THE ORIGIN OF SPECIES.

The following is the first portion of an essay read before a Young Men's Literary Society in Glasgow a short time since by a working man. It will serve at once as a specimen of the kind of thinking that is fostered by church literary associations, and to furnish our readers with some definite answer to the plausible insinuations of some scientific men on the subject of which it treats. The remainder will be given next week :—

What are species? and how have they come to exist? are the questions which I have had set before me for declaring. I am sensible of the importance of the subject. I am still more sensible of my incapacity for deciding, of my own authority, what should, or what should not be held as true in theory upon it. But yet, as a man in the habit of reading, and of forming a more or less decided opinion upon matters that come under notice, and especially upon matters that seem to involve consequences, the importance of which is impossible to estimate, I have presumed to accept the subject for essay desired from me, and shall endeavour, as clearly and concisely as possible, to lay before you what information I have been able to gather, and what thought and judgment I have brought to bear upon it.

It may be as well to state that I do not think the question for consideration in this essay is one as to whether God created; but only as to what was His mode of operation in the work of bringing things into the shape in which we now see them. Most of the upholders of what has been called the development, or continuity, theory, hold as firmly as others the doctrine of a Creator and Governor of the universe, however much those others may think the ground they occupy leads inevitably to a denial of exercise of creative functions. The question is, Did God, by a direct act of his, form and send forth from his creative hand, all those groups of animals and plants, each after its kind, which are called species; or did he, exercising creating power, form one, or a few original forms, leaving them to the operation of laws of "growth with reproduction; inheritance which is almost implied by reproduction;" and "variability from the direct and indirect action of the external conditions of life, and from use and disuse?" If a man say, The world as it is, and the forms therein, are but forms of matter, so existent by forces evolved from within themselves, and self-subsistent, we say to that man, you have no place in this discussion; for we do not consider the question of the interference of the Deity (for that is admitted), but only the question as to how the Deity interfered.

There are two well known and well-canvassed theories on the subject—the one weakly advanced for the most part in these days by scientific men, but for which its advocates have claimed the authority of the Word of God; and the other vehemently asserted by some men of science, many of whom chuckle over the discomfiture they suppose it gives to the statements of Scripture, and which is largely and widely supported by most undoubted facts in natural history. Ere I have done it will be apparent which of these two theories I adopt.

Though every naturalist admits the existence of species, few of them have agreed as to where the line is to be drawn between one species and another. Thus, while one man defines species to be "a combination of individuals alike in all their parts," he may, with the naturalist Borrer, arrange no fewer than seventy-one different species of salix (of which the willow is an example), or he may, with Koch, reduce them to twenty-nine, and be equally consistent with the definition; for the gradations from species to species are so nice that the line dividing one from another is often the most arbitrary conceivable, and makes it difficult to determine where unlikeness to a seemingly central variety begins.

But perhaps the best definition is that of De Candolle, the elder, who defines a species to be "a collection of all the individuals which resemble each other more than they resemble anything else, which can by mutual fecundation produce fertile individuals; and which reproduce themselves by generation in such a manner that we may from analogy suppose them all sprung from one single individual." However much difficulty there may be in fixing to what species a particular animal or plant may belong, by this definition the true way of discovery is to run up its pedigree till, through all changes, it is found to join itself to the head of the family from which it sprang. As this cannot be done, however, De Candolle's process of analogy must be adopted, and an approximation to the truth made by a roundabout, and, it must be admitted, somewhat uncertain process.

The animal kingdom consists of orders, genera, species, varieties, and individuals. The vegetable kingdom has its counterpart of this. Every individual is different in some respect from every other. A variety includes all the individuals which have descended from a common stock, which have to some greater or less extent changed their appearance by change of situation, and other causes. This power of variability, however, is limited, though the limits are such that often the variety has left the central and parent stock so far that it may approach much nearer in appearance to another species than it does to some of the varieties of the stock from which it sprung. Thus, if species are represented by nearly-touching circles, it will be seen that varieties approaching from the centres towards the outer rims of circles will be nearer each other than they are to other varieties that have struck off from those centres in opposite directions. I must, at this point enter upon one or two demonstrations of this principle of Limited Variability; for it is here that differences of opinion most exist.

It has been observed that the most favourable examples for consideration are those that lie nearest to our hand; for the greatest divergencies, both in number and appearance, are found under domestication and cultivation. Of the many varieties of rose, for instance, by far the largest proportion have been produced by cultivation; while Mr Darwin asserts that "at least a score of pigeons might be chosen, which, if shown to an ornithologist, and he were told that they were wild birds, would certainly be ranked by him as well-defined species." Indeed, so greatly has this power of variability been shown to exist under domestication, that Sir John Sebright boasted "he would produce any given feather in three years," while, if he wished to obtain a head and beak of a particular kind he would only take six years. But the same fowl and the beast are alike invalid for the purpose for which they are produced, since this is the utmost extent to which variability goes. Suppose Sir John had taken one of his common pigeons, and resolved that he should form it into a fan-tail. By careful selection and diligent watching of the young birds likely to produce in the next generation offspring with more and more tail feathers, he might have the grand result of the best fan-tail pigeon ever reared. The thirty or even forty feathers are in the tail; the feathers are expanded, and are carried so erect that the head and tail touch; and "the oil-gland is quite aborted." There are all the requirements of the perfect bird, according to the notions of perfection current among pigeon fanciers. But the bird most perfect of this kind is that with the largest amount of tail-feathers; and a further variation in the way of greater perfection is demanded. Let the tail have fifty feathers. When an effort in this direction is made, it is found that the limit of variability has been reached; and that point gained, so far from a capability of advancing being manifested, there is an ever-recurring tendency to revert to the orthodox twelve feathers in the tail.

The same principle is seen in exercise in dealing with horses. By careful breeding, man has adapted the horse to different purposes, and can go over the same process again, if necessary, for the improvement of his breed. Horse-breeders, however, are surely not to be told, that they can, if they will but do their work effectively, increase the power of the Clydesdale, or the speed of the racer, much beyond what has been already obtained. Given a race-horse, you may have, in twenty generations, by watchfulness and proper breeding, a splendid draught-horse descended from him; but though you have changed the animal considerably, you have left him a horse still; and he would never be anything else. Or given a cart-horse, in twenty generations a careful breeder may produce an animal that will stand a chance of winning the Derby. But it would be found to be only a chance; for the acme of speed in the horse has long ago been reached. I have not paid much attention to these matters, but I think it improbable that the speed of horses has increased anything within the last fifty years; and yet that would be quite sufficient to turn the descendants of a good Clydesdale into race-horses, and the descendants of Voltigeur or the Flying Dutchman into prize horses for agricultural purposes.

Besides, there is a feature in this question of variability which I have not yet noticed, and which I think goes directly in the face of the supposition that species have arisen from the accumulation of small and seemingly unimportant differences. When a change has been begun by selection for the purpose of change, its progress is at first rapid, and then slow, decreasing in quickness at every step in the journey till the utmost point possible is reached; and the further removed from the medium condition, the greater the tendency to revert. Like a bow, the further bent, the greater the tension and effort to return to the original condition; and unless held, will come back with the same strides with which it had advanced. As a test of this principle, we shall suppose that, for the purposes of hunting a dog was required with extreme length of nose. To secure such an animal a number of gentlemen form themselves into a club, making it a rule that each shall, to the utmost of his capacity, breed with the sole object in view of producing a long-nosed dog; and that they shall from year to year hold a dog-show, and award a prize for the longest nose. Well, it would be found that, if the effort had begun with ordinary dogs, that most extraordinary results were produced; and the judges would have little difficulty in deciding where to make their award. I shall suppose (and it is, I believe, in no way an extraordinary supposition) that in the first year half-an-inch was gained. But for the purposes for which the club has been formed, half-an-inch is by no means perfection; and the members resolve to go on from year to year. From the results of this first competition, a thorough believer in a principle of continuity might have been led to expect that, if the club continued its operations for a quarter of a century, they would be awarding the prize to a dog at least a foot longer in the nose than the one they had begun with; and having so well begun, they might safely leave the remainder of the work to the next generation, which would be able to develop to its full extent this new species of dog, which in the end would have a longer nose than the body and tail of the common ancestor!

A friend informs me that he knows of a flock of sheep which have been several times turned from the variety to another. They were at first moorland. It was desired by the breeder to bring them up to the Leicester point, and for that purpose a single tup of that breed was put among them, and the moorland tup removed. The result was that, at a bound, the next generation were brought rather more than half-way towards the Leicester variety. The process was continued for several years; but the breeder was never able to take out of this flock the evidence of their moorland ancestry. They were again turned by the removal of the Leicester tup and the putting among them one of a purely moorland breed. They took the same long rapid stride towards the moorland that they had formerly taken towards the Leicester variety; but though a considerable time has elapsed since the experiment was made, the flock feed among the hills of Perthshire with such traces of the Leicester tup among them still as are perfectly discernible to one familiar with the marks of the different breeds of sheep.

But admitting, for the sake of argument, that, by the constant accumulation of small variations, continuing through a prodigious, and, as I hope to be able to show, a preposterous number of years—admitting all that is required to be admitted by those who, with Lamarck, the author of "The Vestiges of Creation," and Mr Darwin, the latter of whom has most effectually put the development theory into shape, it is worth while asking—Where does this theory lead us to? Has the accumulation of variations ceased in us? Are the varieties of the human species, which is the highest development as now of, only waiting some new improvement into a grander family, whose improvement shall be such that, in the struggle for existence, man as he at present exists, shall have to give place? I have a philosophical friend who thinks so. And indeed his position seems to me to be the only one that can for a moment stand, if the principle of a continuous development is held at all. If the monkey has been perfected from the monad, as Mr Darwin seems to imply, and mankind has come from the monkey, as Lord Monboddo distinctly asserts, I cannot see that the flight will be very great from green man to some ethereal creature whose sublimated structure shall refuse to acknowledge the attraction of the earth. According to my friend, "The animal kingdom is simply an ascending series of embryonic forms, arrested at the successive stages of their development," and he argues that "the next great advance in organisation" will be "the assumption by man of his true position as the aerial and papilio type of the mammalia." In other words, viewing man as the most absolutely advanced, he is yet relatively the least advanced, and the next step will be a development of wings as the grub gets to make her a butterfly! Nor do these dreams end even here;—for if men are developments, so also are their faiths; and Christianity, Buddhism, Mahommedanism, are the outgrowth of developed minds pretty much as sin was said by Milton to have been developed from the left lobe of Satan's brain! And indeed at the present time papers are being written and books published avowedly maintaining this view, wherein Moses and Confucius, Christ and Mahomet, are made to stand on the same platform. The more common advocates of the development theory, however, do not aspire to be so logical as this; and for that reason this paragraph may be regarded as a digression.

So far as we have gone, then, there seems sufficient ground for believing that the constant variations produced through nature have all central points round which they move, like planets round their suns. We have seen that in the artificial breeding of varieties there is almost no end to them, while yet a specific distinction is maintained. To open up this discussion a little further, let us enquire whether, in breeding in a state of nature, there is a principle in operation which has not been found in artificial breeding—a principle that shall be seen to be strong enough to make not only a variation, but a specific difference in structure.

In one of the most interesting chapters of his fascinating book, Mr Darwin gives a new name to an old and well-understood principle, and states it as follows:—"Individuals having any advantage, however slight, over others, would have the best chance of surviving and of procreating their kind. On the other hand, we may feel sure that any variation in the least injurious would be rigidly destroyed. This preservation of favourable variations, and the rejection of injurious variations, I call Natural Selection." The principle here is, that nature lays hold on whatever advantageous variation may take place in an animal, and fixes that variation in its descendants, till, in the struggle for existence, the less favoured animals of the same kind are reduced in number, and finally, should the struggle go so far, be extinguished. Darwin admits that this process is a slow one; and not giving sufficient weight to the tendency to revert to the average animal, and too much to the length of time he supposes there is for such changes to take effect, he writes—"We see nothing of these slow changes in progress, until the hand of time has marked the long lapse of ages, and then so imperfect is our view into long past geological ages, that we only see that the forms of life are now different from what they formerly were." Now, in dealing with a matter of this kind, there is no use in denying that some effect must be produced by even slight variations from the parent stock. By way of illustration, we shall suppose that two variations are produced from the partridge in one year, the variations being, say, a white feather in the wing of one bird, and a black feather in the wing of another. As between these two, most assuredly the white-feathered partridge has the least chance of escaping the sportsman's eye. But, if it is an advantage to vary towards a black feather in the wing, the disadvantage of the birds that have the common colour preserved to them in their wings, as against the black-feathered one, ceases at this point. For, the sporting season done, the black-feathered partridge comes in for its own share of the rigours of winter, and now stands an equal chance with the heather-coloured birds. After that comes the breeding season, and we shall suppose that Miss Gray Partridge is willing to mate with Mr Black-feather Partridge. All these difficulties overcome, however, the likelihood is not great, with a principle of reversion in operation, with a gray mate to breed with, and with equal chances, through injury to the eggs, and the death of the young, with the other birds, that the black feather will have extended to a single bird. And even though it had, it is likely that this bird would succumb to some of the other enemies of the race, which are not, as the sportsman is, affected by the colour of a feather. It is a question of averages, and the average bird has the best chance. The variation which brings a disadvantage, brings upon its possessor swift destruction; while that which brings with it a slight, even a considerable advantage, lasts only for a time, and is swallowed up by the opposing numbers of its brethren. Though I imagine that my idea must be sufficiently clear to you already, I am strongly tempted to give you entire what I reckon a complete illustration of my meaning. I take it from the last number of the N. B. Review, and is as follows:—

"Suppose a white man to have been wrecked on an island inhabited by negroes, and to have established himself in friendly relations with a powerful tribe, whose customs he has learnt. Suppose him to possess the physical strength, energy, and ability of a dominant white race, and let the food and climate of the island suit his constitution; grant him every advantage which we can conceive a white man to possess over the native; concede that in the struggle for existence, his chance of a long life will be much superior to that of the native chiefs; yet from all these admissions there does not follow the conclusion that, after a limited or unlimited number of generations, the inhabitants of the island will be white. Our shipwrecked hero would probably become king; he would kill a great many blacks in the struggle for existence; he would have a great many wives and children, while many of his subjects would live and die as bachelors; an insurance company would accept his life at perhaps one-tenth of the premium which they would exact from the most favoured of the negroes. Our white's qualities would certainly tend very much to preserve him to a good old age, and yet he would not suffice in any number of generations to turn his subjects' descendants white. It may be said that the white colour is not the cause of the superiority. True, but it may be urged, simply to bring before the reader the way in which qualities belonging to one individual in a large number may be gradually obliterated. In the first generation there will be some dozens of intelligent young mulattoes, much superior in average intelligence to the negroes. We might expect the throne for some generations to be occupied by a more or less yellow king; but can any one believe that the whole island will gradually acquire a white, or even a yellow population, or that the islanders would acquire the energy, courage, ingenuity, patience, self-control, endurance, in virtue of which qualities our hero killed so many of their ancestors, and begat so many children; those qualities in fact, which the struggle for existence would select, if it could select anything?"

To this point, then, it comes, so far as experience goes, that no variation takes place either in artificial selection for breeding purposes, or selection by nature of the best sorts for propagation, so great as to form a distinction of kind. The degrees of variation in both cases are great; but they are no more different in kind than the water is which is the constituent element of hail, snow, and ice. And although difficulties many and perplexing arise in the scientific arranging of each animal and plant within the circle to which it belongs, that no more establishes the theory of progressive development of living organisms, as broached by Buffon, Maillet, and Lamarck, and adopted by the author of "Vestiges," and Mr Darwin, than the ignorance of Copernicus of the relation of the earth to the sun and the planets established his view of the solar system. Let the truth be sought out. I will even say, let the truth be sought in this matter in the spirit of Mr Darwin, and there is nothing to fear. And for them that jump to his conclusions without the pains he has taken to come to them, let there be only the faintest expression of pity, for the airy bubble in their minds will soon burst by the extreme vigour of their blowing.

Fireside Reading.

SANDS OF THOUGHT.

BY J. W. JACKSON.

It is only cowards who are afraid to know the worst.

Centralisation is the world's highway to imperial unity.

Every crime you commit is a sin against your own soul.

Bacon is greater in his aphorisms than his dissertations.

When justice reigns within, law is unnecessary without.

There is no tyranny worse than that of an ignorant majority.

The vocation of the legislator will be at an end, when every man is a law unto himself.

The greatest curse that can befall a man of genius, is a too early recognition of his merits.

The world flatters itself that it will know its "coming man" when he arrives—but this a mistake.

As there is sunshine above every cloud, so is there an everlasting blessing behind every bereavement.

It would seem that mad nations occasionally require to be put into a straitwaistcoat of steel bayonets.

The greatest of all earthly privileges, is that we should suffer in the cause of God and the truth.

The life of some men seems one long compromise; they can never say a decisive word, or do a decisive thing.

The strength that does not feel itself to be weakness, and the wisdom that does not know itself to be folly, are simply the baseless fancies of a dream.

The man who has never been devotedly loved by a pure-minded, high-souled, and gifted woman, still lacks one of the grandest and most powerful incentives to deep thought and heroic action.

It may be truly said, that there are minds so grandly colossal, that the whole material universe seems to serve them but as convenient subject-matter for the exercise of their thought and knowledge.

Strictly speaking, not only should an author wait till he is fully inspired before writing, but on all higher topics, it is doubtful if he should put pen to paper, save under inward compulsion—till the spirit will not be gainsaid.

Some men, in every other respect ignoble, occasionally manifest a certain greatness of soul in daring to love superior women, so that, eventually, the world finds presented for its solution the rather mysterious, but too common problem of the brute of a husband married to an angel of a wife, a woman whom all other men revere, united to a creature whom all other women despise.

Remember that all extraneous greatness, such as wealth and rank, fame and power, is fleeting and temporal, a part of the timevesture of your spirit, which having been put on can be taken off again. But the grandeur that is within, which is inherent, that attaches to your soul, and is a quality of yourself, defies time and change, and is from its essential character indestructible and eternal.

It may be said of some men, despite many lapses, that sin still remains external to their inner and higher life. Their actions may at times be very exceptional, but their moral sense is never thoroughly blunted or hopelessly perverted. They cannot call evil good. They can never persuade themselves that gross vices, after all, involve only venial offences. They never palter with their conscience. They confess their faults, and call their failings by their right names. They never impose the fallacy of self-righteousness on themselves, and are altogether above and beyond the meanness of hypocrisy with others, so that at the worst and most erratic part of their career, it may still be said, the citadel of their soul is not taken, and there is yet hope that they may escape, as a bird from the fowler, out of the bondage of Satan.

Fresh instructions have been issued from the Home Office with respect to the organisation of the special constables. The principal object of the instructions is the formation of the constables in their several districts into disciplined bodies, under elected superintendents and assistant superintendents.

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THE ORIGIN OF SPECIES.

[CONCLUDED.]

I do not mean, because it does not appear to me to be absolutely needful, and time would fail me were I to attempt, in the brief limits of an essay such as this, to take up all that has been said, and well said, in support of the development theory. Certainly much could easily be laid down in opposition to arguments derived from development through "use and disuse" of organs in animals, and the preservation of the best specimens obtained by breeding, under principles of selection, and otherwise; but it appears to me that, if I can establish the principle which, for convenience' sake, I have named Limited Variability, and if I can show the impossibility of there being such lengthened periods of time in which even the laws hypothetically believed in could come into operation—such vast periods as it is asserted are necessary for the production of specific distinctions in organisms,—then the object I have in view shall have been gained. These two things cover the whole ground occupied by the best writers on this subject; and therefore, if I do not attack the development citadel in detail, it is not because there is not room for believing that it is raised on a false foundation at these points also, but that the breach is wide enough when the questions of Variability and Time are disposed of to render the whole fabric of no avail for defence.

It is time now, however, that I should deal with what I reckon to be a matter of the very greatest importance in this discussion. Indeed, so great is the importance to this development idea of the lapse of countless ages, that it must be skilful expansion, but unless the expiry of periods of time incomprehensibly vast are taken account of, the whole theory may at once be given up. It is matter of fact that the last thousand years has made no perceptible change on animals and plants living in a state of nature, not subjected to other conditions than their ancestors were; and if no change great enough has taken place in a thousand years to constitute such a difference as that which exists between a crow and a pigeon, what must must have been the myriads of thousands that have elapsed since the changes began that developed the Radiata into the Vertebrata, through the provinces Molluca and Articulata, till the last order is reached at the head of the Mammalia, in the Bimana, or two-handed animal—Man! The very thought of the time required should stagger. The ages of geology are as nothing when compared with this; and I am persuaded that not even the time contemplated by Mr Darwin when he says that "the consideration of these facts impresses his mind almost in the same manner as does the vain endeavour to grapple with the idea of eternity," would accomplish the grand diversity we everywhere see in nature.

But I have no intention to rest my denial of length of time with the denial of an eternity in the past in which vast changes may and have occurred. For my purpose it is not necessary to deny geological evidences as to the lapse of countless ages. All that it is needful for me to do is to prove the unfitness of the earth, from equally well-established scientific facts with those declaring the earth's enormous age, to produce the changes involved in the theory of development within the term required for them. If it can be shown that within a million years the earth has not been in a condition, and was not under influences fitted to promote the growth of organic forms, my point is gained; for a million years is confessedly a unit in the time required for the development of even one of the orders of organic life.

It is a fact now as well founded as any scientific fact can possibly be, that only a given amount of force exists in any given thing; and when that force is expended it ceases to exert the influence it formerly did. So many drops of water in a reservoir, let off in sufficient quantity, will turn a wheel of a particular weight a given number of times. A cylinder covered with silk turned against a bar of glass will give off a vast amount of electricity; but by and by, as the materials are worn by the friction, the electricity becomes more and more scant, till, in the end, the machine becomes useless for its purpose. The steam raised by every ton of coal can be calculated accurately by men who have tested the coal as to its heat-producing qualities, and who know the size and thickness of the boiler under which it is put. Now these are only instances of a principle perfectly understood when applied to the common affairs of life, and nobody for a moment doubts them. But if the principle of which they are illustrations is universal, it must be applied to large as well as small things. If it is true of a ton of coal that it will produce only so much heat, and no more, it must be true of ten thousand tons that they will produce just ten thousand times more heat; and were the world on fire, it would just expend its force in that way, and be done with it. One step further: if true in these cases, it must also prove true when the principle is applied to the sun. The sun, by some means, how I cannot pretend to explain, and it is fortunate for me that my argument does not require it—I say the sun, by some means, is constantly sending forth a continual supply of force, just as the ton of coal in the illustration does. Every blade of grass and grown in the valley, and the cattle upon a thousand hills, all draw their life from its rays. The shining of the sun is the very condition of life. Everybody is familiar with the scientific statement that, were its influence to be withdrawn from the earth for three days, there would not be a living thing on its face, and every sea would be frozen to its bottom. How long, then, has the sun been shedding forth this influence? How long has the heat of its beams been just so proportioned to the requirements of living organisms, that they could be in a state for the operation of Darwin's law of growth with reproduction? The answer to that has not yet been found; probably it never will be correctly estimated. But Sir William Thomson, of Glasgow, has made a calculation, with this result, that the sun cannot altogether diffuse forces for a longer period than five hundred million years. Certainly this is a long period; but people may be excused for thinking that the sun has yet as long to shine in the future as it has done in the past; and that brings us much within such a period that oppresses the mind as does "the vain effort to grapple with the idea of eternity," and so much, I believe, within a period sufficient to account for a theory of unbroken continuity from the fungus growing on an old wall, to man, "the noblest work of God."

I have another argument to present against the supposition that there is a vast eternity of time in the past for the operation of laws of growth with reproduction to produce species. It is one with which Mr Darwin vainly endeavours to grapple in one of his later chapters. In doing so, however, he ingeniously does not deal with it in the way of a difficulty, so much as in the way of showing how species may have been preserved during the Glacial Period of the world's geological history. For the benefit of those who do not know, I may be permitted to state that the Glacial Period is the very last of the Tertiary Era; and consequently what is found concerning that period must largely determine our ideas of the capacity of the earth for the preservation or propagation of species immediately prior to the advent of man upon it, especially of species known to be contemporary with him. If it can be shown that the Glacial Period was one in which a total, or even an extensive, destruction of prior existing forms must have taken place, and still more if it was a period in which the vast proportion of presently existing species could not have existed, then there is no time for these necessarily vast changes of organic forms to take place. I must here appeal to authority. I am no geologist, and have not even been a diligent reader of geological books. I therefore appeal directly to Professor Agassis. Speaking of the condition of the earth at the end of the Tertiary Era, Agassis writes:—

"A climate such as the poles of the earth can scarcely produce—a cold, in which everything that had life was benumbed, suddenly appeared. Could the animals which were created for a moderate tropical climate survive such a sudden change? Certainly not; for nowhere did the earth offer them protection from the omnipotence of the cold. Whithersoever they fled, into the dens of the mountains, which formerly had served to many of them as a lurking-place, or into the thickets of the forests, everywhere, they succumbed to the might of the annihilating element. . . . . A crust of ice soon covered the superficies of the earth, and enveloped in its rigid mantle the remains of organisms which but a moment before had been enjoying existence upon its surface. In a word, a period appeared in which the greater portion of the earth was covered with a large mass of frozen water; a period in which all life was annihilated, and everything organic upon the earth was put an end to"

And again:—"The polar ice which at the present day covers the miserable regions of Spitsbergen, Greenland, and Siberia, extended far into the temperate zones of both hemispheres, leaving probably but a broader or narrower belt round the equator, upon which there were constantly developed aqueous vapours, which again were condensed at the poles; nay, if Tschudi's observations in the Cordilleras, and Newbold's at Seringapatam, shall be confirmed (and to these we may subjoin those made by earlier travellers upon Atlas and Lebanon), the whole surface of the earth was, according to all probability, for a time one uninterrupted surface of ice, from which projected only the highest mountain ridges, covered with eternal snow."

Here, then, is a distinct barrier thrown between the immense periods said by geologists to exist, and the period which may be as much regarded as historical as geological. Admitting the existence and distribution of species over widely-extended areas, prior to the Glacial Period, there is distinct and undisputed scientific evidence that the vast mass, if not the entire field of vegetable and animal existence was swept from the face of the earth, at a period just prior to the appearance of man. To meet this, Mr Darwin supposes (what an amount of supposition it takes to build up this development theory!)—that the cold came on at one place at a time; and that vast migrations took place, as the cold began in the northern regions of the earth, to the more southern and warmer latitudes. He points to a belt of land almost continuous by which he imagines the migration was effected. That belt of land is very convenient for his purpose, as it stretches, as any one may see who will take the trouble to look at a globe, from Western Europe, through Siberia, to Eastern America. But, the imaginary migration effected, Mr Darwin does not account for the necessary existence of tropical forms side by side with arctic, living in a state of nature! Agassis, however, does not admit the slow on-coming of the Glacial Period, which Mr Darwin requires for his migration. Much less does he picture the migration of the forms: he only sees their death wherever they were when the cold came on. It is more poetic than scientific to conceive of arctic flora and fauna marching down mountain sides and over this belt of land to escape the annihilating cold; and common people may be excused by Mr Darwin if Professor Agassis is chosen as the most sufficient witness in his own department of science. If Agassis is right, there is here again no room for continuity; for that principle requires countless ages; and the ages since the Glacial Period can be counted quite easily.

I here resume the whole argument. There are great variations admitted to exist, and these are found greatest under domestication or cultivation; but these variations are shown to exist only within a circle, out of which no experience has seen them pass; and when nearest the outer rim of the circle there is the strongest tendency to revert to the original average individual, the strength of this tendency diminishing just in proportion as the variety draws nearer the central group. The variation secured by natural selection are less frequent, though more fixed; but even in nature the tendency to revert is seen when the conditions which produced the variety are removed. The theory of continuity cannot stop at man: if he has been developed, so also, by the same law, he shall develop into something else; and this must be applied to his faiths much in the same way that it is applied to himself.—The theory of development requires ages so countless that they may be regarded as infinite in duration. We have seen that there is no record to show the existence of a condition of things suitable for the production of species beyond a period very well ascertained; and the probabilities are that no new species have been produced within the historical period.

To what conclusion, then, are we brought? To the conclusion of De Candolle and Cuvier, and all the greatest names in the field of natural history—to this conclusion, namely: That species are the direct production of God, made by him for wise and good purposes, to show forth his praise, and to be useful to man, the crown and glory of all his other creatures. This conclusion is not in the least affected by a consideration of the difficulty found in a classification of varieties under their own species, and the equal difficulty of fixing whether a particular group marked by naturalists as a species may or may not be a true species. All that is matter of detail, which the increase of knowledge, with the lapse of years, may lay open to some mind of comprehensive vision. And the mind which detects the principle that regulates this revolution of varieties round a central One, shall take rank with him who, by the fall of an apple, grasped the principle which binds every planet to its sun, and every system together. In the meantime, we are not surely to *claim* kindred with the brutes because an ingenious and plausible theory has been framed to show how we may be so connected. Kings are foolish if they suspect their parentage, because it is possible their mothers may have been beggars; and men are foolish to suppose that because a monkey is nearest to them in form, therefore they are developed from the monkey. Maybe they were; but I think there is a much more likely maybe that they were not.

In closing, I may be permitted to say a word or two on an aspect of the question which does not greatly touch men of science as such. By this I do not mean that scientific men should not be influenced to a certain extent by what the Bible says on any matter. Men of the Newtonian stamp are the best men of science. But while it may not concern them, I think it very greatly concerns professing Christian young men that their ideas of what the Word of God teaches should not be shaken by the over hasty acceptation of what is plausible in science. There can be no doubt that all the ideas we receive from reading the Bible concerning the origin of man are ideas of direct emanation from God. I do not now refer to what is stated as to human derivation in the beginning of Genesis, which, for my present purpose, may be passed by, not as though it bore no relation to man's actual origin, but as forming a part of Scripture which has been much contested about. I therefore take other parts of the sacred narrative, and argue from them that man is not monkey-derived. Paul, in his address to the Athenians, declares that God "has made of one blood all nations of men," and quotes and adopts an ancient Greek poet to the effect that men are the offspring, not of the monkey, but of God. Again, in the third chapter of Luke, there is given a genealogy of Jesus Christ, which runs through his reputed father Joseph up till it comes to Adam, who is the reputed son, not of the monkey, but of God. And indeed, as you know, wherever man is traced downward in Scripture, he is traced from Adam to some one else, and wherever a genealogical tree is constructed upward, it is rooted in no one else than Adam, who is falsely declared to be God-made if he is monkey-developed. By this theory it is easy to see how natural and revealed religion are brought for ever into inevitable conflict. The two cannot stand together. To write the next words I am constrained to write, I feel a measure of shrinking. Some can complacently think of themselves as having a bestial origin, and seem willing that it should be so; but when I think of Who became flesh of our flesh, and bone of our bone, and declared Himself to be like to us in all things save only in sin; when I remember that the consequence of accepting this development theory of the origin of species is to make Jesus Christ, the Son of God, a developed monkey, and the faith which he founded the splendid outgrowth of a marvellous beast-developed brain, I stand back in some horror, and seek to keep head and heart free from its degrading tendency. I know that a consideration of this kind is as nothing to some minds; but to me, and I believe, also, to all of you, the consideration is one of vast importance; for on it are founded, not only the trustworthiness of Scripture statements of historical fact, but also some of the cardinal doctrines of the Christian system.

Fireside Reading.

SANDS OF THOUGHT.

BY J. W. JACKSON.

Accept your to-morrows upon trust in God.
The utterances of true genius never grow old.
All power implies proportionate responsibility.
The ruffian alone takes advantage of weakness.
If possible, never write beyond your inspiration.
There is as much character in the voice as in the face.
The zeal of the ignorant is seldom free from fanaticism.
Life without its sorrows would be a school without its lessons.
He who furnished your past will also provide for your future.
There is an auto-biography of every soul in God's vast creation.
Remember that you are only a tenant at will of all your possessions.
Every faculty is a gift for whose use we are responsible to our Creator.
It is the trials of earth which give us our preparedness for the joys of heaven.
If you would write for all time do not expect to be lauded by your contemporaries.
Too much leisure is apt to relax the mind and disqualify it for a great and heroic effort.
Let it be remembered that in all our trials we have God as our unseen yet overpresent witness.
Probably one of our heavenly Father's greatest mercies to us is the withholding of our wishes.
Conscience is the voice of a divine judge speaking in tones of authority from the innermost sanctuary of the soul.
Is there not something of the blackguard in the man who can wantonly inflict needless suffering on the lower creation?
It is in the world as on the stage, where the promptors are kept, as much as possible, both out of sight and out of hearing.
Grief is a mighty angel, in the dread shadow of whose stupendous pinions the whole earth is more or less eclipsed.
Oh mortal man, thou perishing creature of an hour, canst thou not reverently and patiently wait on the eternal purposes of thy Divine Creator.
The greatest victory ever achieved was won by Him, who after a life of suffering and humiliation, expired as a common malefactor upon the cross on Calvary.
Must there not be something materially wrong in the constitution and working of modern society, when so many animal pets are not only fed to repletion, and often on the choicest dainties, but also regularly washed, combed and dried, while so many orphans and friendless and deserted children are either committed to the tender mercies of the police, or worse still, allowed to run wild as city Arabs, unwashed, unkempt, neglected and undad; and so, almost as a matter of necessity, growing up into criminality and vice? How is it that we thus pamper brutes, while neglecting the children of our Father in heaven? Why have we allowed the good old custom of adoption to fall into desuetude, and so driven children's wants to the sad and degrading necessity of expending its superabundance upon such unworthy recipients?