

rough gravelly mortar and small flat stones—all these are circumstances so utterly discordant with the associations of the other monuments of the land, that it is impossible to assign both to the same era, and if so it is impossible that the pyramids should have been other than temples originally. If we want, then, to trace the earlier stages of pyramidal architecture, we must look for them out of Egypt; the very rudest of its monuments are works far too serious for the infancy of civilization.

The same may be said of the cavern-temples and tombs. They belong to a distinct phase of thought and creed; they represent a distinct era of civilization, the antecedents of which must be similarly looked for out of Egypt, for there they do not exist.

Still more emphatically is all this true of the general architecture of the country. It bursts upon us in meridian splendour; we look around in vain for its earlier and ruder stages.

What is true of the monuments is equally true of the arts and learning of Egypt. Its creeds are neither primitive nor original; its writing is a perfected system from first to last; its implements are hardened copper; there is no "stone age" in its archæology, no real beginnings in any direction: we must look elsewhere for the origin of its civilizations. Let us stretch its antiquity to any extent we please, there must still be other antiquities beyond it. What we see, is relative maturity, what we do not see is the youth and infancy of this maturity.

As with Egypt, so with Assyria, Chaldea, Babylon, India, China. China has, properly speaking, no *monumental* antiquities of remote date, none at all events known to European research. In Southern India, we find some rude structures of the same class as the Cromlechs and stone circles of North Western Europe, and in Northern Asia we have specimens of the mounds of the same region; but, with these exceptions, all that we know of the great centres of Asiatic dominion and civilization speaks only of relative maturity.

It is in vain then that we search Africa or Asia for the early eras of monumental history. It is still more in vain that we question written history for any information relative to the Primeval World of man. The earliest lisplings of history give us but the names of perished empires. She speaks of the East only, and the East, everywhere, bears the unmistakeable stamp of a Recipient, not that of a Creator. We must look elsewhere for the Master and Teacher.

DARWIN ON THE ORIGIN OF SPECIES*

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THERE are questions, easily set at rest by a direct appeal to facts, which, if examined on the ground of principle, might be wholly unapproachable, and there

* *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., &c. &c.—John Murray, 1860.

are also questions fully within control, when brought under the jurisdiction of law, which present but a chaos of inextricable difficulties when treated as matters of detail. It is the business of the clear thinker to distinguish between these two categories of problems, and shape his course accordingly.

The question which we are here called upon to discuss, belongs emphatically to the latter of these categories; the work which proposes it unfortunately chooses the former of the two methods of treatment. Of course the question is not set at rest, and of course the solution arrived at is erroneous. It would have been something short of a miracle had the result been otherwise.

Every age has its superstitions—in science as in morals—and the scientific superstition of the present age is the deification of the methods of direct observation, conjoined with a scowling suspicion of the processes and results of systematic and consecutive reasoning. In abandoning the speculative philosophies of our fathers, we have rushed into the opposite extreme, and have become Puritans and Iconoclasts in regard to all the higher operations of mind. We make apologies if we have to appeal to principles, or trace out to any extent the sequence of causation; we deem ourselves secure when we can hedge ourselves in with a multiplicity of details, without being over-squeamish as to their fitness for the use we make of them. In a word, because the master has erred and abused his prerogatives, we think to set matters right by placing his servants above him; because an architect has exhibited defects in taste, and errors in judgment, we decree that, for the future, he shall take his orders from the mason and the bricklayer, and even receive with deference the suggestions of the mixer of mortar and the carter of materials.

Not so, however, thought the Father of Inductive Philosophy. He was emphatically and before all things a reasoner—the giant reasoner of his age. Not so, either, have thought his illustrious successors, who, by following in his steps, have made us what we are. They were not speculators, because they were reasoners; neither did they collect facts in order that they might dispense with the higher labours of science, but they were men who, while fully recognising the supremacy of reason, practically felt that all reasoning is but illusion, when not based on the rock of observation.

Very many of the errors and imperfections of existing science are due to this reaction against systematic reasoning. We idolise what we are pleased to term practical thought and working, we give the name of theorising to all the higher operations of the mind, and while fully aware of the importance of a division of labour in other cases, we are constantly overlooking the idea in our discussions, and take up indifferently the highest and the simplest questions, treat them in the same manner, and dispose of them with the same ease, without any reference to our

special capacities and casts of mind. But as there are questions which naturally come within the province of the observer, there are also questions which belong especially to the reasoner, and demand for their proper treatment a power of sustained thought, a comprehensiveness of grasp, and a vividness of perception, and strength of memory in all that concerns interdependence and causation, which rarely belong to men distinguished by their great knowledge of details. The question before us is just one of these. It is not at all a Naturalist's question, in the usual acceptation of the term Naturalist; it is a question of high Philosophy, and it is in vain to seek for a satisfactory solution of it, until we can rise above the world of detail, and look *down* upon facts instead of up to them.

The Origin of Species is one of the great questions, not of zoology merely, but of physical science generally. The Origin of Species is the origin of all organic types, the origin of all new combinations of entity, whether organic or inorganic. It is a question which carries us at once into the very penetralia of Nature's works, into the immediate presence of her great presiding laws; and no amount of science in the article of cabbages, and no degree of familiarity with dogs or pigeons, nor any learned comparisons between animals past and animals present, will in the least avail us in its settlement, while we remain insensible to its fundamental character and wide spread relations.

The fundamental error of the work before us is that it treats this question with an entire practical oblivion of its higher relations; never rising to a discussion of principles considered in themselves, but seeking to reach conclusions by the examination of an infinitude of details so susceptible of different interpretations that the author himself rarely expresses a decided conviction relative to them, but contents himself with simple statements of opinion or even with such vague phrases as "I am inclined to believe," "I strongly suspect," and the like. Yet Mr. Darwin has brought to his subject the knowledge of a life time, a prodigious store of facts, and the devotion of some three and twenty years. Will the reader believe that a study thus minute and protracted has at last eventuated in a result which entirely overlooks the question at issue, and makes the title of his book a pure misnomer?

These are startling charges to make against a scientific work. We are only sorry to say that they are very easily substantiated.

Mr. Darwin has undertaken to show how species *originate*, he has simply shown how they are *destroyed*. By some strange confusion of thought he has blended together ideas wholly discordant, and here offers as the *cause* of the origin of species that which he proves to be the *effect* of this origin. He has found, or believes he has found, that in the battle of life, victory is to the strong and death to the feeble, but

he has not shown how the strong came to be strong and the feeble feeble, and that was precisely what he had to show. Natural Selection is but the metaphorical expression of this victory, while species is its *cause* not its consequence. The victor is "selected" because he is strong, and not strong because he is selected.

Mr. Darwin commences his reasonings by not only admitting, but assuming, the pre-existence of species and diversity, and thus *in limine* decides the question against himself by the mere statement of the conditions of his theory. Rather a bad beginning for a scientific argument! Surely the causes, whatever they may be, which have produced one species or type, cannot be very different from those which have produced another species or type only fractionally varying from it. Like effects must proceed from like causes; there cannot be a greater divergence in the one than in the other; yet to account for the modification of an original type, Mr. Darwin does not assume a corresponding modification in the cause of that type, but introduces a new and wholly unlike cause. If this be not a fair statement of his case what is the meaning of the phrase, "The Origin of Species *by means* of Natural Selection?" But we must give the substance of his argument more in detail.

Mr. Darwin does not attempt to begin with the beginning, but plunges at once *in medias res*. He takes for granted the pre-existence of some species or organic type, which is to be modified into other species, in accordance with the principle of natural selection. He next assumes, what no one will dispute—viz., that all the individuals of this type will not be exact counterparts of each other, but will present, in certain instances at least, fractional variations. He assumes that a tendency to variation, however produced, is inherent in organization; that a tendency to transmit acquired peculiarities is also inherent in it, and, finally, that there likewise exists in it a tendency which may be named *correlation*, by means of which it happens that when organic changes take place in one portion of a living structure, harmonious and compensating changes will take place in another. Mr. Darwin does not attempt to account for any of these pre-existences, or at most only hazards some loose statements and conjectures relatively to some of them, he takes them as facts, and makes them his starting point. Yet these are precisely the things which have to be accounted for, if we are to know anything about the origin of species.

Mr. Darwin next assumes that some of the fractional variations in type just alluded to, will be more favourable than others to the well-being of the individual possessing them, and consequently that, in the struggle for existence, the chances of success will be in favour of the individual thus gifted. Such an individual will not only be more likely to live out his time, and live it out prosperously and in posses-

sion of all his energies or even of increased energies, but he will likewise be more likely to leave offspring, and offspring inheriting his own vigour and peculiarities, original and acquired. In the battle of life, then, which takes place in the second generation, this offspring will similarly have the advantage over the progeny of a feebler parentage, and consequently will repeat, with increased emphasis, the story of the first generation. And thus, from age to age, differences which individually may be but infinitesimal, will ultimately accumulate into noticeable quantities, and finally eventuate in divergencies of sufficient amount to require the designation of distinct species; and as the possible rate of animal increase is far higher than the possible means of existence, it necessarily follows that an increase in the representatives of favoured types necessitates a proportionate decrease in those of the less favoured, so that the introduction of new types means, in the long run, the extinction of the old.

This statement is a condensed, but faithful expression of Mr. Darwin's argument, as far as we understand his book, and from it, it is obvious, that, as regards the generation with which we happen to commence, "Natural Selection" is a direct consequence of the pre-existence of species and diversity. But the argument, as stated by Mr. Darwin, may commence with any generation indifferently, so that what is true of one is true of all, individually considered, and if Natural Selection must be a consequence and not a cause in every generation, individually considered, how is it to be a cause in any case? It is plain that we have here to deal with a mystification merely, with a confusion of thought between sequence in time and sequence in causation. The improvement in the second generation follows the Natural Selection that has taken place in the first, and this sequence has been confounded into causation. But how does the matter really stand?

An individual is more favoured by nature than his neighbours; because he is so favoured he obtains more and better food; because of these united advantages he obtains, or is assumed to obtain, an increase of power; because of this increase he produces more offspring; because of an original tendency in his nature to transmit acquired as well as native peculiarities his offspring will represent his specialities in an increased degree; and because of a tendency similarly innate to develop harmoniously, the changes thus produced will entail other changes, and so on, in succeeding generations, till we ultimately reach an amount of diversity equivalent to a specific difference. Here, then, we have a series of causes, real or imaginary, which, according to Mr. Darwin's own showing, give origin to species, but what has all this to do with the origin of species by the means of natural selection? If Mr. Darwin has proved anything, it is, not that species originate because favoured races are preserved, but that races are preserved because

they are favoured, and favoured because there pre-exists in organism a tendency to this favouritism. Of course, if favoured races were not preserved, favoured species could not subsequently arise, if we reject the theory of special creations, but neither could they arise if we took away the atmosphere, or light, or heat, or food, or water, or any other of the necessary conditions of existence; but if this be what Mr. Darwin means, it was scarcely necessary to write a book, or spend years of research, in giving an illustration of so palpable a truism; and if this be not his meaning, we see no other but the one we have given, and that is a position so glaringly erroneous that it is impossible to entertain it for a moment, once that its conditions are clearly stated. Turn the matter as we may, "Natural Selection," as explained by Mr. Darwin himself, means nothing more than the "Preservation of Favoured Races," and the destruction of those not favoured, and these phenomena cannot, in any rational sense, be said to be the cause of species: they are simply consequences of pre-existing species or modifications of species. Had the object of Mr. Darwin's book and labours been simply to bring into scientific prominence the struggle for existence constantly going on in the organic world, and show the relations of that struggle to the generation of new types of being, we might only have had to thank him for calling attention to facts which, possibly, have not been sufficiently emphasized by his predecessors, but the case is entirely altered when, utterly reversing the entire bearing of the evidence, he makes this struggle and its consequences the actual cause of generation.

Mr. Darwin has discussed, either incidentally or formally, most of the topics bearing on his subject. All are discussed in the same spirit, and all as questions of detail. We can only say that had the subject been similarly treated in a hundred thousand volumes instead of in one, it would be found in the end in as unsettled a state as that in which Mr. Darwin here leaves it. The essence of the question is never approached, its conditions never formulated; we have facts innumerable, but they prove nothing; deductions in abundance, but they almost invariably confound coincidence with causation, and superficial analogies with identity of correspondence: we look in vain for methodical statement, sustained attention, or lucidity of thought.

Mr. Darwin belongs to a school of reasoners whose members must surely be very deficient in mechanistic instinct; for they can create a universe without a plan, and educe the most admirable and complicated harmonies from the mere concurrence of unregulated forces. Give them but time and material and they will produce for you any required form or nature by simply letting things take their own course. According to the logic of their principles, there should be no earthly reason why a churn or a buttertub might not grow into a steam engine, then develop into a

railway carriage, and finally end as a printing press : nothing ought to be needed but indefinite time, plenty of materials floating in the air, and a sufficient density of atmosphere to conceal the *modus operandi* of the process.

According to their principles, we shall have to recognise in the universe another Omnipotence than that of Wisdom and one also by far more powerful—more marvellous in its results, more unfettered in its processes, doing easily what the other cannot do at all—impossibilities. The Omnipotence of Mystification can easily accomplish what Omnipotent Wisdom cannot even conceive : it can change one set of harmonies into another and a very different set, without calculation, without control, by influences as unguided as motes in a sunbeam. Each force, individually, shall be able to do nothing, but take them collectively, and nothing is impossible to them. Food, for instance, will not shorten a man's thigh while lengthening his waist, nor colour the hair of his head black while giving him a red beard and a fair moustache, neither will climate do this, nor light, nor heat, nor water, nor human propinquity, nor any other agency of the kind—none of them will exhibit the least fitness for accomplishing any portion, however fractional, of such a phenomenon—but set them all at work together ; leave them to hustle and jostle, to fight or embrace, just as chance may direct, and then suddenly wake up, at the end of a hundred thousand years ; and lo ! the thing is done : done to a hair's breadth, to the shadow of a shade ! Pity we cannot avail ourselves, in practical life, of such marvellous agency.

This is no burlesque of the argument : it simply reduces, to intelligible forms, propositions which those who hold them are compelled to envelope in a cloud of incomprehensibilities, for stated in their naked simplicity, no sane mind could for a moment accept them.

The phenomena which we are here called upon to account for are not vague or incongruous forms or functions, but elaborately harmonious and admirably balanced combinations. No one denies to unregulated forces the power of producing unregulated phenomena. It needs neither new books, nor new facts, nor new arguments to prove what no one will think of questioning. What we want to discuss is the *order and system* apparent in the works of nature ; what we want to ascertain is the cause of that order and system ; but these are precisely the points which this school is ever keeping out of sight, or enveloping in ambiguities when it does happen to allude to them. All else is beside the question, yet it is precisely the all else we get, and not the question. Or of what avail is it to discuss the causes of phenomena, if we take no pains to distinguish between the attributions of these causes, or to group the phenomena in relation with those attributions ? What have we a right to expect, when proceeding in this headlong fashion,

but muddle in our thoughts and jargon in our language ?

As the question is stated by the writers of this school, discussion is interminable. It is an everlasting war of skirmishings, without honour, or profit, or result. As Nature states it, the facts are so plain, and the conjunctions so suggestive, that an immediate and decisive result is inevitable. A single illustration will make this matter perfectly evident.

Here is a wolf ; here a greyhound, a spaniel, a poodle, and a terrier. The wolf came first ; we will assume that it is the parent of the others. Let us dissect that wolf : what is the character of its structure ? It is a wonderful combination of suitabilities in material, form, and function—a living mechanism, self-acting, self-feeding, self-repairing, self-forming, compared with which all human mechanisms are but the mimic toys of childhood.

Now let us dissect the greyhound. The conclusion is the same in all respects, but we have new proportions, new harmonies. Every particle has been displaced and reset, and a new group of perfections has been substituted for the old. The same with the spaniel, the poodle, the terrier. In every case, new displacements, new proportions, new harmonies, new mechanistic triumphs. It matters not what, or how many may be the intervening links ; how slow, or how rapid the process of change ; the final results are harmonious, and the question is to determine what cause or causes can be adequate to the production of such harmonies, to the conversion of one set of proportions into other and different sets. This is the essential, the only question really at issue. Let us discuss it for a moment.

In the first place, what are we to understand by a cause and by an effect ? An effect is something done (*factum*). That which has done that thing is its cause. Therefore we may say, in more convenient terms :—

A Cause is that which has produced an Effect. An Effect is that which has been produced by a Cause.

Now that which has actually produced or done anything must have had a nature fitted for doing it, and in all respects fitted for doing it just as it was done, under all the circumstances of time, place, manner, degree, &c., under which it was done ; otherwise it would have done that which, in some respect, its nature was not fitted for doing ; that is to say, which its nature could not do, which would be a contradiction. But, by definition, that which has produced or done a thing is the cause of that thing, and the thing done, the effect of that cause, consequently, the nature and circumstances of the cause, or that which has done a thing, must in all respects be suited to the nature and circumstances of the effect, or that which has been done ; and, conversely, the nature and circumstances of the effect must be, in all respects, suited to the nature and circumstances of the cause, otherwise the cause would have produced or done that

which, in its nature or circumstances, it was not suited for doing, which would be a contradiction.

Therefore, every difference in the nature or circumstances of a cause must necessitate a corresponding difference in the nature or circumstances of its effect; and, conversely, every difference in the nature or circumstances of an effect must necessitate a corresponding difference in the nature or circumstances of its cause.

Therefore:—*Like causes must produce like effects, and unlike causes unlike effects*, and the difference between effects must be exactly, and in all respects, proportionate to the difference between their causes; and, conversely, the difference between causes must be exactly, and in all respects, proportionate to the difference between their effects.

Now, let it be granted that man is an intelligent being or entity, and that by the action of his intelligence, he is capable of producing, and actually has produced, order, system, plan, structure, mechanism—the mutual fitness of part to part, of action to action, of effect to effect.

Then, as that which has produced or done anything is the cause of that thing, man, when producing or acting intelligently, is an intelligent cause, and as, therefore, an intelligent cause is capable of producing, and actually has produced order, system, &c., by the action of its intelligence, no cause but an intelligent cause can produce such things; and no cause, whether intelligent or not, can produce them otherwise than by the action of its intelligence; because only like causes can produce like effects, and only intelligent causes can be like intelligent causes; and only intelligent causes acting intelligently can be like intelligent causes acting intelligently; for negation is the opposite of affirmation, and non-entity the opposite of entity, and opposites are not like but different.

Therefore, whatever intelligence can do cannot be done without intelligence, and as, by hypothesis, intelligence can produce, and has produced order, plan, mechanism, structural fitness, &c., nothing but intelligence can produce, or has produced them.

Therefore, all the order, system, mechanism, and structural fitness in the universe are the product of intelligence; that is to say, of intelligent entity acting intelligently.

From this result there is no rational appeal. To deny it is to be self-contradictory; to evade it is to be inconsistent; to urge difficulties from without, is simply to confess to a confusion of thought or want of mental grasp. There are no rational means of evading a demonstration except by showing that its terms involve some error. Should this method be attempted here, all that we shall have to do will be to restate the argument in somewhat greater detail, filling in every link of the chain, leaving nothing, however insignificant, for the reader himself to supply. The result in the end will still be the same—the affirmation of that great law which, to all clear thinkers, has ever been a mere axiom needing no

formal demonstration, carrying, in its very terms, its own self-evidence.

“Only like causes can produce like effects,” is the fundamental law of the universe. Had naturalists applied it in the case before us, they need not have so utterly lost themselves, as many of them have done, in the labyrinth of mystifications and inconsistencies into which hasty and unsystematic reasoning have led them.

All the great phenomena of the universe, rank for rank, are regularities; it is only in relative infinitesimals that there is, or can be disorder. Such disorder is always controlled in mass, and implies no defect in plan, since it can only be evaded by the sacrifice of higher objects. A gardener, for instance, could not place in mathematical symmetry of position every particle in a bed of mould without sacrificing, for a useless result, every advantage derivable from his time and labour; neither does the want of absolute symmetry of position in the atoms of a watch spring, or the piston rod of a steam engine, imply any want of skill in the mechanist, or any want of efficiency in the construction. To the great mundane sphere of which we are a part, the life and movements of an individual organism are but infinitesimals, just as a single particle of food may be to the individual himself; and therefore a certain amount of irregularity, in the one case or the other, implies nothing more than one of those inevitabilities inherent in all action and causation, rational or irrational. But perfection or no perfection, all that is orderly in the universe is the product of intelligence, directly or indirectly, nearly or remotely; and all that is not orderly takes place without the guidance of intelligence, being the product either of fractional antagonisms in the laws of structure, or of the primary necessities of entity and motion.

The phenomenon we are called upon to study, in studying the origin of species, is the phenomenon of mundane *growth*. Let us say that species, and genera, and classes, and kingdoms *grow*, and all becomes intelligible and consistent. New types of being then, if they be consistent, do not arise in consequence of the battle of life, or of specialities of food, or climate, or such like accidental agencies, but in consequence of being parts of a plan; and, as such, they must arise at predetermined times, in predetermined places, under predetermined circumstances. Such are the inherent necessities of mechanism and growth. If types vanish, it is not because they are weaker than other types, but because evanescence is a law of initial types and groups. If other types exhibit the characteristics of permanence, it is not because victory is to the strong, but because relative permanence is one of the conditions of more advanced growth, as evanescence is of incipient and early growth. The study of embryonic and foetal life furnishes a clear analogical key to all that geology has revealed relative to the sequence, the evanescence,

and the stability of types. So also with its periods of prolific and varied growth as contrasted with long intervals of comparative barrenness. The same phenomena of action and remission are equally the law of individual growth.

This is the only view of nature which can give us rational or intelligible results; the only ark in which we can find safety or repose amid the flood of inconsistencies which vague thought and hap-hazard reasonings are constantly pouring out on the mind of the age.

PRE-ADAMITE MAN.

OR THE STORY OF OUR OLD PLANET AND ITS INHABITANTS, AS TOLD BY SCRIPTURE AND SCIENCE.*

PRE-ADAMITE man! and who does the reader suppose was Pre-Adamite man? It is useless for him to guess; we might safely wager any odds against his ever hitting upon the right answer: we will, therefore, spare him the trouble of useless thought, and proceed at once to inform him that Pre-Adamite man was a personage, that is to say, a race which once inhabited this earth, when Megatheria were rooting up its trees, and Mastodons smashing through its forests, but which has long since been translated to other abodes, carried away bodily, with all appertaining to it, not leaving a wreck behind, unless, indeed, it be certain flint axes and arrow heads, which, in that case, we may suppose were abandoned, as being of an inconvenient specific gravity for people who had to perform a very long journey through the realms of ether or of space.

Well then, this Pre-Adamite race, after living on the earth, for nobody knows how long, in a state of perfect innocence, peace, and happiness, exempt from care and pain, and death, immortal, and immaculate, fell at last, somehow or other, into a state of discord, and became split into two factions. One of these retained its pristine character, the other became as prodigiously wicked as it had been before prodigiously good. The consequence was a terrific battle between the opposing parties, and the result of this battle a great victory for the good Pre-Adamites, and a complete defeat for the bad ones. Whereupon the victors were lifted up from the earth into realms of light and bliss, and the vanquished ignominiously driven forth into abysses of gloom and misery.

Now these victors and these vanquished are—what does the reader imagine? The former, the angels of Heaven, the latter, a certain Gentleman in black, well known to poets and painters, who with his servants and retainers, lives somewhere down below, in a magnificent palace, designed for him by John Milton, and erected for him by John Martin.

Such, seriously, the palace of course excepted, is the thesis which this work undertakes to support, in perfect good faith, and in a spirit altogether unob-

jectionable, on every ground except that of simple argument. Such is Pre-Adamite man, and such the story of our Old Planet as told by Scripture, and Science. What Scripture may have to say to such a story, it is not our province here to inquire, and few readers, we fancy, will need such an inquiry; but as to science, the only science we know of which has any bearing upon such a narrative is the science of Mythology, and the author will hardly care to look in that direction for support to his views.

But without at all wishing to enter into theological controversies, we may be permitted to suggest that religious truth is little likely to be advanced by illegitimate argument, and that it is paying but a poor compliment to a venerable document, to base on it theories which virtually charge it with being so obscurely or clumsily written that it is only after the lapse of many thousands of years that we have succeeded in reaching its meaning. It is surely more respectful, as well as more rational, to drop altogether the letter of Scripture, in such passages as may be found really irreconcilable with fact, than to torture plain words out of their obvious meaning, by modes of interpretation which sap the foundations of the very authority which they are meant to uphold.

Our space does not admit of further description or comment, and if it did, it would be impossible to describe with seriousness, and ungracious to be needless finding fault with a well-meant effort, and with a writer who has at all events the merit, not over common in his class, of cordially accepting all the facts of science, though unfortunately he substitutes speculation for induction.

THE FUTURE.

It will be readily seen from the character and aspect of this little work, even in its initial number, that it is an experiment of some novelty and risk in our Periodical literature. It does not indeed contemplate, nor is there the least occasion for its contemplating, any competition with existing journals; it simply seeks to fill an unoccupied place, and one which no other work is at all likely to contest with it. Still, though the abstract importance of its aims will be at once conceded, it by no means follows that its mode of carrying out those aims, or the results which that mode entails, will meet with similar favour. We feel, then, that we are engaged in an experiment in which success depends as much on the estimate formed by the reader as upon any exertions we can ourselves make; and though we trust to deserve success and hope to meet with it, it is still not without anxiety that we enter upon our task.

The science of this latter half of the nineteenth century is rich in detailed knowledge, almost overburdened indeed with the wealth of facts which fill its stores even to overflowing. Those treasures are constantly and rapidly accumulating, and no memory is adequate to the retention of even the thousandth part of what is already collected. We divide ourselves into sections, and still have to stand aghast at the work which falls to our individual

* Saunders, Otley, and Co., Conduit Street.

Agui from his mouth; and Vaya from his breath. From his navel came the atmosphere; from his head the sky; from his feet the earth; from his ear the four quarters; and "so they formed the worlds."^a

A very distinct version of the original story has also existed, or still exists, in the Cosmogonical traditions of the inhabitants of the Marian islands, as the following passage will show:—

"Pontan," they say, "who was a very ingenious man, lived for a long time in the imaginary regions of space which existed before the creation. At his death, he commanded his sisters to form, of his breast and shoulders, the heavens and the earth; of his eyes, the sun and moon; and of his eyebrows, the rainbow.†

The tradition seems even to have travelled farther than this, for the Tangaloo of Tahiti "formed the ocean from the sweat of his brow—so hard did he work in making the land."‡ And there are, we believe, some other fragmentary vestiges or allusions, to which at the moment we cannot distinctly refer. But even those that are unequivocal form a curious series of facts, and evidently point to wide-spread and remote relations among the families of man; but such relations have nothing to do with the speculative dreams so fashionable in the last generation, and not yet wholly forgotten by the present, relative to the primeval peopling of the earth, and the branching out of a primeval faith into an infinitude of local superstitions.

Here, then, we must for the present pause. We are fully justified in speaking of these stories as having a common origin and involving some common import. We are equally justified in considering them as implying intercommunication at some time or other between these widely separated portions of the globe; but the materials do not entitle us to infer the nature or medium of this communication. From what is before us, we cannot say whether it was produced by movements from the central races, or from one of the extremes, or whether all may not have been passive, while the communication was established by the movements of some power, or powers, not alluded to in the stories. The historical value of such conjunctions as these depends wholly upon our keeping ourselves within the clear limits of the evidence, without any straining of facts, or any hypothetical begging of the question. As we advance, our resources will multiply, and we shall be able to draw broader, more important, and more definite deductions, without any necessity of approaching the treacherous confines of conjecture or assumption.

THE FUTURE.

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MR. DARWIN'S book has evidently made a strong impression on the intellectual public. It is the "Vestiges of Creation" of the day; and though no two books on the same topic, and with the same general aim, could well be more different than the "Vestiges" and the "Origin of Species," yet their effect upon the public is singularly analogous. The "Origin of Species," written in a style, with materials, with a general treatment, which can have little attraction for any but a scientific man, is still as eagerly read as a work of an especially popular character and of an unusually pleasant style for a subject of the kind.

The reason is obvious: there is a great question at issue, there are great interests involved, or believed to be involved: the attraction is in the subject, the question is a party question, the hero of the hour is a champion, who stands forth in the presence of rival hosts, and offers wager of battle to whomsoever is bold enough to enter the lists against him. Of course he instantly becomes the centre of the common gaze, and is cheered on by his friends with an energy proportionate to the shout of defiance which bursts from his foes.

And now let us suppose that just as a number of excited combatants are rushing from the opposing ranks, each eager to pick up the gauntlet flung before them, that some representative of an intermediate party steps in between the rival champions and attempts to prevent the fight. Let us suppose that finding the voice of persuasion unheeded, his feelings rise into energy, until he endeavours to do by force what gentleness will not effect. Imagine him calling these combatants, and would-be combatants, fools and madmen, giving a push to one and a blow to another, turning with alternate defiance to either host, and flinging reason at passion and prejudice. Let us imagine all this, and then ask ourselves what he has a right to anticipate. Ought he not to deem himself very fortunate if he simply manages to escape with unharmed life and limb? As to inducing his auditors to listen to reason, in his acceptance of the term, it is out of the question.

Such is ever the position of the moderate man when he attempts to speak on important party questions. Such the position of the small minority to which he belongs, a minority rarely possessing any important influence, except in great calms or great emergencies, when prejudice slumbers, or some eminent danger terrifies it into reason.

It is our own fate to belong on this, as on many other questions, to this moderate party, this unimportant middle-class, this central point of powerlessness, at which antagonistic forces neutralise each other. All we can do is to utter what seems to us the voice of reason, tell home-truths when necessary, confront the obloquy of party without the advantages of

^a Pritchard (*Physical History of Mankind*, vol. v., p. 176) quoting Freycinet, &c.

^b Muir, *Original Sanscrit Texts*, p. 7.

† Latham, *Varieties of Man*, p. 193.

party, and trust to time and circumstance for producing some tardy and imperfect result. The prospect is not flattering, but it has its precedents and its rewards, and Truth is worth any sacrifices she may demand from her worshippers.

Mr. Darwin's book is a great success, and we heartily rejoice that it is so, much as we differ from his conclusions. It is always pleasant, in the abstract, to witness the success of earnest and conscientious effort; and it is eminently creditable to the age that such a book should have produced such an impression: but it would have been still more creditable to the age had such a book come from such a man without producing any impression at all. We need not trouble the reader with an explanation of so simple a paradox.

We rejoice, then, that this subject is exciting a warm interest; and if we feel compelled to speak somewhat depreciatingly of the "Origin of Species" as an argument, our only feelings for author and work, in all other points of view, are those of the sympathy and respect which meritorious effort and eminent services rendered to science have a right to claim from all interested in the progress of knowledge.

The "Origin of Species," then, is the tocsin which proclaims the renewal of hostilities between the great parties of intellectual Conservatism and Progress. We would stay this war if we could, by proving that both are in the wrong, and that it is the interest of both to come to an agreement; but if they will fight it out, why, as we do not choose to stand aloof, we must just mingle in the contest and alternately fire into both sides. To assist in weakening both, will be to aid in bringing both to reason.

Were the only alternatives offered to our choice, the hypothesis of Special Creations, or the hypothesis of Progressive Evolution, taken in the abstract, we should not have room for a moment's hesitation. The former hypothesis is unsupported by a single known fact; in principle it is impossible; it is in direct contravention of the fundamental law of causation, which requires that there should be an inherent, and necessary, an inevitable relation between an effect and its cause, and consequently, that like effects should ever be the product of like causes. But what possible necessary relation is there between the utterance of a command, or the formation of a wish, or act of volition, and the sudden appearance on the stage of existence of a new organic structure? Such creation as this, is creation according to the laws of Magic creation by the powers of the Spell. Quite time enough to attribute such workings to Omnipotent Wisdom, when we clearly see the fact of their existence. "Let there be light, and there was light," is the language of poetry and lofty feeling, the expression of entranced reverence in the presence of completed results and incomprehensible working; but translate these words into plain, cold prose, and they instantly become an absurdity, and if not also a

profanity, it is simply because they are uttered in well-meaning ignorance. We cannot, then, accept the theory of special creations, and no scientific man would think of accepting it except as an escape from what seems to him still more objectionable alternatives.

Call the development hypothesis, development by plan and growth, and we at once, and unhesitatingly accept it, as borne out by fact, and meeting every requirement of principle; but take away from it plan, and introduce the *hocus pocus* of accident, and we as unhesitatingly reject it as equally untenable with the theory of special creations, and infinitely more mischievous. Development without plan, is logical Atheism, and that is the plain English of the matter, and there lies the secret of the absorbing interest of the question. No wonder the religious world should feel alarm; but if it wishes for a victory over a powerful antagonist, it must arm itself with the weapons of modern warfare, and fling aside the obsolete contrivances of days that can never return. Let it attempt to retain the whole of its ancient territory, and it will be defeated in every encounter; let it yield with a good grace, that which has in reality passed from its grasp, and it may take its stand upon the remaining ground of this controversy in unconquerable strength, and smile down the opposition which it need no longer seriously contend with.

In saying that development without plan is logically Atheism, we are fully aware that few who advocate the vague doctrines of the influence of external circumstances have any thought of pushing them to such an extreme as this, but such is their necessary consequence; and it is the perception of this consequence, joined to the difficulty of perceiving any intermediate ground, which has induced so many thinkers to accept the hypothesis of special creations, incomprehensible as it is, to say the least, in principle, and unsupported in fact. Make the worst of this hypothesis, and still it is immeasurably preferable to the theory of development without plan. At the worst, it provides a fully adequate cause of the wonders of creation, and only fails in the modes in which it assumes that cause to have acted. But the opposite hypothesis leaves the Universe not only without an adequate cause, but even without any cause at all, for pushed to its full consequences it amounts to a direct contradiction in terms.

This theory of planless order is not even accurate in its facts. Its advocates continually draw upon their imagination even when they are profoundly persuaded that they are only stating the unquestionable evidence of their senses. They draw pictures which often bear but very partial resemblance to the realities of nature. There are no such endless diversities, no such delicate intershadings as the theory would necessitate, while there is a whole universe of harmonies which it completely

ignores. Were Mr. Darwin to migrate to some distant planet, and there propound his theory of terrestrial formations, the inhabitants of that world would have the falsest ideas relative to innumerable matters with which every one here is familiar. Yet a more dispassionate and conscientious observer or advocate than Mr. Darwin, we should say it would be impossible to find, judging him from his book. But theory blinds us all, if our theory happens to be erroneous.

If any one will open his eyes to the opposite side of the question, and carefully collate facts as they actually present themselves, he will soon become satisfied that order and system are the rule, and disorder and indeterminateness the comparatively rare exceptions, even within the limits of species. When we consider the unfettered liberty of breeding that exists among some of our domestic animals, we should naturally expect, even setting aside all influences dependent on food, shelter, and other like accidental agencies, that an almost universal mongrelism would be the rule, and classifiable diversities the rare exception. Yet the direct reverse is the fact. Look, for instance, to the dogs and cats of a large city. What can be less under restraint than the breeding of these animals, that of cats especially; yet anything like mongrelism of type is a comparatively rare exception. The grand rule is a great multitude of classifiable and constantly recurring specialities. We have noticed, for instance, several successive litters from a favourite cat. The general rule was that the females were exact counterparts of the mother, a beautiful tabby; the males counterparts of males in the neighbourhood; now and then there was an animal which represented intermediate characteristics.

Among dogs the phenomena stand thus: first, we can make two grand divisions. In one of these we have a series of broadly distinguished types, such for instance as the greyhound, foxhound, Newfoundland, spaniel, poodle, terrier, &c.; secondly, a series in which the forms are less strongly characterised, without, at the same time, showing any perceptible trace of intermediateness. In the former case, the types represent groups divisible into distinctly classifiable varieties. Thus we have a whole range of greyhounds varying in hair, in colour, in markings, in size, but every one presenting the true greyhound structure, and having equal apparent claims to purity of descent. And so of the other types. Only now and then do we see those appearances which imply mongrelism, and in which the idea of a double descent suggests itself.

Now such a state of things could not exist if there were not stringent laws at work, laws which restrain diversities within determinate limits, and constantly tend to reabsorb irregularities when they do occur, as they necessarily must occur occasionally. We have no hesitation in asserting, from long observa-

tion, that here, as elsewhere, there is fixed and discoverable system. Yet who, from an application of Mr. Darwin's principles, could ever anticipate such results as these, though Mr. Darwin's candid statements and admissions in matters of fact are often in curious accordance with this description, and in curious contrast with his own principles.

With the facts here spoken of, human control has obviously nothing to do. They simply take place in the midst of great aggregations of human beings, and this circumstance may have its significance, but all beyond this is the spontaneous action of the animals themselves.

In comparing the domestic dog and cat in reference to the number and general character of their diversities, it will be obvious that they are not groups of the same relative order. The varieties of the domestic cat are parallel, not to those of the domestic dog as a totality, but simply to those of special subdivisions of this group; as, for instance, to those which occur among spaniels, or terriers, or greyhounds, etc. They are subdivisions into races—*ethnic* subdivisions, while the term spaniel, greyhound, Newfoundland, and the like, if they are not to be viewed as designations of distinct species, must represent some natural line of separation higher than race, though lower than species.

Every domestic animal will present analogous phenomena, provided we make due allowance for the rank of the subdivisions into which they branch out. Neither Mr. Darwin's theory, or any theory of the school to which he belongs, can give us the shadow of a satisfactory reason for the extraordinary contrasts which the domestic animals present as to the number and order of their diversities. Why should the cat have but one group of races while the dog has so many? Why does the camel present so few varieties and the horse so many—why fewer than the Llama? Why has the antelope, which is not domesticated, more varieties than the ox and sheep, which are? and so on of many parallel cases. The usual assertion that the dog is so varied and so docile because he is the oldest conquest made by man in the domestication of the inferior animals, is a pure assumption, for it is impossible to *know* anything about the matter, nor will the assumption in the least help us out of the difficulties involved in the parallel cases.

But we may go farther than this. Any one who will take the trouble to make a careful comparison between the different orders and families of the class of birds, and the corresponding groups of the mammalia, will soon be surprised at the remarkable *representative* affinities which the generality of these groups display. Thus, the Parrots represent the Monkeys, the Raptores the Felidæ, the Corvidæ the Canidæ, the Pheasants the Horse, the Grouse tribe the Antelopes, the Ostrich tribe the Camels and Llamas, the Galinacæ, special (represented by the

Turkey, Guinea-fowl and Cock,) the parallel Ruminans, Ox, Deer, and Sheep, or Goat; the Pachyderms by the Duck tribe, the Duck itself being the equivalent of the Pig, as the Swan probably is of the Elephant, and so on. These remarks must not be criticised with too close a reference to existing classifications. All these classifications though, generally speaking, tolerably accurate in leading features, are, after all, and confessedly, but approximations to the truth of nature.

Throughout these comparisons, it will have to be observed that the number of diversities is far greater, group for group, and the divergencies generally wider among birds, than among mammals, and this for one plain reason—viz., that the bird is an older type than the mammal, and therefore more advanced in its development. For it will be found a law of zoology, that *ceteris paribus* the older the group, the more is it diversified; but it is also a law that the *higher* the group, the more will it be diversified, all other things being equal. And, finally, it is likewise a law, that all *initial* groups are temporary and transitional, and have fewer diversities than the permanent groups. It is these three great laws that give the principal, though not only the key to the contrasts above mentioned.

Bearing these things then in mind, we see that the ornithic counterpart of the dog, the Crow tribe in its widest acceptation, is wonderfully diversified when compared with the counterpart of the cat tribe—viz., the Raptors, which present only three prominent divisions, the Falcons, the Vultures, and the Owls. But the cats, or Felidæ, are worse off still, for from the Lion, downwards to the domestic cat, they form but one such division, and that the lowest; they represent, exclusively, the owls, as their natural habits, their soft tread, their stealthy pace, their very markings plainly show. The noble, the diurnal Felidæ, the equivalents of the large, proud, soaring Eagles, *have yet to come*. Why, there is a whole universe of curious truths lying before us, of which zoologists have yet formed no conception, and which have only come to light through the special study of the *plan* of creation.

When then we contrast the Raptors and the Corvidæ, we see the same phenomena in relative multiplicity of forms as we find in the case of the cats and dogs, just as we find the same marvelous beauty in special groups, as in the Spaniel or Setter in the one case, and in the Bird of Paradise in the other. Man certainly has had nothing to do with the diversities of the Crow tribe.

These are the sort of things that come to light when we study the minor details of zoology, not as so many separate individualities, but as classifiable individualities. While things remain chaos, we may find facts in support of any theory. But let zoologists lay aside their preconceptions and carry out, in this region, the operations of grouping with which

they are familiar in the greater divisions of their science, and they will soon find that they have to do with law and system here as well as there.

It is for reasons like these that we must assert, in the most formal and emphatic manner, that neither Mr. Darwin, nor any member of his school, in any of its sects, gives a fair representation of the facts of nature, as they lie spread out before their eyes. They are in the midst of order, and they see it not; they are talking of facts which have never had existence, speaking of exceptions as if they were the rule, and making no distinction between the regularities produced by the express intention of nature, and the irregularities which arise in spite of her, and which her plan controls in mass, but cannot control in detail, without defeating its own higher objects. It has been said, and justly, "there is no theorizer like your opponent of theories," we say "there is no such speculator as your man of facts:" no one who can take such prodigious jumps to remote conclusions, and for the very reason that his idiosyncrasy prevents that methodical and sustained pursuit of deductive sequence which alone can justify a remote conclusion. We question then, to a very great extent, the very facts of this school, as often as its members speak in generalities, and we charge them with giving one sided views of the state of facts by their habit of perpetually ignoring the harmonies of groups, and even of individual structures, while giving exaggerated importance, and often unjustifiable generalization, to relatively partial irregularities. We have not the remotest idea of charging them with any conscious unfairness. They are simply obeying the universal law that like produces like, that error leads to error. This is a law from the iron despotism of which no one can emancipate himself.

What we have here stated as to laws and facts in the less known departments of zoological philosophy has not been lightly uttered. We have spoken on the authority of careful and long-continued study, and all that we have hinted at, and a vast deal more, will in due time be brought under regular treatment and discussion in the pages of this Journal. There are abundant materials for coming to a clear and decisive conclusion on the question of the Origin of Species, even in its widest and highest aspects, but before we can reach these conclusions we must pass, both in fact and in law, far beyond the bounds of existing science.

UNPUBLISHED LETTER OF ANDREW CROSSE, THE ELECTRICIAN.

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"It is better to follow nature blindfold, than art with both eyes open."

Memorials of Andrew Crosse, p. 159.

THE depths of scientific research resemble those other great depths of which our navigators had not, until Lieutenant Maury arose, any definite notion: While