as a part of the complete fabric. As accidental, variable changes—that is, changes due to foreign, external causes—are constantly mingled with those which arise in connection with the organic principle itself, it is easy to assign the same character to them all. But the very fact that the distinctions of the first class

mutually compensate and obliterate each other, while those of the second sustain and confirm each other, indicates a hidden difference in the agencies at work. We have now a uniform character in the waves that follow one the other, disclosing some fixed conditions of the sands and rocks beneath.

The theory of Darwin, with a modification which would allow it to rest ultimately back on rational causes, not chance effects, may well stand as an hypothesis that has explained many obscure facts, and greatly quickened inquiry; one that promises much more service and waits further confirmation. If the successive steps of organic progress are recognized as designed in character, definite in direction, and often decided in degree,—like that of the spike-horn deer of the Adirondacs,—the disposition which now exists to make them so limited and unessential as to become accidental modifications, that may be pushed out of sight and left unexplained, will disappear, and the animal kingdom will grow up through distinct yet dependent changes, that will leave its ultimate reference to a rational source unaltered. The gains of science will be secured without its losses. We are not disposed to underrate or reject the interpretations which the theory of development seems to bring; neither are we, by an unqualified acceptance of it, in the form presented by Darwin, prepared to put in jeopardy the entire plan and purpose of creation. These certainly can be rescued, are, by sober thought, rescued, while yielding to the modifying influences of the facts which Darwin so fully and so skilfully urges. The theory of development is quite another thing, if we recognize the presence of decided, predetermined steps in passing from one form of life to another, from what it is if these are resolved universally into slight and accidental transitions. The first view can stand by us to advantage everywhere in our study of nature, finding acceptance and rejection as the especial phenomena under consideration allow.

In development, as it is now presented, natural and sexual selection are pressed to and beyond their utmost, in order that, as blind forces, they may take the place of an intelligent agent.

Darwin, in closing his "Descent of Man," remarks: "I am aware that the conclusions arrived at in this work will be

denounced by some as highly irreligious; but he who thus denounces them is bound to show why it is more irreligious to explain the origin of man as a distinct species by descent from some lower form, through the laws of variation and natural selection, than to explain the birth of the individual through the laws of ordinary reproduction."

There is either great simplicity or some want of candor in this passage. The religious bearing of a theory can not be doubtful that sedulously refers all results, far and near, to second causes, with slight recognition of a personal source in their origin, and none of a personal plan in their development. Such a theory certainly has been, and certainly will be, used by atheistic thinkers for atheistic ends.

ART. II.—REMINISCENCES OF JAMES P. WILSON, D.D., AND REV. ALBERT BARNES.

By RICHARD W. DICKINSON, D.D., New York.

ALTHOUGH I have been repeatedly asked to embody my reminiscences of Dr. Wilson and Mr. Barnes, yet I have always been reluctant to essay a task which would necessarily involve allusion to myself; but as it is now thought by several of my clerical friends that something of the kind is due from me, both out of respect to the memory of Dr. Wilson, and regard for the church to which I ministered for a season just before the late Albert Barnes was called to its pastorate, I will narrate such particulars as are still fresh in my memory, and which it has often been my pleasure to recall, while retracing the way in which the Lord has led me;—though more than forty years have elapsed since I bade fare well to the venerable father with whose closing ministry it was my privilege to be associated, and tendered the hand of Christian fellowship to him who, so providentially for the interests of the church, became his successor.

In the fall of 1828, the Session of the First Presbyterian Church, Philadelphia, needing a supply for their pulpit, in consequence of the protracted debility of their revered pastor,