had a great success among the Parisians, and being skilfully done is even recommended to those who were not lost to the world's progress in that eventful period. In this "catching up," it is to be hoped the Parisians will not be deprived of the honest and wholesome criticism which Christendom has more or less liberally bestowed on them during confinement, unhappily without a hearing. Bismarck's sayings, which with less difficulty crossed the barriers, were too bitter for digestion then, but, if now remembered for their truthfulness, perhaps will be forgiven for their wit. This wit was not disarmed by the capitulation. "I have got what I deserve," said he to Jules Favre, during the negotiations for the armistice; "a man like me writing to a madman like Gambetta! I have blundered, and must expiate it. Do you know what his answer is? It is a paraphrase of Cambronne's *mot*." A *mot* which is known to readers of "Les Misérables." On hearing of the Paris nominations for the Assembly, Bismarck said, with a slight change of the old verdict against the Bourbons: "They have forgotten everything and learned nothing." And when, the question of entering Paris being raised, Picard remarked to him: "You ought to be aware of the significance of the city elections." "Perfectly," interrupted Bismarck; "they went against you." Still better is the dialogue between Favre and the Prussian Chancellor on the same subject: "Be it so," said the latter, "we will not enter; but on one condition—that every time a Paris journal shall say, 'They didn't dare to,' Paris shall pay a contribution of a million thalers." "The price would be too dear," responded Favre.

—Only in its last number (29) does the *Zeitschrift der Gesellschaft für Erdkunde zu Berlin* depart from its single-eyed devotion to scientific explorations, and give any indication that Germany has been at war with France. In its report of the meeting of the Geographical Society in October, we find a few remarks by the President, H. Bastian, on the worthlessness of the French claims to the Rhine country, from an ethnographical and historical point of view; with other remarks by H. Kiepert concerning his historical maps of Alsace and Lorraine (lately described in the *Nation*), in which he called attention to the very slight encroachments made by the French on the *Sprachgrenze*, or line of demarcation between the two languages, in the course of a century and a half of occupation. Attention is also called anew, in a patriotic review of the book, to Richard Böckh's standard work on the number and linguistic area of the Germans in Europe ("Der Deutschen Volkszahl und Sprachgebiet in den Europäischen Staaten—eine statistische Untersuchung." Berlin, 1869.) Böckh was the collaborateur of Kiepert's in making the maps just referred to. In that part of his book which relates to the Germans in France (chap. xi. pp. 151–194), it is estimated that the German-speaking domain (*Sprachgebiet*) embraced 140 geographical square miles and one million of inhabitants.

—In the same number of this admirable journal is an account of the latest contribution to the discussion of Xenophon's line of march to the sea with his Ten Thousand. While no part of this long journey can be said to be known with certainty, there is every probability that in time the most important points will be established. That upon which nearly all the rest hinges is the location of "the sacred mountain Theches," from which the Greeks first saw the sea. Whenever this height is identified, we may reasonably expect to find traces of the stone heap which the soldiers in their joy threw up as a monument. Col. Strecker, who, in the last volume of the *Zeitschrift* (see also vol. x., p. 194, of the *Nation*), mapped out the entire route, selected the Kolát Dagh as the sacred mountain, without, however, pretending to have found the trophy. Another engineer in the Turkish employ at Trebizond, P. Borit, has had the merit of exploring the parallel ranges south of the main range of Pontus, and which have heretofore been supposed to be shut out by it from any view of the sea. He actually found an unnamed peak with a practicable road from which, as he believes, he saw the sea through a gap in the more northern range, and close by were circular stone heaps, of no great height, to be sure—a middle one about thirty (German) feet in diameter, and several smaller ones surrounding it from four to six feet in diameter. An examination of one of these brought to view fragments of coarse red and black clay vessels such as are still in use in the region. All that can be said of this discovery at present is that it suggests further investigation in a quarter where no one had before thought of looking.

—Those who are interested in Aryan (Indo-Persian) studies know well what excellent service was done them, a score of years ago, by Professor R. Roth, of Tübingen. No scholar brought either to the Veda or the Avesta a more penetrating insight, a greater power of combination, or a sounder and more fruitful method. Since that time, he has been mainly absorbed in the great St. Petersburg Sanskrit-Lexicon—a most valuable work, indeed, yet one to which many students have grudged his so exclusive devotion. What he is capable of doing for the Veda when the Lexicon (now nearly completed) is off his hands, he showed a year since by a specimen or two of translation, published by way of criticism upon that great bundle of padding, Müller's so-called translation of the Rig-Veda. No one, we venture to say, who compares the two versions would hesitate as to which of them he would wish to see continued and completed. More recently, we learn, he is availing himself of his intervals of leisure to return to the Avesta; and he has begun a series of contributions upon it to the German Oriental Society's *Journal*, the first being on the point of appearing. In this he explains his method and the principles that underlie it, and translates and expounds the "Honover," or prayer *ahuna vairyo*, one of the most sacred formulas of the Zoroastrian faith, and a hymn from the Gâthâs, the oldest and most difficult part of the Avesta. The interpretation of the Avesta, since Burnouf's beginning, has been almost wholly in the hands of Spiegel and Haug, of whom the former rejects on principle the most valuable aid of the interpreter, comparison with the nearly-related Veda, while the latter is far from possessing the sound judgment and critical insight which should make his work, upon the whole, satisfactory. If the version of the one is set beside that of the other, one hardly sees that both have been at work upon the same material. And, what is much worse, both alike bring out a result that is little better than nonsense. Roth lays down the rule that nothing is to be accounted as understood and translated until a good and consistent meaning is wrought out of it; and he shows practically that sense can be found where it has been hitherto sought in vain. Of the sacred formula, which quite probably goes back to Zoroaster himself, he makes a verse, containing a profession of faith in the better world and in its just ruler, who bears sway also in the present world, and has established in it a guide and comforter for those who are in trouble (that is to say, doubtless, his prophet Zoroaster).

THE ORIGIN OF SPECIES.*

THE author of the "Origin of Species" is more widely known, more eagerly read, more cordially admired, and more emphatically denounced than any other scientific man of the day. The interest in him is in great measure due to the natural desire of humanity to penetrate that "mystery of mysteries"—its origin; the encomiums which even his warmest opponents (excepting those who are filled with the *odium theologicum*) have bestowed upon him are just tributes to his long and faithful labors, and to the modesty which has compelled others to award to him some of the credit he seemed loth to claim; but much, if not all, of the indignation which many good persons feel towards him arises from misconceptions of his ideas respecting the Creator, which have their origin not in his own works, but in those of certain advocates of his general views.

In truth, the candid reader of Darwin's own works can find little fault with his conceptions of the Creator so far as regards their sincerity, although it is evident that he regards the origin of species as a legitimate subject of scientific enquiry, and ignores, as well he may, the vain attempts to reconcile the conclusions to which he is led with the commonly received interpretation of Scripture. So does the author of the "Genesis of Species," who is, however, a professedly devout man, and gives many arguments and quotations, especially in the chapter on "Theology and Evolution," to show that neither "Darwinism" nor any other derivative theory necessarily conflicts in the least degree with the most orthodox religious convictions.

This leads to the needed correction of another grave misconception—that "Darwinism" is synonymous with "derivation" or "evolution," and that either of these terms is equivalent to "transmutation." This idea has not only crept into the book catalogues, where all works upon the origin of species are grouped together under the title "Darwinismus," as if they treated of merely local varieties of the same intellectual epidemic, but it has also caused many who feel that Darwin's particular theory is wrong to oppose all theories whatsoever involving the derivation of higher forms from lower.

A sketch of the views which preceded his own is prefixed, by Darwin, to the later editions of his work; but we have nowhere met with any grouping of these and subsequent theories which exhibits their relative

* "The Origin of Species by means of Natural Selection. By Charles Darwin, F.R.S." Fifth edition. (Am. reprint.) New York: D. Appleton & Co. 1871. Pp 447, 8vo.
"The Genesis of Species. By St. George Mivart, F.R.S." London and New York: Macmillan & Co. 1871. Pp. 296 (with illustrations).

nature. Such a classification we venture to offer here, admitting the impossibility of more than indicating the salient points of each theory and the names of a few of its more zealous advocates. We have also thought it best to omit the hypothesis of "acceleration and retardation,"* recently proposed by Professor Cope, and spoken of by Principal Dawson as, in his view, "the most promising of all."

Family.	Genus.	Species.	Supporters.
Creation — Independent	Production of adults		Milton.
	Production of eggs		Swedenborg.
Creation — Derivative	Production of Varieties	Transmutation	Lamarck.
		Natural selection	Darwin. Wallace. "Vestiges." Parsons.
	Production of Species	Ordinary Genesis	Owen. Mivart.
		Parthenogenesis	Ferris.

The above will explain itself to those who are already familiar with the subject, but a few words may be added for others. If the species of animals and plants were created *independently* of all other species, then they must have been made as either perfect and fully formed individuals or as seeds and eggs. The former view is here ascribed to Milton rather than to Moses or to Scripture, because most intelligent people now admit that the earlier chapters of Genesis cannot reasonably be interpreted in their literal sense; so that for a distinct statement of this view we must look to the great English poet, who, however, was not a scientific man.† The idea that organisms were created as eggs, which have a simpler structure, is less difficult to comprehend than the foregoing, but it is not easy to see how this could occur with the higher animals whose young are born *alive*, and not in the form of eggs. A rather vague enunciation of this idea is contained in a little work by Swedenborg,‡ which is probably to be regarded as purely philosophical and not as one of his theological works.

The second and more numerous family of theories is called "Derivative," because they all involve the supposition that in some way the lower and earlier forms have served as the means of producing higher and later ones. But it will be seen that they differ essentially as to the *manner* of this derivation. Lamarck was impressed with the amount of variation in size and form which the parts of an animal may undergo in consequence of their use or disuse, and so indirectly from any desire or "appetency" which the animal experienced, *e. g.*, a fish might thus become a quadruped if forced to live upon the land, and an ape might become a man. The amount of change in any one generation might be very slight, but the next generation would inherit, increase, and perpetuate the transformation.

In the endeavor to give a concise statement of Darwin's own theory, we suffer from an "embarras de richesses;" for not only is his own work one long presentation of it in many different aspects, but each later writer upon the subject has given his particular version, and from a different standpoint. Summary expressions of the theory are given by our author on pages 40, 70, 178, 412, 437; but a more diagrammatic enunciation is that of Wallace, who not only presented publicly an independent theory of natural selection at the same time with Darwin (1858), but has since paid a warm tribute to the latter's work, while expressing a doubt respecting the sufficiency of that theory for the production of man. With a few unimportant changes, his presentation is as follows:§

"1. Tendency of individuals to increase in number, while yet the actual number remains stationary.

"2. A struggle for existence among those which compete for food and endeavor to escape death.

"3. Survival of the fittest; meaning that those die which are least fitted to maintain their existence.

"4. Hereditary transmission of general likeness.

"5. Individual differences among all.

"6. Change of external conditions universal and unceasing.

"7. Changes of organic forms to keep them in harmony with the changed conditions; and as the changes of condition are permanent, in the sense of not reverting back to identical previous conditions, the changes of organic forms must be in the same sense permanent, and thus originate species."

The following passages from the "Origin of Species" may aid the comprehension of what the author admits to be a complex hypothesis:

"There is a struggle for existence leading to the preservation of profitable deviations of structure and instincts" (p. 412). "Natural selection acts solely through the preservation of advantageous variation, and it acts with extreme slowness, at long intervals of time, and only on a few inhabitants of the same region" (p. 108). "It is not probable that variability is an inherent and necessary contingent under all circumstances; variability is governed by many unknown laws" (p. 50). "We are profoundly ignorant of the cause of each slight variation or individual difference" (p. 192). "Nature gives successive variations; *man* adds them up in certain directions useful to him" (p. 40).

We italicize *man* because we are convinced that the grand fallacy in Darwin's theory lies just here, in the assumption that the selection and propagation of useful variations by *man* is in any way comparable to what takes places in nature. What is proved by all his works is this: that, so far as experience goes, no two created things are identical; that in many cases naturalists differ in their estimate of the value of the distinctions existing between individuals, so that what some call varieties others regards as species (a mighty question, which can only be decided by comparing great numbers of individuals of an undoubted species, and especially the progeny of a single pair); that by constant attention, by saving such as meet his wants and rejecting the rest, man has produced very strongly marked varieties, which continue "permanent" so long as this care is given, but which, the instant it is relaxed and a free crossing with other breeds is allowed, show that they are only varieties and not true species by reverting to the original stock. It may also be admitted that in nature a somewhat similar selection takes place, especially under the form of "sexual selection," but there is as yet no evidence whatever that natural species can be compared to the breeds of domesticated animals; and to ascribe to "selection" of any kind the power of originating *species* merely because it can preserve useful individual *varieties*, is as illogical as—if so homely a simile is allowable—to suppose that the man who is able to manage his own house is, therefore, competent to "keep a hotel." Natural selection may be a *true* cause, but it is not shown to be a *sufficient* cause.

It may here be noted that *reversion* is not mentioned in any of the statements of the theory of natural selection by either Darwin or Wallace. Yet the former treats of the subject at length, and even depends upon its agency, after the lapse of thousands of years, to account for the sudden reappearance of otherwise inexplicable structures; so that, if we give to reversion the weight which Darwin himself allows it when it favors his views, his arguments against its action (pages 28 and 160) do not remove what is really a very serious objection to the theory of natural selection as applied to the production of specific forms in nature.

This whole subject is well presented by Mivart in the chapter on "Specific Stability;" and we have alluded to it here because it has always seemed to us to involve a fundamental fallacy which the author of "Natural Selection" is bound to remove.

The object of the "Genesis of Species" is "to maintain the position that natural selection acts, and, indeed, must act; but that still, in order that we may be able to account for the production of known kinds of animals and plants, it requires to be supplemented by the action of some other natural law or laws, as yet undiscovered" (page 5). This is, we may remark, but one of the numerous evidences that, while the general theory of "derivation" has been steadily gaining adherents even from among its original opponents, yet "natural selection"—Darwinism "pure and simple"—has been, and is still, losing ground even with those who were inclined to adopt it. Huxley "adopts it only provisionally."* McCosh† admits that "it contains much truth, but not all, and overlooks more than it perceives." Lesley‡ says, "All agree that it is true if kept within the regions of *variety*, but it is disputed whether it be true for actual *specific* differences." Wallace denies its sufficiency in the case of man, and Darwin himself has modified his views somewhat in this last edition of the "Origin of Species;" furthermore, he admits "the existence of difficulties so serious that he can hardly reflect on them without being staggered" (p. 167); and that "scarcely a single point is discussed on which facts cannot be adduced often apparently leading to conclusions opposite to mine" (p. 18). Indeed, with characteristic candor, he specifies certain ideas which, if proved, would be fatal: "If it could be proved that any part of the structure of one species had been formed for the exclusive good of another species, it would annihilate my theory" (p. 196). We may, for example, yet learn the use which the "rattle" and the expanding hood have for the rattlesnake and the cobra, but Mivart is inclined to believe they are rather injurious, since they warn the prey (p. 50). Another such "fatal idea" is the doctrine

* "The Hypothesis of Evolution." University series. New Haven: C. C. Chatfield & Co.

† "Paradise Lost," Book VI.

‡ "Worship and Love of God," Section 3.

§ "Contributions to the Theory of Natural Selection." London and New York: 1870. Pp. 302.

* "Man's Place in Nature," p. 128.

† Report of recent lectures.

‡ "Man's Origin and Destiny."

that "many structures have been created for beauty in the eye of man or for mere variety" (p. 194). And here our author seems to contradict himself when, upon the same page, he admits that "many structures are now of no direct use to their possessors, and may never have been of any use to their progenitors"—a subject which has been well discussed by the Duke of Argyll.*

The theory of natural selection implies that all changes are minute and gradual; and also that only useful structures are preserved and augmented. Prof. Mivart points out the difficulty of explaining the origin of the unsymmetrical form of the flounders, etc. (p. 37), of the limbs of animals which, in their earliest and minutest form, must have been mere buds or roughnesses, and thus rather impediments to the progress of our ancient aquatic progenitor (p. 39). Darwin further admits that "it is impossible to conceive by what steps the electric organs of fishes were produced (p. 184), also that the absence of imperfectly organized forms in the lowest strata of the earth's crust is inexplicable" (p. 292); and his explanation of the absence of the transitional forms which must have existed, according to his theory of "minute modifications in time," between such forms as the elephant, the giraffe, the galeopithecus, the bats, and the ordinary quadrupeds, is very unsatisfactory. His theory of rudimentary organs, also, is extremely imperfect. He accounts for all such from the *disuse of previous perfect organs* (p. 408); but he nowhere hints at the far more essential question as to how these original organs became perfect; for upon his own general hypothesis they must have been rudimentary in the beginning. With regret, and after the closest and most sincere examination of all his remarks upon this subject, we confess that we have rarely seen such an absolute lack of logical argument as is evinced in the section upon rudimentary and functionless structures. In fact, the immense amount of evidence which he has collected does not seem to us to bear upon the main point, the *origin of species*, at all, but only upon the *preservation of favorable individual variations*.

We have not space for further presentation of our own difficulties or those which others have urged against the theory of natural selection, and will simply quote the general grounds upon which Prof. Mivart has been led, with no prejudice against it, to regard that theory as playing only a subordinate part in the production of new species (p. 21):

"Natural selection is incompetent to account for the incipient stages of useful structures. It does not harmonize with the coexistence of closely similar structures of diverse origin."

"Certain fossil transitional forms are absent which might have been expected to be present; and some facts of geographical distribution supplement other difficulties. There are many remarkable phenomena in organic forms upon which natural selection throws no light whatever."

"Still other objections may be brought against the hypothesis of 'pangenesis'† which, professing as it does to explain great difficulties, seems to do so by presenting others not less great—almost to be the explanation of *obscurum per obscurius*."

These difficulties, which are set forth with equal cogency and fairness in the earlier chapters of the "Genesis of Species," have led its author to a view which he alludes to throughout his work, but presents in detail in the chapter entitled "Specific Genesis."

"According to this view, an internal law presides over the actions of every part of every individual, and of every organism as a unit, and of the entire organic world as a whole. It is believed that this conception of an internal innate force will ever remain necessary, however much its subordinate processes and actions may become explicable. That by such a force, from time to time, new species are manifested by ordinary generation, these new forms not being monstrosities, but consistent wholes. That these 'jumps' are considerable in comparison with the minute variations of 'natural selection'—are, in fact, sensible steps, such as discriminate species from species. That the latent tendency which exists to these sudden evolutions is determined to action by the stimulus of external condition."

The part assigned to natural selection is stated as follows:

"It rigorously destroys monstrosities, favors and develops useful variations, and removes the antecedent species rapidly when the new one evolved is more in harmony with surrounding conditions."

Professor Mivart has so frankly admitted the essential coincidence of the above view with the one expressed by Professor Owen in 1868,‡ that we do not hesitate to call his attention to the similar views previously advanced by Professor Parsons, of Harvard University, and by the anonymous author of "Vestiges of Creation;" believing that his own conclusions were reached in entire independence of all of them, as is said of Professor Owen's. The author of the "Vestiges" expresses himself as follows:*

"My idea is, that the simplest and most primitive type, under a law to which that of like-production is subordinate, gave birth to the type next above it, that this again produced the next higher, and so on to the very highest, the stages of advance being in all cases very small, namely, from one species only to another. . . . Yet, in another point of view, the phenomena are wonders of the highest kind, in as far as they are direct effects of an Almighty will, which had provided beforehand that everything should be very good."

Professor Parsons† writes as follows:

"Suppose the time to have come when there is to be a new creation, and it is to be a dog, or rather two dogs, which shall be the parents of all dogs. How shall they be created? . . . The fifth view is, they will be created by some influence of variation acting upon the ova of some animal nearest akin—a wolf, or a fox, or a jackal—and the brood will come forth puppies, and grow up dogs to become dogs."

Besides the above, several other authors (Gray,‡ Argyll,§ and Neale‖) had already hinted at the necessity of admitting the sudden production of new specific forms, in some cases at least; and Darwin himself, as we shall see hereafter, appears to have a dim idea that something of the kind might happen in defiance of natural selection.

Nothing like direct evidence can be given in support of this theory of "specific genesis;" but the question really is, as stated by Parsons, whether, as a provisional hypothesis, it is not, on the whole, less improbable than any other, and open to fewer objections. Those who, like Spencer, are unwilling to admit the action of any but known physical laws and agencies, may say, and truly, that the supposition of an "innate internal tendency" only removes the difficulties one step further back, and is at best merely restating the case in a general way; but little more can be said of the theory of gravitation.

* "Reign of Law," seventh edition, p. 230.
† Propounded at the close of the work upon "Variation under Domestication."
‡ "Comp. Anat. and Phys. of Vertebrates," vol. iii. p. 808.

The Nation.

Apr. 11, 1878]

PHYTOGAMY.*

IF this name has not been coined already it ought to be. For "the loves of the plants," so mellifluously sung by Dr. Erasmus Darwin in the days of our grandfathers, have been in our time, through a felicitous ata-

* 'The Different Forms of Flowers on Plants of the Same Species.'—'The Various Contrivances by which Orchids are Fertilized by Insects.' Second Edition, revised.—'The Effects of Cross and Self-Fertilization in the Vegetable Kingdom. By Charles Darwin, M.A., F.R.S.' London: John Murray; New York: D. Appleton & Co. 1876-77. 3 vols. 12mo.