PART II.

REVIEWS AND NOTICES OF BOOKS.

On the Origin of Species by means of Natural Selection, or the Preservation of Favoured Races in the struggle for Life. By CHARLES DARWIN, M.A., F.R.S., F.G.S., F.L.S., &c. Author of '*Journal of Researches during H. M. S. Beagle's Voyage round the World.*' Fifth thousand. London, 1860: JOHN MURRAY.

THE author of the now celebrated work which we propose to review, is perhaps better known to most of our readers by his observations and theories upon the formation of coral islands in the South Pacific, than by his monograph on Cirripedes. The former subject is more attractive to any but the most enthusiastic naturalists, than the latter. But while Mr. Darwin has established a claim to the gratitude of every student of nature by his researches and writings upon two subjects, of which previously little was known with accuracy, it is upon the qualities displayed in the investigation of the structure and habits of an obscure group of molluscs that we should rely as evidence that he has a right to be heard with respect upon the "mystery of mysteries"—the Origin of Species. Close and accurate observation, patient and persevering accumulation of facts, however apparently trivial in themselves, and careful deduction from the materials thus obtained, are needed by the naturalist who will put forward views opposed by high authorities, and repulsive to the prejudices of most of his readers, in order that he may have a chance of convincing or even of obtaining a fair hearing. These conditions Mr. Darwin has fulfilled.

Nor have we in the work before us the statement of a crude theory hastily taken up. Mr. Darwin's views on the Origin of Species are the result of twenty two years of thought and study, and patient collection of facts in any way connected with the subject. From 1837, when the idea of studying the question first occurred to the author in South America, up to the time of the publication of the Abstract before us, his inquiries have been steadily directed to one object; and every fact in natural history, reported

or observed, has been examined with reference to its bearing upon the origin of species. In 1844 Mr. Darwin formed the conclusions enunciated in 1860. His complete work, to the appearance of which naturalists, whatever their opinions upon the immutability of species, will look forward with eager expectancy, will contain the results of the labors of an ardent student of nature's secrets, during a period of a quarter of a century.

Mr. Darwin does not stand unsupported by authority. Mr. Wallace pursuing his researches independently in the Malay Archipelago, has recently arrived at conclusions but slightly different from his. Sir C. Lyell, formerly a strenuous upholder of the immutability of species, has modified if not abandoned his former views. Dr. Hooker lends the support of his high authority and has supplied abundantly illustrative facts. Prof. Huxley is another able ally. The absence of formidable opposition, the feebleness generally of the attacks of hostile critics, and the silence of men of science who are known to hold opinions different from Mr. Darwin's, are scarcely less valuable testimony in favor of the plausibility of his views than the support of his allies. At the recent scientific congress in the United States, the question of the mutability or immutability of species was studiously avoided—even by Prof. Agassiz—although he is said to have elsewhere expressed total dissent from Mr. Darwin's conclusions, and even doubt of some of his facts. Prof. Owen in his recent work "Palæontology" has also avoided direct collision. He has contented himself with enunciating what he strangely calls an 'axiom'—"the continuous operation of the ordained becoming of living things." We must confess ourselves unable to determine whether this 'axiom' is opposed to Mr. Darwin's conclusions or not. To us it is almost—we cannot bring ourselves to say *quite*—unintelligible. To all it must be obscure.

Before proceeding to examine the work itself, one more preliminary observation must be made. Circumstances into which we need not enter now, rendered it advisable to put forth a brief abstract of Mr. Darwin's conclusions, and the arguments which appeared to him as satisfactory as the nature of the subject allows. The facts upon which these arguments were based are for the most part reserved for the future work. It is obvious that this is a serious disadvantage to the author. Those who are unwilling to accept his conclusions can avoid confession to his arguments by demanding

his supporting facts. The disadvantage is not imaginary, the objection has actually been made by a recent hostile critic. In estimating the value of arguments dependent upon unstated facts, we must be guided by our knowledge of the author's candour and competency to judge of those facts aright. In the present instance, Mr. Darwin's clear and forcible statement of the strong objections to his theory leaves us no room to doubt his candour; while the many original observations and experiments which are scattered through this small volume, taken in connection with the use made of them, give us confidence in his judgment.

We shall give Mr. Darwin's general conclusion in his own words :—

"I am fully convinced that species are not immutable ; but that those belonging to what are called the same genera, are lineal descendants of some other and generally extinct species, in the same manner as the acknowledged varieties of any one species are the descendants of that species. Furthermore, I am convinced that natural selection has been the main but not exclusive means of modification." (p. 6.)

Other causes of modification are admitted to have had some influence ; but little in comparison with natural selection. Such are the external conditions under which animals or plants are placed—as climate and food—habit, and some others. It will be remembered that the author of "Vestiges of the Natural History of Creation" laid great stress upon these modifying forces. He supposed them to have been the *causes* of the modification, or rather "development," of one form into another. Mr. Darwin, on the other hand, maintains that certain modifications are produced *first*, by "variation," and that these become permanent if climate, food, and other external conditions are such, that the modification gives advantage to the individual and its descendants in the "struggle for life."

Natural selection, then, is the great cause of modification, and consequently, of that vast variety of animal and vegetable forms which we see around us. This wonder-working principle is thus explained.

"As many more individuals of each species are born than can possibly survive ; and, as consequently, there is a frequently recurring struggle for existence, it follows that any being, if it vary however slightly in any manner profitable to itself ..... will have a better chance of surviving, and thus be *naturally selected.* From the strong principle of inheritance any selected variety will tend to propagate its new and modified form." (p. 5.)

The "direct effects of the conditions of life" are, according to our author, "unimportant in comparison with the laws of reproduction, of growth and of inheritance." His "impression is, that with animals such agencies (heat, moisture, light, food, &c.) have produced very little direct effect, though apparently more in the case of plants..... Nevertheless some slight amount of change may, I think, be attributed to the direct action of the conditions of life—as in some cases increased size from amount of food, colour from particular kinds of food or from light, and perhaps the thickness of fur from climate."* (pp. 10,11). "Habit also has a decided influence." (p. 11.) Again (p. 43.) "I believe that the conditions of life, *from their action on the reproductive system*, are so far of the highest importance as causing variability."

We are inclined to think that Mr. Darwin, in his zeal for his favorite principle of natural selection, rather under-rates the modifying power of external conditions. We think it probable that many of the differences observable between the "varieties" of the human species are due to these causes. We may give as an illustration the fact that the negroes born in Africa and imported into Cuba, are easily distinguishable from the descendants of the original slaves by the slighter make of the latter. This change has been effected in (comparatively) a very short period. The principle of natural selection would, it appears to us, lead us to expect a result the reverse of the actual one. So would the usual effects of food and habits of life. It would appear that in this instance we must attribute to climate, acting through but a few years, a considerable change of structure in a variety of mankind. But we have not space to discuss either the general question at which we have hinted, or the particular instance mentioned above.

If Mr. Darwin's theory be sound, it is obvious that we must attach to the words "species" and "variety," other ideas than those which they have hitherto represented. The question is not, however, a merely verbal one, as it is sometimes strangely represented to be. As regards the word "species" naturalists have hitherto attached to it an idea perfectly definite. As Archbishop Whately points out, when

* It is elsewhere suggested that the thicker fur of animals in cold climates may be the result of natural selection. Those individuals which happened to be born with better means of resisting cold were thus preserved, and propagated offspring like themselves, when those less protected perished.

applied to organized beings, a species is a *real thing*, which in its ordinary logical application it is not :—"It is always applied (when we are speaking strictly as naturalists to such individuals as are supposed to be *descended from a common stock*,) or which *might* have so descended: viz., which resemble one another (to use M. Cuvier's expression) as much as those of the same stock do:"* (the latter clause being added, apparently, to meet the possible case of separate creations of different individuals or pairs of the same kind.) Naturalists are not always able to determine whether a group of individuals is a "species" or a "variety;" but this means that they cannot tell whether those individuals have descended from the stock (hermaphrodite or bisexual) from which another group which they resemble has sprung, or from a different one. Descent from distinct stocks, then, is the essential difference of "species"—descent from the same stock modified, that of varieties—in the common language of naturalists. Let Mr. Darwin give in his own words the meaning which he, on his theory, attaches to those important words :—

"I look at the term species, as one arbitrarily given for the sake of convenience to a set of individuals closely resembling each other, and that it does not essentially differ from the term variety, which, is given to less distinct and more fluctuating forms. The term variety again, in comparison with mere individual differences is also applied arbitrarily, and for mere convenience' sake." (p. 52.)

Let us now state briefly the steps by which Mr. Darwin endeavours, we think, with considerable success—to establish his theory.

There is in all organized beings a tendency to vary in a greater or less degree from their parents—whether under domestication or in the natural state. A variation having appeared tends to become hereditary, with occasional reversion to ancestral forms. But some variations are more favorable than others to existence in the "struggle for life," which is ever going on. These can be taken advantage of for the preservation of the individual and the race—and, as a corollary to these last two propositions, there will be on

* Whately's Logic, Book IV. c, v. sect. 1. We give the passage from M. Cuvier's *Regne Animal.* "Varieties are accidental subdivisions of species .....Generation being the only means of ascertaining the limits to which varieties may extend, species should be defined—*the reunion* of individuals descended one from the other, or from common parents, or from such as *resemble them as closely as they resemble each other:* but although this definition is rigorous, it will be seen that its application to particular individuals may be very difficult when the necessary experiments have not been made."

the whole improvement in organization. Having established these premises the author replies to the most obvious and most serious objections to which his theory is open; and afterwards shews that it serves to explain many facts in nature, which on any other hypothesis are inexplicable. This process is rigidly logical in its form. Induction in both its senses—the investigation and collocation of facts and deduction of inferences from them—is followed by verification—testing the truth of the conclusions by applying them to existing facts.

The book contains fourteen chapters. Chap. I. treats of Variation under Domestication; Chap. II., Variation in the Natural State; Chap. III., the Struggle for Life; Chap. IV., Natural Selection; Chap. V., Laws of Variation; Chaps. VI.—X. are devoted to answering objections; Chaps. XI—XIII., contain applications of the theory to the explanation of facts, and Chap. XIV., gives a summary of the whole Abstract. We shall endeavor to give our readers a sketch of this remarkable work, and shall conclude with a few remarks upon the question which is, we believe, the great obstacle to the reception, and even to the fair examination of this and all other theories of development of organization. Is man the result of a special act of creative power, or is he merely a product of "Natural Selection," and development from lower—from the lowest—forms of life?

Certain degrees of variation we casually perceive in every individual, either of our own or any domesticated species—differences of feature, constitution, disposition, &c. We see, too, that these are inheritable, and we know that they frequently disappear for one or more generations, and then reappear. We are familiar with instances of this in many morbid diatheses of common occurrence—the rheumatic, the gouty, the maniacal, and others. But the principles of variability, inheritability of variations, and tendency to revert to ancestral forms, are much more strongly brought into view by study of the domesticated animals and plants which man has selected for use or pleasure. When we consider the numerous varieties of the dog, or the cabbage, differing as they do widely from each other, and yet known to be descendants from the same original stock, we can scarcely be surprised at any amount of variation in other instances. And when man has effected so much in modifying, or selecting and rendering permanent, modifications useful to himself, by accumulating peculiarities separately inappreciable by

an ordinary eye, in the comparatively few years during which he has been an inhabitant of the earth, what degree of modification may we not conceive possible to result from the action of *natural* selection employed through the lapse of countless ages?

Mr. Darwin selected for study the numerous and remarkably definite varieties of the domestic pigeon. His demonstration of the fact that all these varieties are descendants from the *Columba Livia* is most worthy of attention, as an example of the mode of argument applicable to zoological subjects, as well as of the author's powers of close and conclusive reasoning. We cannot doubt either the common descent of all these varieties, or that, if this were not known, several of them would be ranked as distinct *genera*. In this instance we find forms admitted to be only "varieties" differing more than some "species," as much as some "genera." The inference is irresistible. What is actual in the case of the *Columba Livia* is possible, nay, is highly probable, in other cases. When modifications so great as these have been produced by human selection in two or three thousand years, why may not the slow but constant process of natural selection, acting through countless millions of centuries, have modified the descendants of some extinct form into types so distinct as to be now ranked as different species, or assigned to different genera or orders—nay, perhaps, even to different subdivisions of the animal or vegetable kingdom?

Before passing on to variation under nature, we must notice the distinction pointed out between man's selection and nature's. Man selects for his own benefit—nature, for the advantage of the race modified. When a peculiar 'breed,' selected and maintained by man for his own use, ceases to be useful, it perishes. The ancon sheep had disappeared completely a few years after the introduction of the merino, its peculiarity of structure then ceasing to be valuable. This well-known case is a striking instance of man's "methodical" selection, "unconscious" selection has improved the varieties of horses, dogs, and cattle; those individuals only being allowed to breed which are best of their kind, for the purpose for which they are maintained. But in both cases the good of the animal itself is not considered.

On the other hand, when a variation arises in nature, if it aid the individual in the struggle for existence, it is pre-

served and inherited by its offspring. If it be useless, it may or may not disappear. If it be injurious, the individual perishes. Such at least is the rule. Mr. Darwin lays great stress upon the fact that no modification will be preserved by nature for the benefit of other organisms, still less for the injury of the one modified. This principle, if true, destroys many of the "wonderful provisions of nature," which we read of in popular, and even in scientific works, on Natural History. The rattle-snake was not endowed with a peculiar conformation of the caudal vertebra in order that a warning might be given to his prey or to man to escape. On Mr. Darwin's theory the rattle, having arisen in the course of ages in an individual Ophidian, was, in some way unknown to us, directly favorable to its preservation in the struggle for life. Its offspring inherited the peculiarity, and by its aid gradually superseded its rattle-less congeners, and "improved them off the face of the earth."*

To take another instance. At a recent meeting of the British Association an account was read, of a certain minute lepidopterous parasite which subsists upon the waxy secretions from the surface of the Fulgora Candelaria. If we remember aright, this secretion was supposed to be a "provision of nature" for the benefit of the parasite. On the contrary, Nature provided the secretion for the advantage of the Fulgora—that is, some ancestor of the latter in whom it first appeared, gained by its means a superiority in the struggle for life, which, being beneficial, descended to its posterity. The Lepidopteron may be said to have taken advantage of what was never intended for its benefit.

Proceeding to "Variation under nature," which is more to the purpose than variation under domestication, our author expresses his opinion that the observation of naturalists has not been directed to this point, as much as its importance deserves. The detailed result of his own researches is not yet before the world. His conclusion from them is that,

"Certainly no clear line of demarcation has as yet been drawn between species and sub-species, that is, the forms which in the opinion of some naturalists come very near to, but do not quite arrive at the rank of species; or again between sub-species and well-marked varieties, or between lesser varieties and individual differences. These differences blend into each other in an insensible series: and a series impresses the mind with the idea of an actual passage." (p. 51.)

* We select the rattle-snake merely for illustration. The "rattle" may have been in itself useless, but correlated with some advantage.

Thus much must, we think, be conceded to Mr. Darwin's arguments on this point, necessarily destitute as they at present are of detail of supporting facts, that in very many cases it is impossible to decide whether a plant is a "variety" or a "species," and that botanists of great and equal celebrity are at issue upon the question. Mr. Darwin gives two examples which we will quote. The *Primula vulgaris* and *veris* "differ considerably in appearance; they have a different flavour and emit a different odour; they flower at slightly different periods; they grow in somewhat different stations; they ascend mountains to different heights; they have different geographical ranges; and lastly, according to very numerous experiments made during several years by that most careful observer, Gärtner, they can be crossed only with much difficulty. We could hardly wish for better evidence of the two forms being specially distinct. On the other hand they are united by many intermediate links, and it is very doubtful whether these links, are hybrids; and there is, as it seems to me, an overwhelming amount of experimental evidence, showing that they descend from common parents and consequently must be ranked as varieties."*

Again,—

"Look at the common oak, how closely it has been studied; yet a German author makes more than a dozen species out of forms which are very generally considered as varieties; and in this country the highest botanical authorities and practical men can be quoted to show that the sessile and pedunculated oaks are either good and distinct species, or mere varieties."

In the other division of organic nature :—

"How many of those birds and insects in North America and Europe, which differ very slightly from each other, have been ranked by one eminent naturalist as undoubted species, and by another as varieties, or, as they are often called, as geographical races!" (p. 48.)

It is, we think, quite true that hitherto systematic naturalists have been more anxious to see permanency in 'important' parts of animal or vegetable organization than variation. That it should be so is a natural *idolon tribûs*. There is, moreover, as Mr. Darwin points out, a latent fallacy involved in the assertion that "important parts do not vary." Parts are considered important, *because* they do *not* vary. This is admitted by some naturalists. It is obviously reasoning

* "Mr. Herbert has lately recorded the following experiment:—'I raised from the natural seed of one umbel of a highly manured red cowslip, a primrose, a cowslip, oxlips of the usual and other colours, &c.'"—*Lyell's Principles*, *p.* 590.

'in a circle' to argue against variation in nature on the ground that "important parts do not vary."

The analogies between species and varieties disclosed by study of organic nature, both in plants and animals, are close and remarkable. They show that species bear in many points the same relation to genera, as varieties to species. Some of these we shall indicate. Our space will not permit us to do more. First, then,—the *species* of plants which are richest in well-marked *varieties* belong to genera, including more than the average number of species. The same tendency to variation which originally caused certain genera to form numerous species continues to produce numerous varieties, *i.e.*, incipient species. Secondly, in large genera several species are found grouped round one to which they are more or less closely allied; in the same manner as a species forms several varieties more or less closely resembling it, and grouped around it. And thirdly, secondary sexual differences occurring in the same species are found in the same parts as those in which the species of the genus differ. For instance, in those Hymenopterous genera in which the neuration of the wings differs in the different species, it also differs in the sexes of the same species. These analogies are what we should anticipate if varieties and species are supposed not to differ essentially. It is difficult to account for them if each species is believed to have been separately created.

In the universal struggle for existence—the constant competition between different species of vegetables and animals, and in still greater degree between different individuals of the same species—the principle of natural selection comes into play.

"Owing to this struggle for existence, any variation, however slight, and from whatever cause arising, if it be in any degree profitable to an individual of any species in its infinitely complex relations to other organic beings and to external nature, will tend to the preservation of that individual, and will generally be inherited by its offspring." (p. 61.)

This competition has been ably handled by De Candolle and Lyell. We can see it going on around us on every side, if we will; but we are likely to overlook it, or to fail to realize the extent to which destruction of organisms is at every moment proceeding. Even Lamarck overlooked other causes of extinction than the efforts of man. This last is the most obvious cause, and we have seen it operating

in the extirpation even of whole races of our own species. But other causes not so patent, to superficial observation, are no less important or rather are much more effective, whether we consider the death of the individual or the extinction of the species. Scarcity of food on the one hand, or on the other, increase of number of enemies; climate, most frequently acting indirectly by favouring other species in competition; epidemics (if we may thus apply the term) are among these causes. But so complex and complete are the relations and interdependencies of different forms of life that "the causes which check the natural tendency of each species to increase in number are most obscure. Of what wonderful increase some species are capable, under unknown favorable circumstances, we see in the case of the wild horse in South America and Australia. The former example is the more remarkable, because extinct species have been discovered in the places where the modern species introduced by the Spaniards have, under changed conditions, multiplied to so prodigious an extent. In India numerous instances will occur to our botanical readers of plants which have spread through the whole peninsula since the discovery of America. The common prickly-pear was, we believe, introduced from the West Indies.

How great would be the increase of each species, were it not checked by competition with others, may be estimated by Mr. Darwin's calculation of the "probable minimum rate of natural increase" of the elephant. One pair of elephants —the slowest breeders known to the naturalist—would produce in five centuries fifteen millions of individuals. While all organized beings tend to increase in geometrical ratio—this tendency must be checked by destruction at some period of life, or the earth would be overstocked.

As an example of the interdependence of organic beings apparently the most unconnected, we would refer to p. 74, where Mr. Darwin shows it to be "quite credible that the presence of a feline animal in large numbers in a district might determine.....The frequency of certain flowers in that district. Other *actual* illustrations are given. We allude to this one in particular, because it has been found fault with as a merely theoretical instance, with the remark that 'one fact would have been preferable to any number of such credibilities. Facts are given too: but the logical sequence of one possibility to another in Mr. Darwin's illustration is perfect. It is a faultless zoological *sorites*.

We shall conclude our analysis of Mr. Darwin's third chapter—on the struggle for existence—with a short quotation :—

"In looking at nature it is most necessary.....never to forget that every single organic being around us may be said to be striving to the utmost to increase in numbers ; that each lives by a struggle at some period of its life ; that heavy destruction inevitably falls either on the young or old, during each generation or at recurrent intervals. Lighten any check, mitigate the destruction ever so little, and the number of species will almost instantaneously increase to any amount." (p. 66.)

"The preservation of favourable variations and the rejection of injurious variations," is Mr. Darwin's definition of Natural Selection. It differs as we before observed from man's selection, in its end. Nature can only operate for the advantage of the being; man selects for his own benefit. Nature's power of modifying by selection is immensely greater than man's, chiefly from having more time at her disposal.

Domestication would seem to have the effect of rendering the whole organization more plastic. The change of conditions involved in domestication causes or increases variability, by acting through the reproductive system. We can only state these conclusions of Mr. Darwin's and some others, which require investigation and deserve attention. Some of his opinions on hermaphroditism, and comparative fertility of crosses in plants, are curious and striking. Few of our readers, we fear, will have leisure or opportunities for examining for themselves into the correctness of his conclusions ; but even to amateur naturalists they will be interesting.

Hermaphrodites have been usually considered as divisible into two classes—true and spurious. The latter are incapable of self-impregnation ; and the congress of two individuals, mutually impregnating each other, is necessary to reproduction. The common land-snails are an example familiar to all. The true hermaphrodites, on the other hand, *are* capable of self-impregnation, and habitually produce without the aid of a second individual. The oyster is an example. The number of true hermaphrodites has been much diminished of late years, more accurate research having shown that many species supposed to reproduce without copulation, do require the sexual congress of two individuals. Mr. Darwin sees reason to believe that "no organic being self-fertilises itself for an eternity of generations;" that "a cross with another individual is occasionally—perhaps at

long intervals—indispensable." The difficulty, if not impossibility, of demonstrating the truth of this opinion in the case of animals is obvious. It would require separate proof in each individual instance; and where, as in aquatic molluscs, impregnation by a second individual would be effected by the diffusion of the seminal element through the water, the difficulty of proving by observation or experiment that such impregnation either did or did not occur, is plainly almost insuperable. But in no known case of hermaphrodite animals are the organs of reproduction so placed, that impregnation from without is physically impossible. One such case would, of course, be fatal to Mr. Darwin's supposition. On the other hand, he has been able to prove that two individual cirripedes, generally self-fertilising, do sometimes cross.

In support of the supposition that "with all hermaphrodites two individuals, either occasionally or habitually, concur for the reproduction of their kind," a large number of facts have been collected by Mr. Darwin which show that, in both animal and vegetable kingdoms, a cross between different varieties, or different 'strains' of the same variety "gives vigour and fertility to the offspring: while close interbreeding diminishes them."* It seems a fair inference from these propositions that continual self-fertilisation would be injurious, and occasional crossing by another individual beneficial, if not essential. In the case of plants, which are mostly hermaphrodite, it seems established that pollen of a distinct *variety* is prepotent over a flower's own, for impregnation; while the latter is prepotent over that of another species.

How are we to account for divergence of character? How do the minor differences between varieties, (or 'incipient species,') become developed into the greater differences which confessedly exist between fully-established species? Natural selection can only act for the advantage of the being on which it acts. Is the development of a less into

* In relation to the human species this subject has not been studied with sufficient attention except in the United States; nor are the facts established sufficiently influential upon practice. A recent analysis of the immates of the charitable institutions of the United States, shows that 10 *per cent.* of the deaf and dumb, 5 *per cent.* of the blind, and 15 *per cent.* of the idiots, are the offspring of first cousins. Accordingly, such unions are, we believe, prohibited in Kentucky. Another return shows (if we remember rightly—we are unable to refer to it), that of 31 children of brothers and sisters, or parent and offspring, 29 were deformed or idiotic or both.

a greater degree of diversity beneficial to the race of animal or plant? Otherwise the principle of natural selection will not explain it.

"Take the case of a carnivorous quadruped, of which the number that can be supported in any country has long ago arrived at its full average. If its natural power of increase be allowed to act, it can succeed in increasing only by its varying descendants seizing on places at present occupied by other animals; some of them for instance being enabled to feed on new kinds of prey, either dead or alive; some inhabiting new stations.....and some perhaps becoming less carnivorous. The more diversified in habits and structure the descendants of our carnivorous animals become, the more places they will be enabled to occupy. What applies to one animal will apply throughout all time to all animals." (p. 113.)

In plants, too, diversity is favorable. Those which succeed best in a new country are *not* those most nearly allied to the original inhabitants, but in most cases *generically* distinct. Since then, this distinctness has proved favorable to the strangers, equal diversification would have been profitable to the indigenes, if it had occurred.

"In the general economy of any land, the more widely and perfectly the animals and plants are diversified for different habits of life, so will a greater number of individuals be capable of their supporting themselves."

Of the laws of variation scarcely anything can be said. Why animals and plants should vary, or why they should vary in one part or organ more than in another, we cannot tell. We have seen that Mr. Darwin attributes little direct influence in producing variation, to change of climate and conditions of life; while allowing that by the indirect action of these on the reproductive system, variability is considerably increased. This influence is more potent in the vegetable than in the animal kingdom. Disuse is in some cases a powerful cause of variation. Several interesting examples are given. We shall notice but one—the cave-animals of Styria and Kentucky.

As it is inconceivable that the possession of eyes or sight should be *injurious* to the animals inhabiting these caves, Mr. Darwin attributes their absence to disuse. He supposes certain animals with normal optical powers to have gradually migrated, in the course of generations into the caves, from the neighbouring country. The farther from the light of day they penetrated, the less necessary eyes became—and the less they were used, until in the deepest parts of the cavern

they were no longer developed. The transition is now observable—the powers of vision are proportional to the amount of light—that is, to the distance from the mouths of the caves. The affinities of these cave-animals to the ordinary inhabitants of the neighbourhoods, both in Europe and America, seem to show that the caves were, as our author supposes, peopled by immigration from the surrounding country, not by creation of forms especially suited to lightless life : while the latter hypothesis is also opposed by the fact that the inhabitants of the two sets of caves, similar in geological conditions and placed in nearly similar climates are not more closely allied in organization than the non-subterranean inhabitants of the two countries. On the theory of special creation to suit special conditions, we should expect closely similar forms in Europe and America, under conditions so closely alike as those found in these two sets of caves.

One other important principle only, can we notice in the chapter devoted to Laws of Variation. Mr. Darwin defines "Correlation of growth" to be such combination and interdependence between different parts of an organization "that when slight variations in any one part occur, and are accumulated through natural selection, other parts become modified." (p. 143.) The examples given here and elsewhere will illustrate the principle. Thus "modifications accumulated solely for the good of the young or larvæ will, it may safely be concluded, affect the structure of the adult." Draught cattle in Africa and dogs in Northern Asia and America are matched by color by the savages; that is, qualities of speed, strength or endurance are correlated with certain colors. Cats with blue eyes are invariably deaf, and the tortoise-shell color invariably correlated with the female sex. White sheep and pigs are differently affected from colored individuals by certain vegetable poisons. Hairless dogs often have imperfect teeth, (but this case may be explained by homology.) Other instances will occur to our readers, in which certain formations or peculiarities are invariably or generally asssociated with others, without our being able to assign to the phenomena any common cause, or connexion of cause and effect. The correlation of true ruminancy with cloven hoofs is an obvious example.

To the members of our profession the study of morbid correlations is most important. With many such we are all

familiar, and in the majority of cases, perhaps, our knowledge is empirical—we can give no reason for connexions which we perceive to exist either constantly or generally. The association of a certain well-known "aspect," with malignant disease—of certain physical appearances with the strumous diathesis—of bronzed skin with disease of the supra-renal capsules—are familiar instances. Many others could be adduced, in which the common cause of the correlated phenomena or their relation as cause and effect is hidden from us, or but obscurely known. The knowledge of the correlation is not, however, on this account the less important in our practice.

Our object in the foregoing pages has been, to give those of our readers whose tastes or pursuits prevent their perusal of Mr. Darwin's work, a sketch of the arguments, by which he believes he proves that "varieties are incipient species"—that the ancestors of all species—all genera—even all orders—were at some early period merely varieties. We now come to the second division of the argument—the answering of objections. We must remind our readers that the question at issue between our author and those who hold the immutability of species and the separate creation of each, is a contest of probabilities. Our view is a "theory" as much as the other. To both there are objections. 'There are objections to a *plenum*, and objections to a *vacuum*, but one of them must be true.' We cannot expect *demonstration* on either side. "To us," says Bishop Butler, "probability is the very guide of life." It must be our guide in determining which of the two theories in question is to be received by naturalists.

Mr. Darwin is as conscious of the magnitude of the difficulties opposing the reception of his theory as any one can be. "Some of them," he says, "are so grave that to this day I can never reflect on them without being staggered; but," he adds cheerfully, "to the best of my judgment, the greater number are only apparent, and those that are real are not, I think, fatal to my theory." Our limits will allow us to notice but three objections – the absence of transitional forms in nature—the more exquisite instincts—and the phenomena of hybridity.

"Why, if species have descended from other species by insensibly fine gradations, do we not every where see innumerable transitional forms?" Mr. Darwin's answer is briefly this. New forms become permanent only because of their

superiority in some way to others. In the struggle for existence they overcome the inferior forms. 'Extinction and natural selection go hand in hand.'

But these intermediate forms have at one time existed, though they perished in the contest with superior organisms. Why do we not find them in the fossil state? Mr. Darwin replies, because of the imperfection of the geological record: and his ninth chapter is devoted to the working out in detail of this reply.

Whether the avowed imperfection of the geological record is sufficiently great to account for the rarity of transitional forms in our collections of fossils, we cannot pretend to determine. No geologist can fail to be conscious of the fact, that the geological record is imperfect to a very high degree. While every day adds new fossil forms to our Museums—and forms which are frequently 'transitional' between fossils previously known, we cannot but feel how few are the extinct species of which we possess specimens, in comparison with the lapse of geological time. When we consider the complex conditions which must be fulfilled—as enumerated by Lyell or any systematic geologist—in order that any bone or shell of a dead animal may be preserved in a formation and become a "fossil," we cannot but feel that few forms indeed have been preserved, compared with the countless numbers that have existed. And when we reflect upon how little of the earth's crust has been thoroughly examined, we must admit that the fossils we now possess are few indeed compared with those which still lie buried in the strata.* Keeping these facts in mind we shall not be surprised on comparing complaints of the 'imperfection of the geological record' with our lists of fossil forms or the collections in our museums. We shall rather wonder that so many transitional forms have been preserved and discovered by man. We shall look upon Professor Owen's success in connecting the ruminants and pachyderms into one group by fossil gradational links as a result of palæntological research not to have been anticipated. We shall perhaps admit that Mr. Darwin partially removes the objection we have stated above, by his *argumentum ad ignorantiam.* We must allow the possibility that as our geological researches proceed, more of the transitional links will

* One of these conditions we must mention, for Mr. Darwin lays great stress upon it. Fossils can only be found in deposits formed *during subsidence.* While a sea-bottom is stationary or rising none will be preserved.

be discovered. But before leaving this subject we must not omit to state what are the links to be expected on Mr. Darwin's theory. They are not forms transitional between two contemporaneous species, but between each of these and a common ancestor, except in the rare case where an organic form and its modified descendant have continued to co-exist.

This is important to bear in mind when comparing the fossils we possess with what Mr. Darwin's theory should lead us to expect.

We have not space to notice the answer to another objection connected with the foregoing. 'Why do we not see the intermediate forms in the stage before extinction?' The reply is ingenious at least if not perfectly satisfactory.

Can we conceive instinct to have reached the state of (almost) perfection which we observe in the hive-bee, for instance, by the process of gradual improvement by natural selection? The seventh chapter contains our author's answer. We regret that we can only give a meagre sketch of it.

Firstly, instincts have, with a few obvious exceptions, been little observed; but in those which have been studied *gradations* exist. Three examples of such gradations are given. The peculiarity in the reproduction of the cuckoo, the slave making instinct of some species of ants, and the formation of the comb by bees, are shown to exhibit distinct gradations of excellence. Secondly, of the instincts of extinct species we can from the nature of things know nothing. We cannot therefore trace the progressive steps of Natural Selection from ancestors in a remote antiquity, as we can to some extent, in the case of physical organization.

"One special difficulty remains which at first appeared insuperable and actually fatal" to the theory—the case of the sterile females in insect communities; "for these neuters often differ widely in instinct and in structure from both the males and fertile females, and yet, from being sterile they cannot propagate their kind." (p. 236.)

Mr. Darwin supposes the peculiar instincts of the sterile females to have become "correlated" with sterility, ascertain forms of the horns of *oxen*, or the barren head of the cauliflower. Natural selection may act upon the family in which neuters have appeared, though it cannot apply to these sterile individuals themselves. In neuters, too, we do find *gradations*—in the same species, in the same family or

nest. The case would seem, as Mr. Darwin observes, a fatal objection to the development theory of Lamarck.

In the view hitherto generally entertained by naturalists, species intercrossed are sterile, or their offspring functionally imperfect and incapable of propagation; and varieties intercrossed are fertile—themselves and their offspring.* If there is no essential difference between species and varieties why should this be so? Have not intercrossing species been "specially endowed with sterility in order to prevent the confusion of all organic forms?"

Mr. Darwin freely admits the general fact that species are sterile and varieties fertile when intercrossed; and that a broad distinction is thus made between species and variety. That the rule is universal he denies—and points out the *petitio principii* of which they are guilty who maintain its universality. When animals or plants interbreeding are sterile, they class them as different species *because* they are sterile. He believes that the sterility both of first crosses and of hybrid offspring is simply incidental, or dependent on unknown differences, chiefly in the reproductive systems, of the species which are crossed. The analogy between hybridism and grafting is very close.

"In the same manner as in grafting trees the capacity of one species or variety to take on another, is incidental on known differences in their vegetative systems, so in crossing, the greater or less facility of one species to unite with another is incidendal on unknown differences in their reproductive systems. There is no more reason to think that species have been specially endowed with various degrees of sterility to prevent them crossing and blending in nature, than to think that trees have been especially endowed with various and somewhat analogous degrees of difficulty in being grafted together in order to prevent their becoming inarched in our forests." (p. 276.)

If then, the sterility of species intercrossing, or incapacity of their offspring for reproduction be not essential, but incidental; dependent not upon the fact that they are "species," but upon unknown laws and causes,—the phenomena of hybridism form no objection to the theory that varieties and species are not *essentially* distinct.

Again, if sterility were an "essential difference" of hybrids —as contradistinguished to mongrels—we should expect that it would be absolute and complete, or at least constant

* John Hunter believed the test of 'species' to be incapacity for propagation or for producing fertile offspring.

in degree. It certainly is not so. Neither are hybrids—in either kingdom—invariably sterile, nor mongrels invariably fertile. Some undoubted species produce fertile offspring. Some no less undoubted varieties will *not* produce when crossed. The sterility of hybrids graduates, from causes unknown to us, and confined to the reproductive system. The fertility of reciprocal crosses often differs in degree. Some hybrid plants are *perfectly* fertile—nay, some plants can be more easily fertilised by the pollen of a different species. The primrose and cowslip, believed on good grounds to be varieties, have been repeatedly crossed without result. In animals experiments are less easily made than with plants; one reason being that few will breed freely in confinement. As far as is known, hybrids between widely separated species can be more easily made in animals than in plants, but the hybrid animals are more sterile. The latter result may probably be due in a great measure to the close interbreeding which the limited nature of such experiments necessitates. It would seem that the sterility of first crosses is general, but *not* universal. Mr. Darwin enumerates several exceptions. Since the appearance of his work it has been stated that an enterprising Frenchman has established a perfectly fertile hybrid breed between hares and rabbits, which he calls *Leporides*. Those two species differ so widely in structure and habits that the case, if authentic, is a remarkable illustration of the proposition, that sterility or fertility gives no clear distinction between species and varieties.

Finally, "in all other respects, excluding fertility, there is a close general resemblance between hybrids and mongrels." They agree in very many important particulars. They differ in but few.

We have but little space left in which even to enumerate some of the facts which are more consistent with Mr. Darwin's theory, than with the separate creation of each species, existent or extinct.

In the tenth chapter certain facts of geological succession of species are shown to be easily explicable on this theory. For instance, a species never re-appears. Why should it not, if each has been separately created? If similar external conditions recur, why should not the extinct species be re-created to suit them? On Mr. Darwin's theory a species *could not* re-appear. Even if a new species exactly filled the place of an extinct predecessor, it could not be the same. It has descended from different progenitors and

will have inherited from them some characters which the extinct organism did not possess.

Again, all forms, existent and extinct, make up one great system, *because* all are counted together by generation. To say that this is so "to complete the scheme of nature," or "for the sake of symmetry is," as Mr. Darwin elsewhere remarks, merely a re-statement of the fact.

Finally, the succession of the same types within the same areas, during the later tertiary periods, is evidently not due to climate or other external conditions, and therefore is not the result of special creation adapted to such conditions. We find on the one hand, in parts of Australia and South America, of the same latitude, and differing little in physical conditions—in the former the Marsupial type, in the latter Edentata. On the other hand we find, in both those countries, these types continued through tertiary and existing periods, during which physical conditions were so dissimilar.

And in the geographical distribution of plants and animals, we see numerous facts readily explicable on the theory of descent, with modification, by natural selection: facts which cannot be accounted for by difference of climatal or other physical conditions. Where "barriers" exist preventing dispersal of any animal or vegetable form, there we find distinct Faunæ or Floræ, or both. In the same latitude in Africa, Australia, and South America, the faunæ are widely different. The marine inhabitants of the Atlantic and Pacific Oceans at the Isthmus of Panama are remarkably dissimilar; and in a less degree differences are found in two parts of a continent divided by a chain of mountains or other barrier. Where no barriers exist there is, on the contrary, a marked affinity between the inhabitants of the same sea or land, in parts however distant.

Oceanic Islands—situated 300 miles or more from a mainland—are destitute of Batrachian reptiles and terrestrial mammals. We can understand this if we believe these islands to have been stocked with inhabitants from the nearest mainland. If they were stocked by special creation, we cannot. Cheiroptera *are* found in such islands; and in New Zealand two species peculiar to itself—modified descendants of original immigrants from another land. On the other hand, the other inhabitants of these Oceanic Islands are closely allied to those of the nearest mainland. The species are different, but the genera are the same. Such affinity

exists between the Galapagos and South America, between the Cape de Verd Islands and Africa. Can we understand these facts in the view of special creation? Do they not coincide with the view of descent with modification?

Before leaving the subject of geographical distribution, we would call special attention to Mr. Darwin's experiments and observations, upon the means of dispersal of animals and plants; especially with reference to the glacial period. Ably as this matter has been treated by Lyell in his "Principles of Geology," we look forward to Mr. Darwin's complete work as likely to throw a flood of new light upon an obscure subject.

The phenomena summed up in the expression "unity of type"—the existence of homologous organs in organizations widely different, as the anterior extremity, for instance, as variously modified in man, in the mole, and in the bat—are easy of explanation on the theory of descent. "Final causes" or "utility" are powerless to explain them, or the kindred homologies in the individual, as of the bones of the skull to the extremities. As Professor Owen pointed out, the explanation of the composite structure of the mammalian skull on the ground of its facilitating parturition, will not apply to similar construction in the other classes of vertebrata. The principle of homology explains these phenomena, and is itself inexplicable on the theory of independent creation of each specific form.

Neither will this theory explain the resemblance found between the embryos of the different classes of vertebrata, and between larvæ which may be considered active embryos. Modification by natural selection explains this resemblance; as well as others, such as appearances in early life of characters belonging to allied species or genera—the stripes of the young lion, the plumage of young birds. The modification which first constituted the variety afterwards developed into species, will be inherited sometimes at an age corresponding to that at which it originally supervened. The embryo will be unmodified. "Community in embryonic structure reveals community of descent."

Finally, how will the theory of independent creation of each specific form account for the presence of "rudimentary" parts or organs?—the teeth of young cetacea, the upper incisors of young ruminants, the wings beneath the soldered elytra of some coleoptera, the pelvis and lower extremities of some ophidia or their imperfect lung, and count-

less other instances with which the most superficial observer of nature must be familiar. As these parts are useless to the animal or plant, they cannot be the result of natural selection. They must be due to inheritance. It is difficult to believe that a physiologist could gravely state that the object of "nature" in producing these rudimentary parts was to excrete certain matters which were in excess in the organism. But this explanation is not more unreasonable than reference to "symmetry" or "completion of the scheme of nature." Can any one doubt whether to accept these explanations, or that offered by our author—"the presence of rudimentary organs is due to the tendency in every part of the organization to be inherited."

And thus it is that rudimentary parts have been found so useful in classification. They "may be compared with the letters in a word, still retained in the spelling, but become useless in pronunciation, but which serve as a clue in seeking for its derivation." (p. 456.)

The conclusion at which Mr. Darwin arrives is briefly this. "I believe that animals have descended from at most only four or five progenitors, and plants from an equal or lesser number." He considers his theory of 'descent with modification' to be applicable to 'all the members of the same class.' The numbers of progenitors which he assigns to each kingdom of animated nature, obviously correspond to those of the great classes into which each is primarily divided.

But Mr. Darwin is evidently not content with this degree of simplification, though he feels that his premises will not justify him in carrying it further. 'Analogy' would lead him one step further, he says,—to believe, namely, that "all the organic beings which have ever lived on this earth have descended from some one primordial form, into which life was first breathed by the Creator." (p. 484.) We must avow our hearty concurrence with our author's admission that "analogy may be a deceitful guide." There is nothing in Mr. Darwin's facts or arguments, or in the teachings of philosophy or science which could induce us to follow "analogy" in such a lead. We cannot even admit that any tenable analogy would lead to such a conclusion.

We are far from underrating a logical weapon which has been used with such powerful effect in the cause of 'Religion, Natural and Revealed,' by the greatest metaphysician England has produced. If we admit that any existing

"species" have had their origin in variation, (and naturalists who would shrink from adopting Mr. Darwin's conclusions do now admit this in many instances,) analogy may justly lead us to extend the powers of variation to other cases differing from those only in *degree*. But when the difference between two forms is one of *kind*, analogy is a "deceitful guide." When Professor Owen can show the camel and the pig to be connected by intermediate links, we find no difficulty in inferring by analogy that similar connecting forms may yet be discovered—or, if not discovered, may nevertheless have existed—between organisms as widely separated as they. If we concede to Mr. Darwin that variation, natural selection, and the struggle for existence have had power to develope by slow degrees, in the lapse of countless ages, the rude spherical receptacles for larvæ and honey of the humble bee, into the mathematically perfect hexagonal cell of the *Apis-mellifica*, we may follow analogy to infer that the low intellectual power of the rodent, might have been improved into the rationality of the dog, or of the 'half-reasoning' (but over-rated) elephant. But it appears to us that even were it certain that the Articulata or the Mollusca, the Acrogens or the Endogens were each descended from one pair of progenitors, or from one individual—even on this supposition, analogy would altogether fail to give any ground for concluding that variation and natural selection could bridge over the chasm between the animal and the plant; or effect the development of the gorilla into man.* In the latter case especially, there are, we maintain, differences *in kind*, which nothing less than a fresh act of creative, or at least of modifying energy could have overcome. In this case there is a

tali dignus vindice nodus—
'a God must intervene.'

Mr. Darwin attributes the prevailing belief in the immutability of species, to the difficulty of grasping in the mind the enormous lapse of years which the other theory requires, and the unwillingness to believe in the existence of the intermediate links which are not, and in most cases cannot be seen. The former cause operated against the immediate and general reception of the views put forward by Sir Charles Lyell in his great work the "Principles of Geology."

* Our readers will remember that on Mr. Darwin's theory, the gorilla would not be "undeveloped man," but it and the human species would be divergent descendants of an extinct common ancestor.

We cannot but think that the principal objection to Mr. Darwin's views is different from these. It is an objection neither to his facts nor to his arguments, but to his conclusions—real or supposed. We are persuaded that his theory would be gladly received both by naturalists and by all others, if it did not seem to involve the opinion that there is no essential difference between Man and the Quadrumana. The popular answer to all theories of "development" of animal and vegetable life has ever been—is still—'Do you believe men to be descended from apes?'* This is supposed to be an irrefutable *reductio ad absurdum.* It is not so. It is no answer to facts and arguments: or it is at best an answer which may not be unseemly in the mouths of the uneducated, but which philosophers and men of science should be ashamed to put forward. The object of their pursuit is TRUTH. Their instruments are the reasoning powers which their Creator has given to them. Their task is to examine facts and combat arguments, not to examine conclusions only, and reject them if inconsistent with their preconceived opinions. Were it inevitably involved in Mr. Darwin's theory that men were originally apes, it were not the less the duty of the educated to study his reasonings. No doubt some do so—but we fear most men will not.

We believe, however, that Mr. Darwin's theory does not necessarily involve the much dreaded consequence. Whatever his own views on the question may be, we cannot admit that his premises warrant the conclusion that the abyss which divides the highest quadrumane from the lowest savage could ever have been bridged without the intervention of Creative Power. We doubt even the reduction of animals to so few as "four or five" ancestors or pairs of ancestors. If we be asked, where the powers of natural selection are to stop? how many origins of animal organizations are to be supposed? We can only answer that we do not know: that while there seems good reason to believe that very many species and genera have commenced existence as varieties of some pre-existing form, we see no reason to con-

* We have seen an anecdote very lately in the newspapers which illustrates what we have been saying. At a recent meeting of men of science (and others) a certain Bishop met Professor Huxley's defence of Mr Darwin's theory with the usual question, 'Do you believe that you are descended from an ape?' The answer is said to have been, 'I should rather have apes for ancestors than men who refuse to receive truths opposed to their preconceived ideas.'

clude that *all* have so sprung; no reason, either in the nature of things or in the arguments adduced, for limiting the exercise of Creative Power to one, or 'four or five,' or any number of exertions. No doubt the Deity does display in his works something analogous to economy; but we know not, and probably never can know in our present state of existence, how far this principle has entered into the plan of creation of organisms. While we may deem it probable that the diversified forms of animal and plant which we see around us have, in the great plan of creation, sprung from comparatively a few primeval forms, we shall never be able more than dimly to guess at the number of those centres of life. We have, as it seems to us, no ground whatever of analogy or other, for believing that that number was a simple unit.

Mr. Darwin does not assert his belief that the animal and the vegetable worlds are connected by common descent from one primeval ancestor; nor that the "four or five" great classes of the former or the similar or less number of divisions of the latter are so related amongst themselves. He merely hints that "analogy" might lead him to such inferences. We have already stated our opinion that neither his arguments, nor analogy, nor the dim knowledge our feeble minds possess of the Divine plan of the Universe, warrant any such conclusions.

But Mr. Darwin does derive all vertebrata—man of course included—from one pair of ancestors.* Conceding what he quotes from "a celebrated author and divine," that 'it is just as noble a conception of the Deity to believe that He created a few original forms capable of self-development into other and needful forms, as to believe that He required a fresh act of creation to supply the voids caused by the action of His laws'—granting that the facts of homology and embryology, the existence of rudimentary and representative parts and organs, and analogy, give *at least* plausibility to the view that man's corporeal part was derived without fresh exertion of creative energy from some pre-existing organism, not 'human'—admitting so far, can we believe that Man as a whole, including body, mind, and spirit, is a spontaneous development from a lower form? We have no hesitation in answering, No. Man's body and man's passions

* Or one ancestor. Dr. Dufosse seems to have proved by numerous dissections (Annales des Sciences Naturelles) that the Terranus (Perch,) is hermaphrodite.

and some of his emotions—even many of his intellectual powers—may be developments of analogous body, passions, emotions, and faculties of previous and lower organisms. But when "God breathed into his nostrils the breath of life"—life in its truest, highest meaning—"and man became a living soul," a fresh outburst of Creative energy conferred upon some pre-existing, highly organized but unspiritual, form, "the dust of the earth"—qualities and powers *essentially* different from any before possessed on earth, and unattainable without Divine interposition.

It would, we think, be interesting to examine comparatively the intellectual faculties of man and the most highly advanced in mental power of the lower animals. It is impossible to deny "Reason" to these—unless indeed, we define reason to be "those intellectual powers exclusively in which man differs from brutes."* But even the lowest savage enjoys mental powers of which not only is the highest brute destitute, but which we cannot conceive the latter capable of attaining—the germ of which our closest study cannot detect. We have not space to point these out.

But higher, holier far than these are the endowments which pre-eminently characterise Man. The Moral Sense, and the feeling of dependence upon a higher Being—the capacity for Religion—Natural and Revealed, are peculiar to Man and common to every Race. The gift of these and Immortality constituted the creation of Man. These gave him "dominion over the fish of the sea, and over the fowl of the air, and over every living thing that moveth upon the earth." By these some high, but still brutal, organism was transmuted into the "Image of God."

And can we not still trace in the complex being Man his double origin?—

> "How poor, how rich, how abject, how august,
> How complicate, how wonderful, is man!
> How passing wonder He who made him such!
> Who centred in our make such strange extremes
> From different natures marvellously mixed,
> Connexion exquisite of distant worlds!
> Distinguish'd link in being's endless chain!
> Midway from nothing to the Deity!
> A beam etherial, sullied and absorbed!
> Though sullied and dishonour'd, still divine!
> Dim miniature of greatness absolute!
> An heir of glory! A frail child of dust!
> Helpless immortal! insect infinite!
> A worm! A god!"

* Whateley's Logic—*Appendix.*