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religious freedom, and none to harm. This is the most glorious result of the blessed Reformation. Go to the priest-ridden, enervated Italy, down-trodden, crushed Ireland, ignorant and treacherous Spain, unhappy France, and then turn to Protestant countries to see what we have gained. Our Churches, our Sabbath schools, our Bible classes, our meetings for prayer, our free Christian society, what blessings! These are the legacies we have received from the Reformers. May our hearts cease to beat when we despise these men, or what, under God, they have done for the cause of human happiness.

ARTICLE II.

On the Origin of Species by means of Natural Selections, or the Preservation of Favored Races in the struggle for Life. By CHARLES DARWIN, M. A., *Fellow of the Royal Geological, Linnæan, &c., Societies. Author of Journal of Researches, during H. M. S. Beadle's voyage round the World. London: John Murray*, 1859. *pp.* 502, *New York: D. Appleton.*

By Rev. EDWARD F. WILLIAMS, A. M., Uxbridge, Mass.

There has long been a wide diversity of opinion among Naturalists in regard to the *Origin of Species.* Hence the publication of the views of such a philosopher as Mr. Darwin, upon this subject could not but attract universal attention, and elicit the most varied criticism. The positions he has taken have been reviewed by some writers with evident unfairness, and with so much bitterness of spirit as to lead one to suspect the existence in the reviewer's mind, of a lurking jealousy of the author's well established reputation. While others gladly welcoming anything that can furnish the least ground for doubting the strict accuracy of the Mosaic record, have loudly applauded the "new theory" and have earnestly striven to establish the truth of the statements which Mr. Darwin adduces as the *facts* upon which rest his theory.

And yet no two of these reviewers exactly agree. Their confidence is either shaken in the ordinarily received theory

of Species, and they employ their ingenuity in inventing new theories, or they doggedly refuse to give up their previously formed opinions and fail to show a proper amount of candor in the consideration of the facts brought to their notice in the work they undertake to criticise. Still we are glad that Mr. Darwin's Book on the "Origin of Species by Natural Selection," has appeared. Its publication was timely, and has been productive of good. The book has been extensively circulated and quite extensively read. Its opinions have been discussed in Quarterlies, and Monthlies, and Dailies, until the larger portion of the reading public has become familiar with them. Thousands have had their interest in science awakened or increased by the ingenious speculations of the English Naturalist. Many, beside profound students of Nature, have weighed the arguments employed, and pronounced judgment upon the conclusions reached. And almost every one who has read the book, has been astonished at the vast amount and endless variety of information it contains; charmed by the simplicity and transparent clearness of the style, and favorably impressed by the seeming modesty and diffidence of the Author. We are tempted to quote some of the beautiful passages, in which the book abounds, and to present some of the most wonderful results to which Mr. Darwin's observations and discoveries have led him. But our purpose in writing this article is not to please merely, but to show by a somewhat extended comparison of the opinions of distinguished Naturalists, in regard to the Origin of Species, that nothing has yet been discovered, no argument yet advanced, which should shake our belief in the old theory of the *immutability* of Species.

Adopting the classification of Agassiz, we have 1st those Naturalists who explain the Origin of Species, by admitting that all organized beings are created, that is to say, endowed from the beginning of their existence with all their characteristics, and 2dly those who assume that they arise spontaneously. In the first class are to be placed such Naturalists as Cuvier, Prichard, Agassiz and Dana; though each differs to a certain extent from the others in his definition of the word Species, the point around which the real difficulty centres. In the second class are all those who believe in the theory of *spontaneous* generation, a theory proposed many years ago by DeMaillet and which for a time found many adherents, but which has to a great degree been supplanted by the transmutation theory of Mr. Darwin.

The definition given by the advocates of what may be termed the *direct creative* theory, are the following : that of Cuvier, who says, "We are under the necessity of admitting the existence of certain forms which have perpetuated themselves from the beginning of the world, without exceeding the limits first prescribed ; all the individuals belonging to one of these forms constitutes what is termed a species." Allied to this is the definition of DeCandolle, who says, "We write under the designation of Species, all those individuals who mutually bear to each other so close a resemblance, as admits of our supposing that they may have arisen from a single pair." According to these definitions the test of species is *constancy of peculiarities.* The definitions are unsatisfactory, in that they do not tell us what species is, or give us any means of discriminating between *species* and *permanent varieties* : 2. another class of definitions makes *community of descent*, the criterion of species. Dr. Prichard says : "Under the term species are included all those animals which in the first instance are supposed to have arisen from a single pair." Dr. Carpenter writes, "When it can be shown that two races have had a separate origin, they are regarded as of different species ;" in the absence of such proof, they are to be considered as of the same species. We are not quite satisfied with these definitions, for 1. in most cases community of origin either cannot be proved, or is the very thing to be proved ; and 2. diversity of origin is not necessarily proof of diversity of species*

3. Another class of definitions, proposed by some of the advocates of the direct creative theory, regards different species as nothing but different primordial forms, and to this opinion Agassiz, in some of his writings seems to lean. But the difficulty is, to determine what forms are primordial. In his earlier writings, Agassiz looked upon species as "a phenomenon, dependent upon the *immaterial* nature." In the last volume of his contributions to the Natural History of the U. S. A., he says, that "species have no *natural* existence, yet they exist as categories of thought, in the same way as *genera*, families, orders, classes, and branches of the animal kingdom, and yet he seems to admit, that individuals of a species may vary widely ; while the immaterial principle, the characteristic of species can never change. 4. The last definition which we will bring forward, is that proposed by

**Vide* Biblical Repository, Jan. 1859, Art. Unity of the Human Race.

Prof. Dana, and the one generally adopted. "Species are the units of Nature." A species is a specific amount or condition of concentrated force, defined in the act or law of creation. These characteristics are essential in a species, in originality, i. e. immediate creation by the hand of God, 2. universality, i. e. each individual of a species must possess the characteristics of the whole species; and 3. permanence, or immutability, i. e. no individual of one species can penetrate an individual of another species.

Before giving Mr. Darwin's theory at length, it may be well, just for completeness, to remark that Prof. Parsons, of Cambridge, has prepared to account for the existence of species by *generative development.* Some change is effected on the *ovum*, before or at conception, or during uterine nutriment, whenever a new species is to be created, thus rendering it not only possible but probable, that the dog should trace his parentage back to the hyena, through the wolf, the fox, or the jackal; the difficulty with this theory is, the absence of fact upon which to base it.

Mr. Darwin's theory, which is that of the transmutationist, or of the origin of species by a certain power in nature which may be termed "natural selection," can be briefly stated as follows, viz:

1. All organisms tend to re-produce themselves in a geometrical ratio, and with such exuberance of life, that each one would speedily fill the earth if not prevented by powerful causes of destruction. Of the Elephant, the slowest breeder of all known animals, Mr. Darwin says, "It will be under the mark to assume that it breeds when thirty years old, and goes on breeding until ninety years old, bringing forth three pair of young in this interval; if this be so, at the end of the fifth century there would be 15,000,000 elephants descended from the first pair," p. 64. "and some of the plants, such as the cardua, and a tall thistle, now most numerous over the wide plains of La Plata, clothing square leagues of surface almost to the exclusion of all other plants, have been introduced from Europe," p. 65. so that the theory of Malthus in regard to the rapid and fearful increase of the human race, is litterally true in the vegetable and animal world. Hence there must be a provision of nature which shall render it impossible for more than a very small portion of the seeds of plants, or the impregnated *ova* of animals to come to maturity.

2. There must, therefore, be a competition among these germs for life, or a struggle for existence, in which the weaker shall give place to the stronger, the inferior to the superior; and thus superiority is due to some structure or functional advantage in the kindred of one by which it, rather than others, is enabled "to live, grow, mature, and reproduce.

3. This difference, or variation is almost universally imparted by the parent to its offspring. These becoming established the same law of rapid increase, of advantages in the struggle for life, will operate, and thus give rise to varieties and further improvements in the species.

4. This law is universal. It has operated from the beginning upon all organisms. In this way varieties are established, varieties pass into species, species into genera, genera into families. So that all forms of animal and vegetable life have arisen by successive differentiation from some one primordial form.

A single quotation will show that we have not misrepresented our author. Speaking of the various forms of animal and vegetable life with which the earth is now peopled and which are preserved in a fossil state, he says they have descended, "animals from at most four or five progenitors, and plants from an equal or less number," then growing bolder he adds, "Analogy would lead me one step further, viz: to the belief that *all animals and plants* have descended from some one prototype. But analogy may be a deceitful guide. Nevertheless all living things have much in common in their chemical composition their germinal vesicles, their cellular structure, and their laws of growth and reproduction. Therefore, I should infer from analogy, that probably all the organic beings which have ever lived on this earth, have descended from some one primordial form into which life was first breathed by the Creator," p. 484. Thus the basis of Mr. Darwin's theory, is speculation and an *analogy* which he admits may be "a deceitful guide."

It is evident from the passage quoted, that in Mr. Darwin's mind, varieties are incipient species, that species, genera, etc., are men, arbitrary designations of individuals or classes of individuals which are constantly pouring into one another.

To establish this theory, Mr. Darwin first calls our attention to "variation under domestication." The *causes* of this variation are, changes in the conditions of life, and excess of food, or more important than either of these, changes affect-

ing the organs of reproduction before or at the time of conception. Habit too has a great influence in forming new varieties, which in process of time may become species. For example the legs of domestic ducks are larger than those of wild ducks, simply because the former are constantly, the latter rarely used. The drooping ears of domestic cattle may be accounted for, if we remember that they are in no danger, and have no occasion to keep their ears in an erect position, as wild cattle have to warn them of the approach of enemies.

The laws of correlation of growth are very remarkable and deserve our careful attention, for any change in the embryo or larvæ produces a corresponding change in the developed animal. The meaning of this law will enable us to explain the singular fact, that blue-eyed cats are always blind, that long limbs indicate a long head, that hairless dogs have poor teeth and short-beaked pigeons have small feet. By careful selection therefore it is evident, that species may be greatly modified, and new varieties formed. Were man to skilfully and continually employ the power given him, he could almost entirely change the work of nature.

But Mr. Darwin rests his theory of domestic variation chiefly upon the variations which have taken place among pigeons through the agency of artificial selection. The seven or eight existing varieties, which Mr. Darwin would regard as *species*, have arisen from a single pair, the *Columba livia*. Habit and changes in the external condition of life are insufficient to account for the difficulties more apparent in the pigeon family. Man's power of accumulating selection must be appealed to, if we would understand the causes that have produced several varieties of pigeons from a single pair. Just as breeders have greatly improved and are constantly improving the different herds of cattle, sheep and horses, dealers in pigeons have greatly varied the primitive species. "Sir John Sebright used to say with respect to pigeons, that he would produce any given feather in three years, but it would take him six years to produce beak and head," p. 31. With this proof that variation is constantly taking place under domestication in regard to pigeons, and therefore with all domestic animals, by means of man's power of selection, the author proceeds to consider variation under nature. Admitting very strangely for him, that "a species includes the unknown element of a distinct act of creation," and that "a variety supposes community of na-

ture," p. 46. Mr. Darwin attempts to show that the variation which is produced among domestic animals is constantly taking place, though on a greatly extended scale in the whole department of nature. New varieties will therefore be formed, or be met with in the process of formation, if a power can be found to preserve and add these successive variations. Such a power is at work all around us. This power is termed "Natural Selection," or the selection which Nature herself makes of the variations from the original type which are to be preserved and handed down, till eventually a new species of plants or animals is formed, out of what was only a variety. The rule is, "strength always prevails over weakness," but it is in the power of natural selection to give to one variety rather than another, that superiority which shall secure its life and perpetuity.

The *laws of variation* are next considered. In plants, changes of climate and of the conditions of life produce well-marked varieties. In animals, variations from parental forms are due either to changes affecting the sexual organs, or to age or disease. Certain birds cannot fly, for the simple reason that they never attempt to use their wings. For the same reason "dung beetles" have no hind legs, while another variety on the island of Madeira has no wings.

It is evident to any one that all these variations may be admitted, without however admitting anything but variation within well established limits, and then so confined as to allow of no variety ever passing into another variety, still less of any species ever changing into another species. Mr. Darwin, however, is unfortunate in the use of his *word* species, which he regards as a mere arbitrary term employed to designate a number of individuals, more or less alike. The looseness with which he employs the term often leads his readers into error as regards his meaning. In his mind, species have neither the element of *originality*, nor *universality*, nor *immutability*. They are simply things of fancy, existing only as "categories of thought."

To the acceptance of this theory, Mr. Darwin admits the existence of four serious objections. 1 The perfection of everything in Nature. If species are mutable, why is all nature perfect? Why are there no transitional forms? Says one author, the transitional forms are supplanted by those of the new species. But continues the objector, if transitional forms ever existed, why are they not found in

the rocks, in a fossil state. Mr. Darwin's answer is, that the Geological record is very imperfect, nor is he sure that certain varieties, which Geologists are accustomed to regard as distinct species, are not intermediate, i. e. in the process of passing into species. If there is any difficulty in the length of time required to carry out these changes, the uncertainty of the Geological chronology, enables us to throw in an interval of a few hundred millions of years, whenever it seems to be most needed. Upon these answers we cannot forbear to remark, 1. that if transitional forms ever existed in any period of the earth's history, (and if this cannot be established, Mr. Darwin's theory falls to the ground ;) it is very strange that no Geologist or Paleontologist, infidel or christian has ever yet discovered the slightest trace of them. Mr. Darwin is no sceptic, he has no points to show, that at all accord with his theory of transitional forms. Prof. Agassiz says, that species appear as perfect in the earlier as the later formations ; "most species," he affirms, appear in myriads of individuals in the first bud in which they are found. They appear suddenly, and disappear suddenly. "Every Geological formation teems with types which did not exist before." These statements, confirmed by all intelligent observers, are wholly irreconcilable with the theory of the gradual formation of a new species out of one immediately preceding it.

2. If transitions have ever taken place, they must be taking place now. But the most careful Naturalists have not yet discovered anything like a transitional form in any of the departments of Nature, and till they do, the theory of the mutability of species must be set aside. 2. A second dificulty, which Mr. Darwin advises, as appertaining to his theory, is the diversity of habits in the offspring of the progenitor. This objection he removes by simply adverting to its cause ; this is due to differences in the conditions of life, and to the influence of Natural Selection. Admit this, and to establish his theory, he must prove that each of the descendants of the same parent, differs from that parent to such an extent as to justify us in taking each descendant as the type of a new species, a theory which would give us nearly as many species as there are individuals in a species. He alludes to web-footed geese, which do not swim ; but to derive advantage from the example, he must prove, what he cannot, that web-footed geese will at some period or other cease to be web-footed, or become something besides geese. Organs

of great perfection, as the eye are pointed to; and Mr. Darwin is asked how their gradual growth and final perfection can be accounted for. The web that joins the toes of geese may pass away, and leave the toes free to move as they will; but how can such a complex organ as the eye be formed, anything that obstructs vision be laid aside and only that which will aid be retained. The process is very simple. "Organs of great perfection, as the eye may be formed from a simple nerve by means of "Natural Selection." Then follows a disquisition on some points remotely connected with the subject under consideration, which are closed with the profound remark, "I do not see how this is at all consistent with my theory; which only requires the addition of another premise, to explain the fallacy of our author's reasoning, viz: it is not, and *therefore* my theory is true. Upon such assumptions the theory rests, and with such arguments an attempt is made to meet and refute honest objections."

3. Another objector asks, "How can the complex faculties, called instinct, be accounted for by Natural Selection? Nothing is easier answers Mr. Darwin. Instinct is indeed not the same as habit, yet it is closely allied to it, and may be compared with it; *therefore* instinct is the same, not as habit, but as *perfected habit.* Traces of old customs will of course remain, dogs descended from wolves, do not run to their masters in a straight line when called, but run a long way round. Instincts are however often lost by domestication, partly through habit, and partly through man's power to select, and accumulate, and perpetuate such habits in his domestic animals as please him. Now if this is true, and it may be true, and *therefore* it is true, it will be seen that instinct is not permanent, but a thing of gradual growth, and may easily be perfected by Natural Selection. The tendency of the cuckoo to lay eggs in the nests of other birds, is a case in point. For as she lays her eggs at intervals of two or three days, she could not hatch them herself, if disposed to make the trial. Her experience has taught her to avail herself of the assistance of other birds, and to deposit her eggs in other nests than her own. Were we inclined to admit the validity of this sophistical reasoning, it is difficult to perceive how it would prove that instinct is of gradual growth. For in the first instant of its appearance, it is instinct and nothing else, even though it may vary in its degrees of perfection. It is surprising that so learned a man as Mr. Darwin should seem to assert that there is a transition from no

instinct to some instinct, from the lowest and least imaginable degree of instinct, to the highest and most wonderful degree of instinct. But Mr. Darwin tells us that instinct is not always perfect, that birds sometimes make mistakes in building their nests, and that though bees now uniformly build hexagonal cells, for the sake of economy, to secure the greatest amount of space with the least outlay of wax, it may not always have been so; they have learned from experience, and *gradually* arrived at the conclusion that it is best to construct their cells in all cases in the form of a hexagon.

To this reasoning, it is enough to reply, that while the nests of birds differ greatly in finish and completeness from each other, and instances can be found, where a bird has failed to build what is considered a perfect nest, and whatever nest it first builds, that *kind* of nest it always builds, and its posterity after it. Further, if instinct is of gradual growth in the bee, how does it happen that the power to make perfect cells upon the first trial, should be born, so to speak, in the bee; when man whose higher instinct is called intelligence, is under the necessity of carefully learning his trade, and painfully practicing it, before he can construct even the simplest machine, and that too though his ancestors may have followed the same trade for centuries? The truth is, instinct is not habit, but something peculiar to itself, given by his Creator directly, and according to the degree that pleases him, to the animal that possesses it.

4. The greatest difficulty, however, with which this theory of Natural Selection has to contend, is Hybridism, or the sterility of the offspring of intercoursed animals. If Mr. Darwin's theory were true, then by crossing animals of different species, new varieties would be formed, from which, in turn, other varieties could be derived, and so on, *ad infinitum*, till just such species are obtained as may be desired. The examples of great fertility on the part of a few hybrids are only exceptions which form the truth of the rule that they are generally barren, or that their young soon become so. Attempts to prove an imperfection in the generative organs of hybrids, or that sterility is due to a modification produced in the re-productive system, does not alter the fact of the barrenness of hybrids, or remain an objection which cannot be answered by any who hold Mr. Darwin's theory. However moral or attractive this theory may appear, it is inconsistent with the truth, and may be opposed by the most unanswerable arguments; were we inclined to receive it, we

could not, for the book itself furnishes weapons with which to overthrow the theory it advances. As young students of Nature, whom Mr. Darwin especially addresses, and to whom he looks for the future advocates of his opinions, we desire to utter a respectful, but firm protest against the doctrine of his book. This we do for the following reasons, which in our mind are sufficiently convincing to lead us to cherish at least, for the present, our old belief in the immutabiliiy of species.

1. The objections which Mr. Darwin has admitted may be brought against his theory, are not fairly and honestly answered. The absence of transitional forms both in nature as it now is, and as it exists in the Geological record, is unsatisfactorily explained, the testimony of the most distinguished men of science is passed over as irrelevant, the diversity of habits in animals descended from a common ancestor is not accounted for, instinct is arbitrarly regarded as a perfected habit, of gradual growth, the difficult and as we believe the unanswerable objection from Hybridism is only partially stated, and then purposely passed by, in short the whole book, so far as its arguments are concerned, seems to be based upon hypotheses which the facts of nature do not warrant, and which are only supported by such statements, as "I can conceive," "It is not incredible," "I do not doubt," etc., that my theory is true, and therefore it is true. To an unprejudiced reader the *logic* of the book must appear wonderfully weak.

2. The points which the author seeks to establish are far from being proved. It is readily and universally admitted that the individuals of any species vary very widely from each other, but these variations are always within certain limits which cannot be passed, so that no example has been found, or can be found, of an individual of any one species being transformed into an individual of another. In spite of all the improvements, which cattle breeders have brought about in their stock, they have not succeeded as yet in causing cows to bring forth sheep, or mares to produce goats. Pigeon fanciers may well wonder at the beauty of the animals to which their skilful combinations have given birth, and in triumph may point us to "runts and fantails, short-faced tumblers and long-faced tumblers, long-beaked carriers and pouters, black barbs, jacobins and turbits, which coo and tumble, inflate their esophagi and pout and spread out their tails before us," but after all a pigeon is only a pigeon, and

a cow is nothing but a cow. To establish Mr. Darwin's theory we ought to be able to prove conclusively, that pigeons are the descendants of crows, wrens or humming birds, or some unknown birds of the forest, else we shall be sure to believe that all organisms have sprung from one primordial form.

3. The theory is inconsistent with the biblical doctrine of Providence. The scriptures are the work of God, as well as nature, and the revelations of the one cannot contradict those of the other. According to Mr. Darwin the injunction of the Creator was to breathe life into some "primordial form," endow it with the laws of development, and then leave everything to the care of an undefinable something, arbitrarily termed "Natural Selection." The book, indeed is not necessarly atheistic in its tendency, except that it removes God far from us, while the scriptures record him as near by, as everywhere present, as causing the grass to spring up and the rain to fall, and the seasons to come and go, by the immediate exercise of his power, for the existence of a primordial form requires the existence of an intelligent, personal God, to call into being, and endow it with the laws of its regular development, just as much as the existence of the perfected universe. What is strange and unaccountable in the theory is that "Natural Selection" should uniformly act with such consummate wisdom, always selecting and perpetuating those varieties from the original type, which are most beneficial to the species and to mankind, that no mistakes should ever be made in the order of development, if it be not under the immediate and constant control of the God of the Bible. The attempt seems to have been made, but it has failed, to substitute a power of nature, for the personal, intelligent, and overruling God whom Christians worship.

4. The account of creation given in Genesis is too explicit, to permit us to receive even the theory of a *few* centres of creation, still less one, from which all the different species of animals and plants have alike sprung. In the account of the third's day work, it is said that "the dry land appeared," and that it brought forth grass, the herb yielding seed, and the fruit tree yielding fruit after his kind, *when seed is in itself* upon the earth." Now if the seed of the herb and fruit tree was in itself, i. e., created by itself, from the beginning, it is difficult to see how different species of plants could have been developed out of one another, or from one primordial form. Cuvier has suggested, that the phrase, "when seed is in itself" may mean that a few families, the

types of all the families of plants, etc., were at first created, which contained within themselves, as *drawers within drawers*, or *boxes within boxes*, the germs of all the species which should subsequently belong to these families. This view is at least attractive and safe and in accordance with the facts of science. It effectually silences those who hold the orthodox theory of the immutability of species, and yet deny the wisdom and foresight of a personal God. While it gives no countenance to the development theory of the author of "The Vestiges," or the transmutation theory of Darwin.

ARTICLE III.

LUTHERAN HYMNOLOGY.

By Rev. FREDERIC M. BIRD, A. M., Philadelphia.

THE present article proposes to deal neither with the abundant treasures of original German hymnology, nor with the narrow field occupied by such sacred verses as individuals of our communion may have written in the English language. The former subject would require a volume, the latter would scarcely admit a paragraph. Our business is with such Hymn Books as the Church, or her members have published "for the use, edification, and comfort" of such of the flock as are American born, or thoroughly anglicized. Of these English hymnals there are, or have been, more than people in general are aware, and of them in succession we shall aim to give accounts as fair and full as they may deserve, or the readers of the *Quarterly* desire.

The City of New York took the lead in this business. Comparing the present with the past, it is not encouraging to know that the Lutheran Church or churches in that city were wealthy, active, and liberal enough to publish for themselves successively, between the years 1795 and 1806, *three* English hymn books. Of these volumes, which are all interesting and important to the lover of our Church literature and history, the two earlier are very scarce, and the last by no means common. Dr. Reynolds, writing on this subject in the Review for October, 1859, devoted three pages