

how many a hapless soul has writhed in agony within thy coils, till merciful, though terrible Ragnarök has broken the spell, and given to the weary rest ; and to the troubled, peace!

We can sympathise with Mr. Owen in his hopes and aspirations, even when we cannot share them, we respect his talents, we honour his candour and his fairness, and look upon his work as a most creditable feat of authorship; but for all that, we feel compelled to assert that, in everything essential, it is a mischievous, though honest book, and that its argument, however ingenious, always breaks down at the critical point, and finally eventuates in simple dreams. It is merely an effort to prove that Gleipnir is not Gleipnir, but that the invisible may be seen, and the inaudible heard, and the intangible touched, and that there *are* roots to stones, and that cats *do* make a noise when they run, and that the cheek of beauty, when fairest and smoothest, is nevertheless oppressed with the honours of a beard.

But we, whose senses are too dull to catch these echoes from another world, and whose vision is too dim for that light which plays on the ethereal subtleness of Hadaic shades, must be content to grope along in the silence and darkness of our ignorance, and mourn, with perverted minds, over the happy fate of one who rejoices in the freedom of his chain, and only hopes that Ragnarök will bind it all the tighter.

PROFESSOR AGASSIZ ON DARWINISM AND THE ORIGIN OF SPECIES.

—o—

THE issue raised by Mr. Darwin's book is now exciting attention on the other side of the Atlantic, and the July number of *Silliman's Journal* has no less than two articles on the subject—one an extract from a forthcoming volume by Professor Agassiz, and another from the pen of Professor Parsons, of Harvard University. The extract from Agassiz is from the third volume of his *Contributions to the Natural History of the United States*, now in the press (July), by far the most important argument we have yet read upon this controversy.

We have spoken sufficiently on this subject already, to render superfluous any remarks of our own on the general bearings of the question, our object now is the pleasanter task of directing attention to the manner in which these have been handled by one of the most distinguished naturalists and Palæontologists of the age, and one, too, whose peculiar studies, as well as powerful mind, have eminently fitted him for speaking on such a subject with all the authority which reason and science can concede to individual opinion.

Professor Agassiz commences by calling attention to the crude notions, prevalent among naturalists a few years back, relative to the artificial character of generic, classic, and other higher groupings, as con-

trasted with the naturalness of specific distinctions, and believes, and no doubt justly, that his own efforts may have had something to do with the altered state of opinion on the point. Still much must also be due to the general pressure from without, for so absurdly preposterous a distinction could never be clearly presented to any man of enlarged mind, without being instantly met with ridicule and exposure. We feel a sort of shame in seeing a man like Professor Agassiz seriously arguing against such a puerility, and yet this puerility has been accepted and believed in by scientific men, as far as the term belief is applicable to a mere mystification of thought and language. After stating the fact in question, M. Agassiz thus continues :—

“ Darwin in his recent work on the ‘Origin of Species,’ has also done much to shake the belief in the real existence of species, but the views he advocates are entirely at variance with those I have attempted to establish. For many years past, I have lost no opportunity of urging the idea that while species have no material existence, they yet exist as categories of thought, in the same way as genera, families, orders, classes, and branches of the animal kingdom. Darwin's fundamental idea, on the contrary, is that species, genera, families, orders, classes, and any other kind of more or less comprehensive divisions among animals, do not exist at all, and are altogether artificial, differing from one another only in degree, all having originated from a successive differentiation of a primordial organic form, undergoing successively such changes as would at first produce a variety of species ; then genera, as the difference became more extensive and deeper ; then families, as the gap widened still farther between the groups, until, in the end, all that diversity was produced which has existed or exists now. Far from agreeing with these views, I have, on the contrary, taken the ground that all the natural divisions in the animal kingdom are primarily distinct, founded upon different categories of characters, and that all exist in the same way—that is, as categories of thought, embodied in individual living forms. I have attempted to show that branches in the animal kingdom are founded upon different plans of structures, and for that very reason have embraced, from the beginning, representatives between which there could be no community of origin ; that classes are founded upon different modes of execution of these plans, and, therefore, they also embrace representatives which could have no community of origin ; that orders represent the different degrees of complication, in the mode of execution of each class, and, therefore, embrace representatives which could not have a community of origin any more than the members of different classes or branches ; that families are founded on different patterns of form, and embrace representa-

tives, equally independent in their origin; that genera are founded upon ultimate peculiarities of structure, embracing representatives which, from the very nature of their peculiarities, could have no community of origin; and that finally, species are based upon relations and proportions that exclude as much as all the preceding distinctions the idea of a common descent.

"As the community of characters among the beings belonging to these different categories, arises from the intellectual connection which shows them to be categories of thought, they cannot be the result of a gradual material differentiation of the objects themselves. The argument on which these views are founded may be summed up in the following few words:—Species, genera, families, &c., exist as thoughts, individuals as facts. It is presented at full length in the first volume of this work (pp. 137—168), where I have shown that individuals alone have a definite material existence, and that they are, for the time being, the bearers, not only of specific characteristics, but of all the natural features in which animal life is displayed in all its diversity; individuality being, in fact, the great mystery of organic life."

With a single reservation, we see no difficulty in giving a cordial assent to these views, and that reservation concerns the amount of rigidity which must be allowed to this exclusion of a common descent. To this point converge all the difficulties of clear thinkers, on this most difficult of questions. We agree, to the fullest extent, with Professor Agassiz, in recognising the necessity of plan and forethought, in all that is orderly in the phenomena of organic life; but it has also to be borne in mind that, as these phenomena do not depend on the direct and immediate interference of creative power, but on pre-arranged mechanism, we have still to consider what may be the amount of harmonious change inherent in the plan of this mechanism, and in each of its individual lines of development. Granted that all lines have separate origins, still we have to consider whether the individual elements of a line may not be required to exhibit a progression in development, which shall leave their older forms far inferior to their newer. Otherwise, how shall we account for progress without change of genealogy or type? But we must hear Professor Agassiz further, before we attempt any criticism of his views:—

"It seems to me," he continues, "that there is much confusion of ideas in the general statement of the variability of species, so often repeated lately. If species do not exist at all, as the supporters of the transmutation theory maintain, how can they vary? And if individuals alone exist, how can the differences which may be observed among them, prove the variability of species? The fact seems to me to be, that while species are based upon definite

relations among individuals which differ in various ways among themselves, each individual, as a distinct being, has a definite course to run from the time of its first formation, to the end of its existence, during which it never loses its identity, nor changes its individuality, nor its relations to other individuals belonging to the same species, but preserves all the categories of relationship which constitute specific, or generic, or family affinity, or any other kind or degree of affinity. *To prove that species vary, it should be proved that individuals born from common ancestors, change the different categories of relationship which they bore primitively to one another.* While all that has thus far been shown is, that there exists a considerable difference among individuals of one and the same species. This may be new to those who have looked upon every individual picked up at random, as affording the means of describing satisfactorily any species; but no naturalist who has studied carefully any of the species now best known, can have failed to perceive that it requires extensive series of specimens accurately to describe a species, and that the more complete such series are the more precise appear the limits which separate species. Surely the aim of science cannot be to furnish amateur zoologists or collectors with a *recipe* for a ready identification of any chance specimen that may fall into their hands. And the difficulties with which we may meet in attempting to characterise species, do not afford the least indication that species do not exist at all, as long as most of them can be distinguished as such, almost at first sight.....

"Had Mr. Darwin, or his followers, furnished a single fact to show that individuals change, in the course of time, in such a manner as to produce at last species different from those known before, the state of the case might be different. But it stands recorded now, as before, that the animals known to the ancients are still in existence, exhibiting to this day the characteristics they exhibited of old. The geological record, even with all its imperfections, exaggerated to distortion, tells now, what it has told from the beginning, that the supposed intermediate forms between the species of different geological periods are imaginary beings, called up merely in support of a fanciful theory. The origin of all the diversity among living beings remains a mystery, as totally unexplained as if the book of Mr. Darwin had never been written, for no theory unsupported by fact, however plausible it may appear, can be admitted in science."

The following passages are so eloquent and so important, that we must give them entire. Our only regret indeed is, that our limits necessitate any curtailment of so interesting an argument:—

"It seems generally admitted that the work of Darwin is particularly remarkable for the fairness with which he presents the facts adverse to his views. It may be so; but I confess that it has

made a very different impression upon me. I have been more forcibly struck by his inability to perceive when the facts are fatal to his argument, than by anything else in the whole book. His chapter on the Geological Record, in particular, appears to me, from beginning to end, a series of illogical deductions and misrepresentations of the modern results of Geology and Palæontology. I do not intend to argue here, one by one, the questions he has discussed. Such arguments end too often in special pleading, and any one familiar with the subject may readily perceive where the truth lies, by confronting his assertions with the geological record itself. But since the question at issue is chiefly to be settled by Palæontological evidence—and I have devoted the greater part of my life to the special study of the fossils—I wish to record my protest against his mode of treating this part of the subject. Not only does Darwin never perceive when the facts are fatal to his views, but when he has succeeded, by an ingenious circumlocution, in over-leaping the facts, he would have us believe that he has lessened their importance or changed their meaning. He would thus have us believe that there have been periods during which all that had taken place during other periods was destroyed, and this, solely to explain the absence of intermediate forms between the fossils found in successive deposits, for the origin of which he looks to those missing links; whilst every recent progress in Geology shows more and more fully how gradual and successive all the deposits have been which form the crust of our earth. He would have us believe that entire faunæ have disappeared before those were preserved, the remains of which are found in the lowest fossiliferous strata; when we find everywhere non-fossiliferous strata below those that contain the oldest fossils now known. It is true he explains their absence by the supposition that they were too delicate to be preserved, but any animals from which Crinoids, Brachiopods, Cephalopods, and Trilobites, could arise, must have been sufficiently similar to them to have left at least traces of their presence in the lowest non-fossiliferous rocks, had they ever existed at all. He would have us believe that the oldest organisms that existed were simple cells, or something like the lowest living beings now in existence; when such highly organised animals as Trilobites or Orthoceratites, are among the oldest known. He would have us believe that these lowest first-born became extinct in consequence of the gradual advantage some of their more favoured descendants gained over the majority of their predecessors, when there exist now, and have existed in all periods of past history, as large a proportion of more simply organised beings, as of more favoured types, and when such types as *Lingula* were among the lowest Silurian fossils, and are alive at the present day. He would have us believe that each new species originated in conse-

quence of some slight change in those that preceded, when every geological formation teems with types that did not exist before. He would have us believe that animals and plants became gradually more and more numerous; when most species appear in myriads of individuals, in the first bed in which they are found. He would have us believe that animals disappear gradually; when they are as common in the uppermost bed in which they occur as in the lowest or any intermediate bed. Species appear suddenly and disappear suddenly in successive strata. That is the fact proclaimed by Palæontology, they neither increase successively in number, nor do they gradually dwindle down; none of the fossil remains thus far observed, show signs of a gradual improvement, or of a slow decay. He would have us believe that geological deposits took place during the periods of subsidence; when it can be proved that the whole continent of North America is formed of beds which were deposited during a series of successive upheavals. I quote North America in preference to any other part of the world, because the evidence is so complete here that it can only be overlooked by those who may mistake subsidence for the general shrinkage of the earth's surface, in consequence of the cooling of its mass. In this part of the globe, fossils are as common along the successive shores of the rising deposits of the Silurian system, as anywhere along our beaches; and each of these successive shores extends from the Atlantic States to the foot of the Rocky mountains. The evidence goes even further; each of these successive beds of the Silurian system contains peculiar fossils, neither found in the beds above nor in the beds below, and between them there are no intermediate forms. And yet Darwin affirms that 'the littoral and sub-littoral deposits are continually worn away as soon as they are brought up by the slow and gradual rising of the land within the grinding action of the coast waves.' (*Origin of Species*, p. 290.) He would also have us believe that the most perfect organs of the body of animals are the product of gradual improvement, when eyes as perfect as those of the Trilobites are preserved with the remains of these oldest animals. He would have us believe that it required millions of years to effect any one of these changes; when far more extraordinary transformations are daily going on, under our eyes, in the shortest periods of time, during the growth of animals. He would have us believe that animals acquire their instincts gradually; when even those that never see their parents, perform at birth the same acts, in the same way, as their progenitors. He would have us believe that the geographical distribution of animals is the result of accidental transfers; when most species are so narrowly confined within the limits of their natural range, that even slight changes in their external relations may cause their death. And all these, and many other

calls upon our credulity, are coolly made in the face of an amount of precise information, readily accessible, which would overwhelm any one who does not place his opinions above the records of an age eminently characterised for its industry, and during which that information was laboriously accumulated by crowds of faithful labourers."

In this eloquent and lucid summary of a whole world of evidences, we are not simply listening to the reasoner and philosopher, we are standing in the presence of the man of fact also, and of the man of fact speaking in his own special sphere, and we see that doctrines which are, to the last degree, absurd and impossible in principle, are not only without support in fact, but in the most palpable contradiction to the clearest and fullest evidence. Nor is Professor Agassiz a man likely to overlook the *a priori* relations of this discussion, for he immediately passes on to them as follows:—

"It would be superfluous to discuss in detail the arguments by which Mr. Darwin attempts to explain the diversity among animals. Suffice it to say that he has lost sight of the most striking of the features, and the one which pervades the whole—namely, that there runs throughout Nature unmistakable evidence of thought, corresponding to the mental operations of our own minds, and therefore intelligent to us as thinking beings, and unaccountable on any other basis than that they owe their existence to the workings of intelligence; and no theory that overlooks this element can be true to Nature.

"There are naturalists who seem to look upon the idea of creation—that is, a manifestation of an intellectual power by material means, as a kind of bigotry, forgetting, no doubt, that whenever they carry out a thought of their own, they do something akin to creating, unless they look upon their own lucubrations as something in which their individuality is not concerned, but arising without an intervention of their mind, in consequence of the working of some 'bundles of forces,' about which they know nothing themselves. And yet such men are ready to admit that matter is omnipotent, and consider a disbelief in the omnipotence of matter as tantamount to imbecility; for what is the assumed power of matter to produce all finite beings but omnipotence? And what is the outcry raised against those who cannot admit it, but an insinuation that they are *non-compos*? The book of Mr. Darwin is free of all such uncharitable sentiments towards his fellow-labourers in the field of Science; nevertheless, his mistake lies in a similar assumption that the most complicated system of combined thoughts can be the result of accidental causes; for he ought to know, as every physicist will concede, that all the influences to which he would ascribe the origin of species are accidental in their very nature, and he must know, as every naturalist familiar with the modern progress of Science does know, that the

organised beings which live now, and have lived in former geological periods, constitute an organic whole, intelligibly and methodically combined in all its parts. As a zoologist he must know in particular, that the animal kingdom is built upon four different plans of structure, and that the reproduction and growth of animals takes place according to four different modes of development, and that, unless it is shown that these four plans of structure, and these four modes of development, are transmutable one into another, no transmutation theory can account for the origin of species" (p. 146.)

It would seem, from these statements, that Professor Agassiz regards all organic lines as equally primary, and in equally immediate relation with the action of creative power, and that he rejects all ideas of progress in lines once initiated. To these views, thus rigorously carried out, we must certainly demur. We readily admit the idea of a multitude of distinct lines starting from a common basis, but that all should be primary in an absolute sense, is a position which, to our view, neither harmonises with fact nor meets the requirements of principle. Our space, however, will not permit any discussion of the point on the present occasion; nor, indeed, has it been our purpose to offer any views of our own, but rather to strengthen the positions we have previously announced by the powerful arguments of one of the most eminent naturalists of the age.

CORRESPONDENCE. — *S. J. Thompson.* — We had written an answer to our correspondent last month, which was accidentally omitted. We have to thank him for his communication, and in reference to the subject of his letter, he will see on a moment's consideration, that his suggestion is untenable, as the future complement of the Nocturnal Felidæ must, at all events, be Felidæ, and cannot be represented by an animal of quite a different genus.

Amen.—We hardly know whether our correspondent be serious or jesting. We thank him nevertheless for his suggestions, and shall attend to them.

Pyropelagian.—Received; and will appear in our next.

Newspapers: HAVERFORDWEST TELEGRAPH, Oct. 17th. WILTS AND GLOUCESTERSHIRE STANDARD, Oct. 13th.

THE FUTURE.—The first half-yearly Part of this work, containing the Nos. from April to September, is now ready, price 2s. 2d., post-free.

Editorial communications, books for review, &c., may be addressed directly to the Editor, at his residence, 27, Inkerman-road, Kentish Town, N. W.

PUBLISHED ON THE 1ST OF EVERY MONTH, by
H. BAILLIÈRE, 219, Regent Street, W.

H. Austin, Printer, Fleet Street.