

ART III—*On the Origin of Species by means of Natural Selection, or the preservation of Favored Races in the Struggle for Life* By CHARLES DARWIN, M A, &c. &c. London John Murray 1859

EX ORIENTE LUX is a motto which would be very flattering to us as orientals, if we could occasionally apply it to our literary and scientific achievements. Excluding the specialties of oriental scholarship, our legitimate claims to the distinction have not we conceive been of frequent recurrence. In our eastern land indeed our shining lights are at least of average brilliancy, but their fame does not very often reach beyond ourselves, nor do their rays penetrate far enough to frequently gain the attention of Europe. It is indeed no easy task for us to keep pace with our European contemporaries weighted as we are in the race by all the disadvantages attendant on our exotic position. That Anglo Indians do this at least, few will venture to deny, none more readily admit than ourselves, but the subject of this article entitles us, we think, to claim a leading position, not a place in the rack, in short to appropriate, in this case, our motto. We have to call the attention of our readers to a new light which, emanating from among us, has spread its rays far and near throughout the scientific world of Europe, which has been hailed by some as piercing the clouds of ignorance and prejudice, and disclosing a new path towards truth, scouted by others as the mendacious glare of fatal error, but received by all in a way which unmistakably shews that it has commanded universal attention at least.

Our share—only a share indeed—in this success, we claim on the following grounds.

Mr Wallace, who was then, and is we believe still, occupied in investigating the natural history of the Malay Archipelago and whose labors in India are so honorably known to naturalists, sent home some time in 1858-59 a paper, which was subsequently communicated to the Linnean Society by Sir Charles Lyell, embodying certain general conclusions on the subject of the *Origin of Species* suggested to him by the results of his researches in this part of Asia, and especially by his explorations of that most interesting zoological province in which he was then engaged. That paper is the first and earliest statement before the public of the new doctrines contained in Mr Darwin's work, who states in his preface that acting by the advice of his scientific friends, he thought he could not in justice to himself any longer withhold from the public a work to the

elaboration of which he had devoted many years, and which though not yet ready for the printer, afforded him materials for the abstract forming the present volume. Nor has our eastern claim to a close connection with this new natural history theory ceased here, for Mr Blyth, another distinguished oriental naturalist, has been for years a co-laborer with Mr Darwin in this very field of enquiry, and is spoken of by that author in several parts of his work in terms of praise and graceful acknowledgment which, however gratifying, cannot add to the well earned, high European reputation of the curator of the Asiatic Society's Museum. Thus two naturalists, labouring among us, have contributed directly to the elaboration of the theory contained in Mr Darwin's book, and one of them indirectly caused its publication. We must not however be understood to evince by these remarks any desire to detract either from Mr Darwin's own merits, by mentioning thus prominently the names of two of his distinguished colleagues, nor from those of his work bespeaking attention to its contents on grounds other than its intrinsic value. On the subject of those merits and that value there can be but one opinion. The verdict of the great tribunal of European science cannot yet be given in but whatever that verdict may ultimately be, whether Mr Darwin's doctrines are to revolutionize our views on the foundations of natural history, or to be considered only as essays serving to systematize our existing knowledge, and stimulate research, the high fame of the author the philosophical tone which pervades every page of his book, the names of the men already ranged as adherents and opponents in the discussion to which it has already given rise, at once stamp the essay on the Origin of Species as a production of no commonplace kind.

It possesses moreover the somewhat rare advantage of treating a profoundly scientific subject in a style which renders it approachable by, and appreciable to the lay mind. The reader who may be unskilled in botany and zoology will no doubt, at the close of many of the chapters, lay down the volume with the conviction that he is unable to weigh each portion of the evidence adduced, that he cannot assign to every fact the exact amount of importance to which it may be entitled in the argument, on which its bearing may be of the most complicated kind and he will thus feel himself deprived of the pleasure of giving an unreserved assent to the propositions to which Mr Darwin appends his Q. E. D., but he can judge of the use made of those arguments and of the treatment of those facts, and he can exercise his judgment on the logic

of the reasoner he can await the severe sifting which he knows every statement will receive, and the rigid scrutiny to which every point of evidence will be submitted, by the hostile criticism of Mr Darwin's opponents, and he can meanwhile enjoy the satisfaction of accepting or rejecting such links of the chain, of the argument at least, and of forming an independent opinion as to the final question involved.

This question is not a new one. The Origin of Species has been a frequent subject of discussion, but we may, without doing injustice to any of Mr Darwin's predecessors, safely assert that it has never before been approached in a more impartial and philosophic spirit, never handled with an ability more capable of inspiring confidence, never illustrated by a fund of well digested knowledge so extensive, various and profound as that now brought to bear upon it.

To enter on the perusal of this work in a frame of mind calculated to do justice to both student and teacher, the former would do well to revert for a moment to the past history of science, and endeavour to realize in imagination the introduction of some of those great discoveries which have formed the landmarks of scientific progress, to study the reception with which some of those theories were at first met, which, showing the insufficiency or the errors of then universally accepted doctrines, were opposed by some of the most illustrious men of their time, and took long to establish themselves in the position of acknowledged truths. Axioms to us, the results of Galileo's labors did not at first convict men. The physicians of Harvey's time did not at once accept the circulation theory as a satisfactory explanation of many facts of observation then unaccounted for.

Many an astronomer was, we may be very sure, shocked at the comprehensive simplicity of Newton's way of accounting for the celestial motions, and clung fondly to the angelic agency of one of his predecessors, or the vortices of another, pertinaciously dwelling on the difficulties which the lunar calculations presented to the new theory.

It will be perhaps considered gratuitous thus to insist on a fact so notorious as the opposition any new hypothesis is sure to meet with from the *vis inertiae* of the human mind, an opposition becoming energetic in direct proportion to the amount of change in established eras likely to follow from the intrusion of the new one. Few will learn from the lesson suggested, the wisdom of patient impartiality, and we have little doubt but that Mr Darwin will meet the fate of all innovators. There is however an instance which it may be well to mention, and which

may be considered à propos, as well because of the close analogy it presents to the case before us, as from the fact of its being within the recollection of many of our readers

The publication of Sir Charles Lyell's "Principles of Geology" really revolutionised that science, and is justly considered as an epoch in its history. Even young geologists can remember the opposition roused by the enunciation of views now almost universally accepted as true. The "Convulsionists" no doubt yet exist as a school, even in England, and can still count in the yearly decreasing muster roll of their adherents, some great names, but these are in every case men who prior to the appearance of Lyell's work had publicly advocated views inconsistent with his, and were pledged to then prevailing theories which will become fossil with the disappearance of their now living supporters. The convulsionists met Lyell's doctrine of the sufficiency of existing causes to account for all observed geological facts, by an appeal to great mountain chains, to inversions on the great scale of vast thicknesses of strata. Lyell's answer pointed to the elevation of a few inches in a century of parts of the Baltic coast, the few feet of oscillation in level which can be shown to have occurred within historic times by the temple of Serapis, and he asked only for time—time for the accumulation of the results of changes small in themselves. Between this mode of reasoning and that followed by Darwin, there is the closest resemblance. He, like the illustrious geologist, makes the accumulation of small changes through great lapses of time the very essence of his theory. Each for his own special subject, brings the rich stores of knowledge gathered by years of patient labor to crowd his pages with the evidence which has convinced himself. Neither can (from the nature of the case) demonstrate anything with respect to the precise mode in which those phenomena were evolved, the causes of which he thinks he has discovered, each appeals to the cumulative effect of the balance of probabilities ever recurring in his favor, each points to the demonstrably vast results of causes whose existence and efficiency are visible, and asks why, with these before us, we should seek to account for facts by suppositions at least less probable, and whose very nature, if conceived at all, must be the creation of our own imagination.

Few men thirty years ago hesitated to believe that the geology of the Alps and the Pyrenees afforded clear proof of vast convulsions, undeniable evidence of violence of such magnitude as to have shivered the surface of our planet, if not shaken her to the core. Some still cannot accept as an

explanation of those facts, the statement that the scarce felt tremulous motion which marks the track of even our slightest earthquakes, may indicate movements which are now somewhere altering the relative position of great rock masses, however slightly, and which need only time to effect all that the Pyrenees, the Alps or even the still greater Andes and Himalayas disclose to us. Thus however reasoned Lyell, and if he has still opponents he has at all events lived to see his theory a fundamental doctrine of the English school of geology—the first in the world. Mr Darwin is following in his steps in another branch of science. What the ultimate fate of his theory will be we think we can foresee. For the present however, all, save the very few who have been closely watching the workings of men's minds on the subject, to which he has himself devoted his life, will, we are prepared to see, find it difficult patiently to admit the proposition which Mr Darwin believes he has established a scientific truth, to be even a legitimate subject of investigation or discussion, his conclusions will shock many a long cherished opinion, call into hostile opposition many a prejudice. He is not indeed himself very sanguine as to the reception he is likely to meet. Naturalists who have labored for years with the immutability of species as a fundamental article of their creed, will be slow to admit that the very basis of their systems is shaken, the conception on which all their classification rests is a myth, even although that classification will find in the new theory a sounder and more philosophic foundation. Younger naturalists will give it a fairer trial, a more impartial hearing. In the outer world it will meet with the fate common to all such efforts of intellect. We the crowd will follow our leaders, according it, on the one hand, an unreasoned praise, often founded on the most radical misconceptions of its very meaning, or branding it, on the other, with blame, due to an equally profound ignorance, or to self-love irritated by a fancied or real discrepancy between its statements and some of our pet prejudices. To this outer world it is that we address what we have to say about Mr Darwin and his work, and we shall now endeavour to introduce both to our readers, so as to reduce to a minimum in this case the misconceptions on which the popular opinion of such subjects usually rest.

It is especially difficult to summarise the arguments of such a work as this—itsself a summary, and it is utterly impossible to do those arguments justice in an abstract, they are already condensed to the last limit of perspicuity. Compelled unwillingly to omit altogether the contents of several chapters from our notice, we shall compress our remarks on others within the

smallest possible space, and for convenience take them not exactly in the order followed by Mr Darwin, but consider

1st What may be called the *direct* arguments in favor of the theory

2ndly The indirect arguments—or its claims to acceptance, as *a priori* probable, and as superior to any other theory in accounting for observed facts

I Professor Horsley, in a lecture delivered before the Royal Institution, ably analysed the arguments in favor of the theory of natural selection. It must be treated as any other physical theory would be. Its logical requirements are two-fold. If it can be shown that, 1st, *bodies having all the characters of species are producible* and that 2nd, *the conditions necessary for their production are operative in nature*—then Mr Darwin's must be considered as a true theory of species. The rest of his argument, the apparently absurd extremes to which it leads, offer no difficulties to a naturalist, and are really only apparent, the whole question may be considered as centring in the *productibility of species*. Mr Darwin first then proceeds to show how and to what a wonderful extent variability occurs under domestication, in both the animal and vegetable kingdom, an extent which he argues would unquestionably entitle those varieties, if found in the feral state, to the dignity of being classed as different species, or even different genera. He shows in his analysis of his famous case of the domestic pigeon, that these variations effect not only the apparently unessential characters of size, plumage and the like, but also the form and relative proportions of the different parts of the skeleton, and that they have acted on the instinct as well as on the physical structure.

“Variability is governed by many complex laws—by correlation of growth, by use and disuse, and by the direct action of the physical conditions of life. There is much difficulty in ascertaining how much modification our domestic productions have undergone, but we may safely infer that the amount has been large, and that modifications can be inherited for long periods. As long as the conditions of life remain the same, we have reason to believe that a modification, which has already been inherited for many generations, may continue to be inherited for an almost indefinite number of generations. On the other hand we have evidence that variability, when it has once come into play, does not wholly cease for new varieties are still occasionally produced by our most anciently domesticated productions.”

Man cannot *produce* varieties, or cause variability. Variability is in the nature of all living organisms, animals and plants when exposed to altered conditions of life vary, such is the law impressed upon them in the form of a power of adapting them-

selves to surrounding circumstances. Man sees in one of these variations something useful or agreeable to himself, he imitates the conditions, and thus unconsciously perpetuates a variety. Or he may proceed methodically, he may, acting on his experience of the possibility of transmitting peculiarities from progenitor to offspring, select the peculiarities he desires to transmit, the result in either case is the production of varieties, on which the process of selection in successive generations has stamped to a great extent the character of natural species. This is satisfactorily shown by the inextricable doubts common among naturalists as to whether very many of these are really varieties, or aboriginal species. Mr Darwin considers the domestic pigeon as a case of many widely divergent varieties certainly descended from a single wild species, and the domestic dog as probably the produce of more than one such.

Thus far Mr Darwin has shewn that varieties, having all the characters of species, morphologically considered at least, can be produced, this may we think be taken as demonstrated. The question of the physiological characters is more complicated—and we may admit at once that no proof has yet been advanced that varieties can be produced with the physiological characters of species, that is, which will not breed when crossed inter se, or whose hybrids are absolutely infertile. Mr Darwin weakens the objection to this want of logical completeness in his proof, by showing that varieties (as hitherto described by naturalists) are not invariably fertile to the second generation, nor are species invariably sterile. He points out many reasons for thinking that this law of sterility is probably the result of causes not necessarily connected with what are called specific differences, he dwells on the futility of the negative evidence, and insists on the paucity of properly observed cases, in conclusion he asserts his belief that the tendency of the evidence afforded by hybridism, if not in favor of his views, is far from being conclusive against them, and affords no just ground for objection. We quite agree with Professor Horsley in allowing great weight to the arguments advanced by Mr Darwin towards the removal of the difficulty above stated, and we concur in his stated conviction that judicious experiments would attain the result, namely would succeed in producing varieties, not only possessing all the morphological characters of species (as has already been done in the case of pigeons), but having also the physiological character, i. e. infertile inter se, or producing sterile hybrids, until however this has been done experimentally, or can be shewn to have occurred in nature, Mr Darwin's argument must be considered, so far, logically incomplete.

The causes which have produced varieties under domestication (not being in any way artificial) must of course act in the state of nature also, the guiding hand of man will not be there to conduct them to this or that issue, but they will arise. That which in nature takes the place of this agency is what Mr Darwin calls NATURAL SELECTION, and that which directs this all powerful guide, is the *struggle for life*. In one of the most interesting chapters in his most interesting work, Mr Darwin gives us his view of the causes and effects, the actions and reactions, which go to make the victories and defeats of this never ceasing conflict. He points out that the rate of increase common to all organic beings is in geometric ratio, that this is so is capable of demonstration, but it follows that immeasurably more life is produced than can survive, is born than can arrive at maturity. Take any area, examine it from this point of view, and the result of the observation will be that the problem practically being everywhere solved is—which of the individuals shall survive, which perish, or extending the field of observation—which of several varieties shall extend the area occupied by it, and which shall suffer encroachment from its neighbours. The same of course with species, which shall conquer, or, being beaten, shall decrease in numbers, and finally become extinct. Under such circumstances it is self-evident that the slightest advantage will turn the nicely balanced scale. This advantage over surrounding competitors may accrue to the being, vegetable or animal, in an unlimited variety of ways, at any stage of growth, at any season, in any form, as a more complete adaptability however slight to physical conditions. Suppose that the power of variation, inherent in all living things, takes effect and produces a slight change, the very slightest such change of whatever nature is certain to be either beneficial or unfavorable to the recipient, if favorable to the prosperity of the organism under its then conditions, it must lead to victory, it must be perpetuated, if on the contrary it be unfavorable to the individual, it is equally certain of elimination. If the first varying organism succeed in leaving offspring, such offspring, inheriting the disadvantageous peculiarity, will intalibly not long survive. Such is the unerring result of this struggle for existence of which every habitable spot on our planet is the theatre, at every moment of time, an endless conflict leaving the strong to flourish, and inexorably destroying the weak, the words *weak* and *strong* being (as implied) understood to mean only, less or more perfectly suited to surrounding conditions. We above remarked that the causes which have produced *variation* under domestication, not being due to, but only

taken advantage of by man, must of course occur in nature on this point we find Mr Darwin's writing as follows —

“It has been often asserted but the assertion is quite incapable of proof, that the amount of variation under nature is a strictly limited quantity. Man, though acting on external characters alone, and often capriciously, can produce within a short period a great result by adding up mere individual differences in his domestic productions, and every one admits that there are at least individual differences in species under nature. But besides such differences, all naturalists have admitted the existence of varieties which they think sufficiently distinct to be worthy of record in systematic works. No one can draw any clear distinction between individual differences and slight varieties, or between more plainly marked varieties, sub-species, and species. Let it be observed how naturalists differ in the rank which they assign to the many representative forms in Europe and North America.”

Such is the basis of the theory—variability under domestication, variability under nature. The variation if not useful to the being under its excessively complex relations of life, is certainly checked—if beneficial, it is as certainly preserved, and transmitted to offspring, such variations gradually accumulating by inheritance, until in the lapse of time, wider and wider divergence from the parent stock results. “What limits,” asks the author, “can be put to this power acting during long ages, rigidly scrutinizing the whole constitution, structure and habits of each creature—favoring the good, and rejecting the bad?” After reading Mr Darwin's chapter on the subject we think we may assert that he who would definitely answer this question must look far indeed.

We have pointed out the weak point in Mr Darwin's theory, and what is still wanting to make it completely satisfactory as an explanation of the origin of species, but it must be remembered that the stronghold which he attacks is by no means in a good state of defence. When naturalists speak of varieties and species, they mean that the former are due to second causes, unexplained, but probably conceived to be analogous at least, if not similar to those insisted on by Mr Darwin, while the latter have been asserted, almost universally to require a special act of creative power. And still, notwithstanding that the supposed origin of the two is so widely, so wonderfully different, the line separating them is absolutely undiscoverable. What is called now a variety, will to-morrow be called a species, the species of one naturalist is the variety of another. The physiological definition cuts both ways, for independently of the strong probability established in favor of the belief that we could experimentally produce from races, varieties with sterile hybrids, and that sterility is admitted to be of all degrees, are we to say that varieties whose hybrids are

sterile *inter se*, should be called species, or to assert that species whose hybrids are fertile should be called varieties?

This uncertainty on a point which *a priori* ought to be supposed capable of strict and satisfactory explanation, is more than unsatisfactory. Many distinguished naturalists think that Mr Darwin has but given the *coup de grace* to the long prevalent doctrine of the immutability of species. To them the rest of Mr Darwin's views will, we believe, present no very great difficulties, startling as they may and will appear to the unscientific public. "I can," he says, "believe that all animals have descended from 'almost only 4 or 5 progenitors, and plants from an equal or 'lesser number, analogy would lead me one step farther, namely to believe that all plants and animals have descended from 'some one prototype, but analogy may be a deceitful guide." We venture to advise the non-scientific reader to consider Mr Darwin's theory of the Origin of Species by itself, and to satisfy his mind, if he can as to its truth or falsehood, that is, the essential part of the theory taken as a whole, and represented in the above bold assertion. We will only add that if the mutability of species be admitted, there seems to us to be absolutely but one other condition necessary for the acceptance of the whole, namely time, but then, time measured as astronomy measures space, letting tens of centuries become the equivalent of an inch in the estimation of sidereal distances.

II We now come to the consideration of the indirect arguments in favor of the theory, and have still before us perhaps the most striking portion of the volume. Strictly speaking the theory must stand or fall by what has gone before, if the conditions stated as necessary for a satisfactory theory of the origin of species be not fulfilled, nothing which could be added is capable of making it so, if they be fulfilled nothing in the way of confirmation is necessary. Those claims to acceptance which the learned historian of the inductive sciences speaks of as consistency of evidence, are most valuable as showing that we have not misinterpreted or overstrained the evidence adduced, and in as much as they will have force in proportion to the doubts which we may entertain of our own powers of estimating that evidence, their influence with the general reader will be equal to, or perhaps even greater than, that exercised by arguments resting on that evidence itself.

If a theory based on reasonings and proofs derived from the examination of one set of facts, be found, when applied to a totally distinct set of facts, to agree with and explain them too, it will be at once perceived that the probabilities of such a theory being a true one are greatly increased. Moreover each recurrence

of evidence of this nature, each new difficulty—now contemplated in the original reasonings—which is found thus explained, must, from the nature of the case, carry great cumulative weight. In this branch of his subject Mr Darwin is specially successful. The new theory of course at once removes the difficulty, above stated, which naturalists find in laying down any line of demarcation between varieties and species, by stating such demarcation to be non-existent in nature. Of course if every species first existed as a variety, and is in fact only a variety become more permanent, no such line ought to be expected to be definable.

It is a well known fact that in a zoological province where “many species of a genus have been produced, and where they now flourish, these same species always present a correspondingly great number of varieties.” On the supposition that species derive from ancestors specially created, and that varieties are the unstable results of accidental and second causes, what is the meaning of this fact? Why should species A present several varieties in a district where a dozen or twenty species of its genus are present, and only one or two varieties in one where no more than four or five flourish?—there is no conceivable connection, at least none has ever yet been suggested. The new theory however meets such a case fully. It most naturally follows that when circumstances have favoured variations from type the tendency to vary should continue active, a tendency well known in the products of domestication, or in the words of Mr Darwin “where the manufactory of species has been active, we ought to expect as a rule to find it still in action.” Here the species are the most divergent and probably the oldest of the varieties.

Why, on the supposition of special creation, should the species of those larger genera which embrace many varieties, themselves retain more the character of varieties than the less numerous species of smaller genera, among which few varieties appear, that is, why should species of large genera differ less *inter se* than those of small genera? Strange mysterious relations, resting we may be quite certain from analogy, on some sure and simple basis, utterly anomalous when considered by the light of the theory of creation of species, explained most simply by Mr Darwin's theory.

“As each species tends by its geometrical ratio of reproduction to increase inordinately in number, and as the modified descendants of each species will be enabled to increase by so much the more as they become diversified in habit and structure, so as to be enabled to seize on many and different places

' in the economy of nature, there will be a constant tendency in
 ' natural selection to preserve the most divergent offspring of
 ' any, one species. Hence during a long continued course of
 ' modification the slight differences, characteristic of the varie-
 ' ties of the same species, tend to be augmented into the greater
 ' differences characteristic of the species of the same genus.
 ' New and improved varieties will inevitably supplant and ex-
 ' terminate the older less improved and intermediate varieties,
 ' and thus species are rendered to a large extent defined and dis-
 ' tinct objects. Dominant species belonging to the larger groups
 ' tend to give birth to new and dominant forms so that each
 ' large group tends to become still larger, and at the same time
 ' more divergent in character. But as all groups cannot thus
 ' succeed in increasing in size, for the world would not hold them,
 ' the more dominant groups beat the less dominant." We sug-
 ' gest to our reader a very attentive perusal of this passage.
 Groups must increase in size, and diverge in character, increase
 implies extinction, a lot which must of course fall on the transi-
 tional, less thoroughly modified, that is on intermediate, forms.
 A gradual transition from one species to another is thus avoided,
 while the arrangement of all animated nature into group under
 group is the necessary consequence of descent with modification.
 How is this wonderful fact of the grouping together of all or-
 ganic beings to be explained on the theory of creation of spe-
 cies? All analogy teaches us that the explanation offered by
 our theory is consistent with what we know to have been the
 plan of creation in other fields of action.

The new theory shows how modification by descent will ac-
 count for our finding "a bird formed like a woodpecker, prey-
 ' ing on insects on the ground, upland geese, which never or
 ' rarely swim, having webbed feet, a thrush diving, and feed-
 ' ing on sub aquatic insects." But can we conceive the crea-
 ' tures created with those structures and for those habits? How
 ' strange that the inhabitants of a country, animal or vege-
 ' table, if really created for the special locality, should be sup-
 ' planted and exterminated by colonists artificially introduced
 ' from another and distant land, the special and very different con-
 ' ditions of which they had been created expressly for. Is it pos-
 ' sible to really believe that if created as supposed, many creatures
 ' display what may fairly be called defects of contrivance, and in-
 ' completeness of adaptation? Guided however by the light of
 ' the new theory, we need not marvel at the sting of the bee
 ' "causing the bee's own death" at drones being produced in such
 ' vast numbers for one single act, and being then slaughtered by
 ' their sterile sisters and at other such cases. The wonder in-

'deed is, on the theory of natural selection, that more cases of 'the want of absolute perfection have not been observed'

The discoveries of science have ever tended to bring to light more and clearer proof of design, to make plainer the meaning, as it were, of nature. It has been among their noblest triumphs to show how this or that apparent anomaly existed only through our ignorance and was not intrinsic in the facts themselves. How emphatically it may be asserted that Mr Darwin's theory does all this we have perhaps said enough to prove, but bewildered by the numbers of such cases before us, we know not which to choose, one or two more however we must add, referring the reader to the work itself for fuller statements.

The case of rudimentary and abortive links is certainly a most inscrutable mystery on the supposition of specific creation. What can be the meaning of useless and superfluous appendages like the inefficient wings of the cofferhead duck? How explain the occasional blindness of certain burrowing animals, the habitually sightless eyes of others, the absolute blindness of the inhabitants of dark caverns? Mr Darwin however shows us how use develops and disuse aborts organs, and how such effects of use and disuse are inherited and transmitted by descent. How in short these facts are parts of a perfect system and not exceptions to a great law.

Again, among the species of the horse genus stripes of color are occasionally detected on the shoulders and legs, and specially noticeable on the hybrids of those species. Among the domesticated varieties of the rock-pigeon species, the bars of color on the tail occasionally re-appear, and commonly so when two very divergent varieties are crossed. Now how is the former fact to be accounted for on the supposition that the species of the horse genus were each created separately, how simply explained if we consider those species only more long established varieties.

If species were separately created, why should specific differences be any more variable than generic peculiarities to wit, common to many creatures, more stable than peculiarities common to fewer? Why should any particular part, developed in an unusual degree in some peculiar species, and therefore, one may naturally conclude, specially created for the benefit of, and specially useful to that species, be eminently subject to variation? What finally is the meaning of extinction of species? This subject has led naturalists to the wildest speculations on the analogies supposed possibly to exist between the life of a species, and that of an individual, and on the decay of vital power, but granting that this gratuitously assumed analogy exist, what are we to say

to the strange fact that the fossil remains of extinct beings found in each formation, are in some mysterious way, intermediate between those of the preceding and those of the succeeding periods? Or how comes it that some long extinct organism is found to be intermediate between some two existing and distantly allied groups, and why is it that the more ancient the fossil is, the more frequently this strange relation is apparent? Often have the geologist and the naturalist pondered in wonder over these mysterious facts, others have thus talked of the archetypic system, the plan of nature, &c, but what plan so completely fulfils all the requirements of the case, as that developed in Mr Darwin's theory, that all those groups are connected by descent?

We cannot deny ourselves the pleasure of closing our examination of this section of the subject with a quotation

"The framework of bones being the same in the hand of a man, wing of a bat, fin of a porpoise, and leg of a horse, the same number of vertebrae forming the neck of a giraffe, and that of an elephant—the similarity of pattern in the wing, and leg of a bat, though used for such different purposes—in the jaws and legs of a crab—at once explain themselves on the theory of descent with slow and slight modifications—and on the principle of successive variations, not always supervening at an early age, and being inherited at a corresponding not early period of life—we can clearly see why the embryos of mammals, birds, reptiles, and fishes should be so closely alike, though so unlike the adult forms."

Such are the claims of Mr Darwin's theory on what we have called indirect grounds. We have been forced in our attempts at condensation to omit much which he has admirably set forth, and we can only add that we find it difficult to conceive the existence of such a mental condition in any moderately cultivated intellectual being, as that on which such claims will fail to produce a strong impression. A very considerable space is occupied by Mr Darwin in considering the difficulties in the way of his theory, he meets, and satisfactorily (as he thinks) accounts for many of these, but we cannot follow him here further than to say that he never seems to treat any one of these lightly, but on the contrary gives to each the most careful and important consideration, and we think that the spirit in which this part of the enquiry is conducted is likely to leave the strongest impression on the reader's mind in favor of the honesty, and truly philosophical impartiality of the theorist, while he cannot fail to be astonished at the vast and varied stores of knowledge brought to bear on the all embracing subjects discussed, and to be charmed by the graceful and perspicuous style of the language in which these are laid before him. We will quote one passage. Among the difficulties which he experienced in attaining a thorough

conviction of the truth of his theory, he mentions the existence of "organs of extreme perfection and complication," and as an instance of such he takes the eye, of which he writes

"To suppose that the eye with all its inimitable contrivance for adjusting the focus to different distances, for admitting different amounts of light, and for the correction of spherical and chromatic aberration, could have been formed by natural selection, seems, I freely confess, absurd in the highest possible degree. Yet reason tells me that if numerous gradations from a perfect and complex eye, to one very imperfect and simple, each grade being useful to its possessor, can be shown to exist if farther the eye does vary ever so slightly, and the variations be inherited, as is certainly the case and if any variation or modification of the organ, be ever useful to an animal under changing conditions of life, then the difficulty of believing that a perfect and complex eye could be formed by natural selection, though insuperable to our imagination, can hardly be considered real."

It is however in the geological records of the past that he recognizes his greatest difficulty. If his theory be true, ought we not to expect to find there a perfectly graduated series of varieties, linking together, by however long a chain, the most divergent forms of existence? That nothing distantly approaching to this is found, Mr Darwin at once recognizes, and he labors through many pages to show that we ought not to expect to find it. Those great teachers of geology, who for the glory of their prescience, have sown broadcast ideas, more or less exaggerated, of the amount and exactness of our knowledge of life in bygone ages, are responsible for grave misrepresentation, if Mr Darwin can establish his views of the *incompleteness of the geological record*. If their confidence be well founded, Mr Darwin can scarcely stand. For ourselves, although we are unable to advance anything which we consider in any degree conclusive against our author's views on the subject, we must confess ourselves incapable of the philosophical effort implied in the sacrifice, at once, and without a struggle, of the rooted convictions of years, this bigotry may be highly illogical, and will not we trust be imitated by our readers, but our well grounded confidence in palæontology, though we admit perhaps overstretched, *peremptorily forbids* our submitting to consider it henceforth as the "science which teaches us our ignorance of extinct forms of life." We quote a few eloquent lines embodying Mr Darwin's views. After telling us that each formation does "not mark a new act of creation, but an occasional scene taken from a slowly changing drama," he goes on, "I look at the natural geological record as a history of the world imperfectly kept, and written in a changing dialect, of this history we possess the last volume alone, relating to only two or three countries. Of this volume only here and there a short chapter has been pre-

‘ served and of each page only here and there a few lines. Each word of the slowly changing language in which the history is supposed to be written being more or less different in the interrupted succession of chapters ’

In the frame of mind natural to the most painful of intellectual predicaments, namely being convinced against our will of the instability of a long cherished ground of confidence, we shall now proceed to point out what we consider to be blemishes in the work, in matters not essential to the argument.

While enforcing his views of the incompleteness of the geological record, Mr Darwin states his belief that from the oldest geological times with which the very lowest fossiliferous beds bring us into contact, the oscillations of level,—the changes from sea bottom to land, and back again—have effected only those portions of our earth’s surface which are now *continental areas* that is, existing dry land, and the adjacent seas. In support of this proposition, nothing even distantly approaching to satisfactory evidence is attempted to be adduced, true it is only mentioned as an hypothesis, but we doubt if an assumption so gratuitous can add anything to the argument it is brought forward to confirm.

Again in speaking of the gradual improvement of the telescope as an illustration of what he conceives to have been the action of natural selection in bringing the eye to perfection, we think the analogy he seeks to establish fundamentally vicious. His metaphor personifies natural selection, presiding at each experiment, “intently watching each slight accidental alteration,” scrutinizing the result of every trial, rejecting the bad, and surely recognizing the good. Now we submit that the analogy between the optician, and natural selection, cannot hold if the “slight changes” are spoken of as “accidental”, the experiments of the optician are made with an object, he hopes that, by increasing the convexity or diminishing the thickness of a lens, he may attain some object which he sets before him as desirable, his combination may, or may not, produce the anticipated result, or the result when produced may not, realise his expectations, we take exception here because we believe it to be important to guard against confusion of ideas arising between Mr Darwin’s theory, and the antagonistic doctrines of Lamarck. The illustration of the optician would have aptly fitted the views of the latter philosopher. He held that progressive improvement was a law of nature, which *did* act as it were experimentally, and with ulterior results in view. Mr Darwin on the contrary means by *improvement* only more complete adaptation to surrounding conditions, and includes degradation,

as well as exaltation within the results of ever acting variation, as for example when disuse produces abortion of the eye or the wing or of any other organ. Let the slight changes, be then accidental, that is to say, themselves the results of the great law of variation, and accidental only in reference to the results which may ensue, but let us make the analogy correct by supposing the optician before a glass furnace, seeking material for his lenses among pieces of glass, made from ingredients of which he knew nothing, taking up at random a piece of flint glass, then a piece of brown glass, then a piece of plate glass, scrutinizing the properties of each, putting each to the particular use it is best fitted for, and *irrespective of the result on the final perfection of the telescope*, producing an achromatic lens with its good qualities of one kind, and failings of another. The result of his labor would thus have tended towards the improvement of the telescope in a way analogous to what Mr Darwin states the action of natural selection to have been. It is of course unnecessary to add that the march of mechanical improvement has rarely indeed taken such a course, our object is to avoid confusion of the apparently slight, but really fundamental distinctions, between the two theories of the origin of species.

Again Mr Darwin's calculations of the lapse of geological time, and especially what he says of the denudation of the weald, seems to us unworthy of other portions of his work, besides which, we rather distrust all such calculations, including those presented by Professor Phillips in his address as President of the Geological Society, and which have appeared in the last number of the *Society's Quarterly Journal*. Efforts to insist on the immensity of duration implied in observed geological facts will certainly be misapprehended by the non-geological reader, and, *pace* the illustrious President of the Geological Society, we will venture to promise that in the long run they will be found superfluous to the geologist.

Having briefly noticed the difficulties which Mr Darwin himself discusses, and having offered a few words of criticism on what we conceive to be blemishes in his treatment of some sections of his vast subject we will now venture, at the risk of being charged with offering an insult to the good sense of our readers, to caution them against a kind of criticism which a work like this before us is eminently calculated to evoke. We know how easy it is to misrepresent any statement detached from its context, a link taken from any chain of reasoning, but more especially from such an one as this, may with extreme facility be made to appear weak in a detached position, we will

give an instance of the application of this to Mr. Darwin's book

In a chapter discussing *transitional habits*, after heaping example on example, and producing by the assemblage of cumulative evidence the strongest impression on the mind of the candid reader, he proceeds as follows —

“ I have often watched a tyrant flycatcher (*Saurophagus sulphuratus*) in South America hovering over one spot and then proceeding to another, like a Kestrel, and at other times standing stationary on the margin of water, and then dashing like a king-fisher at a fish. In our own country the larger titmouse (*Parus major*) may be seen climbing trees almost like a creeper; it often kills small birds by blows on the head, and I have many times seen and heard it hammering the seeds of the yew on a branch. In North America the black bear was seen by Hearne swimming for hours with widely open mouth, thus catching, like a whale, insects in the water. Even in so extreme a case as this, if the supply of insects were constant, and if better adapted competitors did not already exist in the country, I can see no difficulty in a race of bears being rendered, by natural selection, more and more aquatic in their structure and habits, with larger and larger mouths, till a creature was produced as monstrous as a whale.”

Here is a notable opportunity for the exercise of that peculiarly shallow wit which, on the principle of taking a brick as a specimen of a house, triumphantly refutes Mr Darwin's theory by ringing the changes of ridicule on the closing lines of this passage, “ what !” our imaginary critic will exclaim, “ a bear swim about with his mouth open till he becomes a whale ! very like one indeed !” We will not wait to enquire whether our case be wholly imaginary, but we may remark,* that a long course of systematic neglect of logical thought, and a simultaneous cultivation of prejudiced argumentation, is capable of leading to the most monstrous results, even in the individual, and without taking into account the possibility of the transmission by descent of those curious, though unhappily not rare, deviations from the ordinary type of *homo sapiens*. Repeating our apology to the reader for supposing him to stand in need of a caution so superfluous to any reasonable and impartial mind, we shall now pass to another branch of this subject.

It has surprised us to find that Mr Darwin has been spoken of by some of his critics as a disciple and imitator of Lamarck, and his work stigmatized as a *rechauffé* of the *Vestiges of Creation*. In some of the cases alluded to, there is unfortunately little room to doubt that there has been a motive behind this apparent mistake, and we need not hesitate to assert that this motive has been supplied by the desire to set in motion against Mr Darwin the engine of religious prejudice, and rouse in opposition to his theory the odium theologicum attaching to the name of Lamarck. Many will, we fear, take the accusation as proved, who

would be uninfluenced by the motive which prompted it, and aware that the errors of Lamarck have long since been refuted, lay aside unexamined what they will prejudice on the strength of the above statement. Claiming for our author all that he claims for himself, namely, an impartial examination of his arguments, it becomes important to point out the injustice of this allegation. Let us for convenience sake take this proposition, that "all organized life had for starting point one original organism of 'the simplest kind'" Both Lamarck and Mr Darwin hold some such creed, each has presented us with arguments which he believes establish its truth these arguments constitute their respective theories. In *limine*, we find them at issue. Lamarck concerns himself with the *act of creation* while Mr Darwin never approaches it, the former discusses spontaneous generation, the irritability and non-irritability of primordial monads, their combination according to a law of progressive advance, so as to form a simple cell, &c &c, the latter in the spirit of philosophical research, has perceived, and respected the limits to which inductive reasoning extends, he knows that the first origin of organized life is, and must ever remain, beyond those limits, all observable facts of natural history, disclosed to us in the present, or in the records of the past history of the earth, have been well called its autobiography, our author does not, like Lamarck, misconceive this truly philosophical conception, and expect to discover there, anything about *birth*—the origin of things.

One would fancy that this single radical difference might have spared Mr Darwin the accusation of being an imitator of Lamarck, but there are differences as broadly marked at every step. The basis and essence of Lamarck's theory, as indeed the name by which it has come down to us sufficiently indicates, is the doctrine of *progressive development*, higher forms are evolved out of lower, by a law which is of the highest universality. Mr Darwin on the contrary—arriving at no such law—directly states that it cannot exist, proves that his process of natural selection includes descent, as well as ascent, in the scale of nature indeed he deprecates too trenchant an application of these terms, terms essential to the very conception of Lamarck's theory, he tells us that "recent forms are generally looked at as being, in *some vague sense*, higher than ancient and extinct forms, and 'they are *in so far higher* as the later and more improved forms 'have conquered the older and less improved organic beings, 'in the struggle for life.'" The italics are ours. Nor does Mr Darwin leave us in doubt as to what he means by such terms as *higher, lower, strong, weak, more improved, less improved*, on the

contrary, he over and over insists on his interpretation, viz., *more or less perfectly adapted to surrounding conditions*

These discrepancies are wide enough, as is also the following. Lamarck laid down that "organization is the result of function," and moreover mystified this doctrine by a confused version of a theory of "second causes" Mr Darwin writes, "it is difficult 'to tell, and immaterial to us, whether habits generally change 'first, and structure after, or whether slight modifications of 'structure lead to changed habits, both *probably* often change 'almost simultaneously"

That is to say, Mr Darwin, altogether omitting the wild speculations which form the basis on which Lamarck's theory rests, directly stating that Lamarck's first fundamental law is inconsistent with facts, and adding, as above, that the second law of progress of his predecessor, is immaterial to his own theory, is nevertheless an imitator, and his work but a rechauffé of Lamarck's

Well may Mr Darwin (assuming that every reader would at once perceive that his theory was, as it is, subversive of, and inconsistent with, that of Lamarck,) after pointing out at considerable length, how certain facts in insect life (instinct, and neuter-insects) were in accordance with his own theory, write—"I am 'surprised that no one has advanced this demonstrative case of 'neuter insects against the well known doctrine of Lamarck."

If imitations consist in re-asserting a proposition which a predecessor failed (or whether failed or succeeded) in establishing, in refuting his errors and by a totally different process establishing his conclusions, then why is Newton not called an imitator of Kepler? Kepler, in his famous laws, asserted the facts of celestial motion, his theory was that those facts were to be explained by supposing them to be performed under the guidance of animal life, or angelic superintendence. Newton re-asserted the facts, but his theory supplied a different account of the causes in action. In what has Mr Darwin come nearer to Lamarck than this? The electric telegraph communicates between two distant points, saving the conveyance from one to the other of a written message—so did the Semaphore, is the latter ever spoken of as a rechauffé of the former? No doubt both Mr Darwin and Lamarck do connect the first dawn of life with the world of organized existence around us, but *therefore* to say that their means of doing so are the same, that their theories are identical, that the later is a rechauffé of the older and its author an imitator, seems to us pre eminently characteristic of the honesty and logical acumen of a school whose philosophy consists in damning unheard whatever does not flatter

their prejudged conclusions, and remorselessly rescinding all that stretches beyond the limits of their Procrustean scale.

We have insisted somewhat at length on this subject, because among the many notices which have appeared on the subject of this work we have seen the accusation made, but nowhere repelled. The motive we have above attributed to the accusers shows that we are aware no appeal to reason can reach them; but we trust that what we put forward will free our author from the risk of being condemned unheard by impartial men, who might have been influenced against our author by the knowledge that Lamarck has really been refuted. For the rest we are well aware that not only the theory of Lamarck, but also the proposition which that theory failed to establish, has come down to us branded with the anathema of religious criticism—religious prejudice will still have its quarrel with Mr Darwin, apart from Lamarckism. Prejudice is powerful from its frequently very close resemblance to honest conviction, the fruits of reasoned belief and of unreasoned belief mix together, undistinguishably too often, in the minds of all of us. The common duty of all is to reject the dross, and retain the pure ore, and it is to the spirit of candid enquiry that we now earnestly appeal, to an unflinchingly honest scrutiny of facts and reasons and to the rigid exclusion of all foregone conclusions.

This is not the place for a lengthened discussion of the serious questions involved in an examination of Mr Darwin's conclusions from a religious point of view. Acknowledging however the existence of the difficulty, we will state our own conviction that it needs only to be fairly faced, to disappear, and we will briefly state our grounds for this conviction. What is in fact the difficulty with which we really have to do? It may be thus stated. Mr Darwin says that species, as we see them, were not *created* in the ordinary acceptation of that term. Scripture says "Male and female *created* he them." If then some simple, straightforward, and plain reason for believing that the ordinarily accepted meaning of the word create, has no necessary application to the passage, our author stands condemned *in foro ecclesiae*.

Premising (as we have already shown) that Mr Darwin never approaches the subject of *creation*, in the sense of *origination* or first causation, but simply takes it for granted, we may ask what is it that we do understand, or imply to have taken place, when we assert that a being has been created, formed out of the dust of the ground and vivified, or as Eve, made from some part or parts of a previously existing being. The species spoken of as *created* may then have been the product of previously existing organisms. With the subject of miracles we have here no-

thing to do. It has been well remarked that preservation is as great a miracle as creation, what concerns us is that the passage above quoted should to the unprejudiced reader be capable of interpretation consistently with the belief that species were evolved by a gradual process, and not suddenly introduced by a single act. Why then need we suppose that when existing species first assumed their present forms, there was any *direct* interference of creative power—is the *indirect* action of power less miraculous?

Why may not the latter have rendered the former unnecessary, by the use of those secondary causes, commonly spoken of as laws of nature, causes which we certainly know to have been the efficient means of their preservation and increase up to this day. In what do we force on the words "male and female created 'he them'" any improperly limited interpretation, by holding with Mr Darwin that the great command "increase and multiply" included the evolution of new forms, and by thus exalting our conception of the act of creation, by as much as the making of a man is a greater effort of power than the act of making a watch? Any one familiar with the writings of P. Smith, Hitchcock, Hugh Miller, and other Biblical geologists, will not accuse us of stretching the meaning of the words—whether they may approve of, or condemn the conclusions—as far as those savans habitually do—we cite their authority only because we enter on their grounds of argument and we do this, because we think we can show that religious prejudice only, and not religious convictions, will stand between Mr Darwin's theory and acceptance among religious men. His denial of special creation of species, instead of being antagonistic to, nobly encourages the loftiest and grandest conceptions of Divine power.

Before quitting the subject we will quote some remarkable lines from the writings of one of the most profound of contemporary thinkers, taken from works published before the appearance of Mr Darwin's book, and approaching this subject from a different point of view from his. Of the creation of species this writer says*—

"The only question is as to the sense in which such change of species is to be understood—whether individuals, naturally produced from parents, were modified by successive variation of parts, in any stage of early growth or rudimental development, until in one or more generations, the whole species became in fact a different one, or whether we are to believe that the *whole race* perished, without reproducing itself, while, even during its continuance, independent of it, *another new race*, or other new individuals (by whatever means, came into existence, of a nature closely allied to the last, and differing often by the slightest shades, yet unconnected with them by descent whether there was a continuation

* Unity of Worlds, 2nd Ed., p. 424

or propagation of the *same principle of vitality* (in whatever germ it may be imagined to have been conveyed) or whether a *new principle or germ* originated independently of any proceeding, *out of its existing inorganic elements* to which the principle of vitality (in whatever it may consist) was superadded in some way as yet unknown”

Quoting from Professor Owen the same author, farther on, writes* —

“To what natural laws, and secondary causes, the order by succession and progression of such organic phenomena may have been committed we as yet are ignorant. But if without derogation of the Divine power we may conceive the existence of such ministers and personify them by the term *nature*, we learn from the past history of our globe that she has advanced with slow and stately steps, guided by the archetypal sight, amidst the wreck of worlds, from the first embodiment of the vertebrate idea, under its old Ichthyic vestment, until it became arrayed in the glorious garb of the human form.”†

“To this noble passage I cannot forbear adding the single comment that, according to my view, not only *without derogation of the Divine power*, may we entertain the ideas so beautifully expressed but if there be any truth in what has been before advanced, so far from anything *derogatory*, such a view constitutes the *very proof* and manifestation of that power and is just what enables us legitimately to trace its operations—as alone we can worthily trace them—in the indications of law and unity, order and system while without such evidence of Universal Mind and Supreme Reason, arbitrary intervention might be only irresistible fate, and sudden revolutionary change and convulsions, only atheistical anarchy”

One more quotation and we have done the same writer in another work, alluding to this subject says‡ —

“But the successive introduction of new species of organic life, in the epochs of past terrestrial changes, are imagined by some to be instances of direct intervention. In the first place such commencement of new forms of existence were events not arbitrary, nor disconnected, but regularly recurring in successive epochs, always connected with other physical changes going on in these epochs, however little the laws connecting and regulating them are as yet known. But this mere fact of the frequent *regular* recurrence of such changes proves distinctly that they were not *casual suspensions* or *interruptions* of the *order of nature*, but *essential parts* of it. As indeed is fendered more undeniably evident by the circumstance that they were in every instance not isolated acts but the *commencement* and establishment of a series of *simply natural results*—and *succession* and *continuance* of the species so generated, by ordinary natural causes.

“On all sound inductive principles these events must be held to have taken place in strict accordance with natural laws, and with the regular order of physical causes, however little we may at present be able to trace precisely what the laws of their production actually were and even without alluding to any theory of development, we must look to some **GREAT UNKNOWN LAW OF LIFE** at which the permanence of species under certain conditions, is only a subordinate part, and particular case”

* Unity of Worlds, 2nd Ed., p 477

† Owen on Limbs, Cit., p 86

‡ The Order of Nature, p 252

This "*great unknown law of life,*" Mr. Darwin has, we think, discovered, and on so truly great an achievement we heartily congratulate him, rejoicing at the same time that men of science among us have shared in its elaboration, and that from the East its first light dawned upon Europe.

We have been led into the discussion of the application of our author's theory to prevailing religious doctrines only by his critics. No thing in the work itself would have invited such a discussion. By broaching such topics we have opened the floodgates, and know not how far we may be carried. An excellent comment is suggested by our difficulties on the pre-eminent prudence of Mr. Darwin's reticence. Certainly the wise and the honest way to proceed in all such matters is to confine physical research, and inductive science strictly within their own domains, if properly conducted they *must* lead to truth, they ever have and always will do so. Why then this nervous anxiety about the bearing of Holy Scripture on these things? Can truth be inconsistent with itself? Shall we the sooner reap the fruits of our laboriously sown seed, if we pull up the little plants to measure their tender roots by some typical scale of perfection? Such considerations no doubt have suggested the course followed by Mr. Darwin and by far the larger number of the most distinguished men of science of our time, indeed they go further, as a rule, and seldom trouble themselves to reply to attacks made on them from under the shield of religion, too often borrowed for such an occasion by persons not otherwise familiar with its use. Unwarned by the example thus set us we have thought it right to descend into the arena and defend (as we think) the right, but to have done this completely it seems to us that there is still one question to touch upon, one doubt whereon to throw what light we can.

It will unquestionably have suggested itself to the reader that Mr. Darwin's theory cannot be supposed to stop short where he has left it. If, as he says, analogy would lead him to reduce the origin of all organic existence from eight or ten, to a single point, what about the other end of the scale? What of Man? It will be recollected that Lamarck was reviled as a misanthrope because he, unlike Mr. Darwin, *did* entertain definite opinions, and did expressly teach that man too was but a link in the long chain of progressively developed life.

We are left to draw our own conclusions as to what Mr. Darwin would say on this question, and, judging as best we may, we venture to suggest that he might, in accordance with the spirit of philosophic induction which seems to us to have been by him so rigidly followed, have pointed out that, consi-

dered only as an animal, man's superiority to the brutes would not imply any necessity for reserving him from the category. Perhaps from man to the highest ape may not be a gap wider than may elsewhere in the sequence be naturally accounted for. The *animal man* has much in common with other animals, and *in so far as we thus* examine him we see nothing to leave a broad line of demarcation open. Man's physical development, even his intellectual nature, *may be* but questions of degree, and may be treated as *legitimate* subjects of *inductive enquiry*, but here we come to a great gulf, the *very reasons* which render it illogical to stop short of the point we have reached, peremptorily forbid a single step farther, and for this simple reason, that man's *moral and spiritual nature* takes us to subjects *radically* and of their *very essence* different. A very elemental condition of physical knowledge is requisite to avoid the attempt to measure heat with a cup, or a liquid with a footrule, childish as the illustration may seem, we conceive that the absurdity implied is surpassed by those who apply the machinery of inductive science to the discussion of the problems suggested by man's moral and spiritual nature. He is made in the image of God: not his animal structure and functions, they are of the earth, but his spiritual being belongs to a *totally different order of things*, apart from, and belonging to new and distinct regions, transcending all material ideas. To clearly lay down the limits of the legitimate field of inductive enquiry, and rigidly to adhere to those limits, is an example of the wisdom which renders to Cæsar the things which are Cæsar's, well assured that by doing so we take the first step towards rendering to God the things which are God's. It carries its reward with it—obedience to our Creator's laws always does—in the satisfaction ever renewed, with which each fresh proof of HIS greatness is hailed, unalloyed by the miserable scepticism which, fettering Scripture with the ignorant interpretations imposed upon it by the insolent assumption of self-infallibility, has ever raised the cry of antagonism between the Word of God and the Book of Nature. These, as Archdeacon Pratt so eloquently teaches us,* “emanate from the same infallible author, and therefore cannot be at variance. But man is a fallible interpreter, and by mistaking one or both of these Divine Records, he forces them too often into unnatural conflict.” Let us thus combining “reason with a humble mind and a patient spirit” seek truth and truth alone: moral and spiritual truth where alone it can be found, in the infallible guide given us by inspiration for that purpose, and physical truth in its own appropriate records.

* Scripture and Science Not at Variance. J. H. Pratt. 3rd edition, 1869.