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 "protectors"—a subject which has been well discussed by the Duke of Argyll.10

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 the earliest and most perfect form, must have been mere buds of their ancestors, and thus rather impediments to the progress of our nearest aquatic progenitors (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. 322); 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 galapagos, the bat, and the ordinary quadrupeds, is very unsatisfactory. His theory of rudimentary organs, also, is extremely imperfect. He accounts for all such forms from the "dissolution of previous perfect organs" (p. 408); but he nowhere hints at the far more essential question as to how such original organs became perfect; for upon his own general hypothesis they must have been rudimentary in the beginnings. 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 evidenced 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 inept 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 remarks of phenomena in organic forms upon which natural selection throws no light whatever."

"Still other objections may be brought against the hypothesis of pan-genesis by which, professing as it does to explain great difficulties, seems to do so by presenting others not less great—almost to the explanation of obscurum per obscursiam."

These difficulties, which are set forth with equal cogency and fairness in the earlier chapters of the "Genera 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 Genus."

"According to this view, an internal law provides 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 force, from time to time, new species are manifested by ordinary generation, these new forms not being monstrosities, but entire individuals. 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 stimuli 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;10 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. 

11. Prefigured at the close of the work upon "Variation under Domestication."
vis, more scientifically if grossly expanded by his grandson, in a series of articles and volumes of which the subjoined are the principal titles. If we have too long delayed our notice of these books, we make amends by calling attention to them at the season which invites and amply rewards the observations in field and garden which they suggest. Mainly in consequence of these writings, the subject which our new word connotes—sexual reproduction by cross-fertilization—has become the latest and farthest-branch of biological science, which has its own laws and rules and technical terms, its distinction of legitimate and illegitimate unions, and tables of forbidden degrees. For example, it is not lawful, at least it is

ceased en righe nor beneficial, for “thrum-eyed” primroses to interbreed, nor for “pin-eyed” primroses to interbreed. Such are illegitimate unions, seldom blessed with progeny. To the unenlightened observer in Wordsworth’s poem,

“a primrose by a river’s brim
A thing of beauty is a thing without a name.
And it was nothing more.”

But as concerns the primrose, where seed-bearing is in question, if it be of the thrum-eyed stock, the pollen brought to it must come from the pin-eyed, and vice versa, in order to full fertility. Tiny blue-eyed Houstonia, emmuling our meadows in early spring, and fragrant Mitchellas, carpeting pine-woods at midsummer, are in similar case. It is this kind of arrangement for cross-breeding to which the larger part of Darwin’s latest volume on “The Variations in Plants of the Same Species” is devoted. In such flowers—and they are rather numerous and of many families—the advantage of cross-breeding between different individuals of the same species is unquestionable, for it is essential to full fertility. The differences in structure, which consist of relative and reciprocal lengths of stamina and style in blossoms otherwise alike, have long been known; the meaning of it was one of Darwin’s happy thoughts, and the confirmation is due to his labors. He demonstrated that the structure was correlated to the transport by insects of the pollen of the one sort to the stigma of the other, and that each pollen was inert, or nearly so, upon the stigma of the flower to which it belonged, but potent upon the stigma of the other sort, upon which, in passing from blossom to blossom among the plants (of about equal number as to sort), the visiting insects are pretty sure to deposit it.

It is noteworthy that this significant dimorphism belongs to certain species of a considerable number of natural families, while others, sometimes even of the same genus, and in most of their species, show no trace of it; as if certain favored species had acquired a peculiarity in which their brethren have not shared. We ourselves call to mind some species in which this acquisition is either incipient or the correlations imperfect. But in all the species of the present series, on “The Various Con- trivances by which Orchids are Fertilized by Insects”—a fascinating volume, which has recently been brought out in a second edition—the “contrivances,” as they may well be termed, are the common property of the whole order, although each genus seems to have patented a modification of its own. Here there is no dimorphism, but (with rare exceptions) all the flowers are alike, and all agree in having the pollen placed tanta- lizingly near the stigma, but prevented from reaching it, as well as in having some arrangement for the pollen’s being transported by insects from one flower to another, and ultimately from one plant to another. Wonderful arrangements, indeed, they are, which it requires a volume to describe, and of which we here offer no details. Suffice it to say that, in this great order, cross-fertilization must be all but universal as between different flowers of the same plant, and commonly between different individual plants.

In both these kinds of hermaphrodite flowers the practical separation of the sexes is hardly less than in oaks, willows, and other trees and herbs in which the stamens and pistils occupy distinct plants or different blossoms. To these three classes, then, Mr. Charles Darwin’s aphorism, “Nature abhors a vacuum,” self-fertilization, undoubtedly applies. But there remains an equipoise of factors, so to speak, in the two families, all alike, with no obvious obstacle to fertilization with their own pollen, while in many the adaptations are such as must apparently ensure it, and indeed does very commonly ensure it. Wherefore it is nowise surprising that self-fertilization was the orthodox doctrine—that there was thought to be a general adaptation for the falling of the pollen upon the stigmas of the same blossom. It is true that Christian Conrad Sprengel taught the contrary, in his work entitled ‘The Secret of Nature Discovered,’ published eighty-five years ago, and that he—mainly upon good observations—in a measure anticipated Mr. Darwin’s aphorism; but he was accounted whimsical and untrustyworthy by his own generation, and was forgotten by the next. Not so the contemporary ‘Loves of the Plants’—the hymn of the old orthodox cult—which sings the

“Gay hopes and amorous sorrow of the seed”

in verse which our fathers were fond of, but from which we will not further quote. Had Dr. Erasmus Darwin known Sprengel’s book, and brought to it the insight of the grandson, how different and how much richer the poem might have been. What curious facts and teeming fascinations have been left unsung!

To H. Müller and to Hildebrand, two of Sprengel’s countrymen, in our own day, may be credited the confirmation of the latter’s thesis as respects the general run of hermaphrodite flowers; and this by showing what a large proportion even of these are functionally universal, either by means of their pollen before the stigmas of that blossom is ready to receive it, or by the development and subsequent shrivelling of the stigma before the pollen matures, or by various other arrangements of like effect. And here, too, comes in the significant fact for the evolutionist that these arrangements belong to widely different families, but only to certain of their species or groups of species, and not to their near relatives; also that they are more pronounced in some species than in others.

Yet, withal, there is much close-fertilization, and no one has demonstrated this better than Mr. Darwin, nor so well illustrated its meaning. The more particularly and special the situation of the pollen before the stigmas of the same flower is, the more is it likely that the pollen is deprived of its chance of wide-breeding, or fails to receive the benefit of it for any long number of generations.

This assumes that wide-breeding is beneficial. The assumption is one which a teleologist like Darwin is bound to make, and which an investigator like Darwin is bound to verify, if possible. The assumption is that ends elaborately brought to pass in a large number of species, in a variety of ways, and by great necessity and exactness of adaptation, cannot be meaningless or useless—must somehow conduce to the well-being of the species. Happily, this inference holds equally good whether, with the old-fashioned teleology, we regard them as the result of design, or, as in Darwinian teleology, a result attained. The two senses are not contradictory, and, as concerns the validity of the inference, it matters not which sense is adopted, or whether the two are combined. Darwin’s investigation, undertaken to determine by experiments whether such crossing is beneficial, is published in the remaining volume of the series under consideration—that on ‘The Effects of Cross and Self-Fertilization in the Vegetable Kingdom.’ It does not fall within the scope and limits of this note to set forth the nature and the extent of these experiments. Readers interested will go to the book, and probably have done so already. As to the results, we may only say that, on the whole, they corroborate the inference—in some cases unequivocally and strongly, in others feebly, while in a very few the result was simply negative. While the crossing in many cases showed astonishing reinvigoration, and self-fertilization evident injury, the maximum good was obtained at the first or second crossing, and some close-fertilized plants soon became tole- rant of that condition, and retained their fertility for several close-breeding generations. If the Darwinian thesis was on the whole maintained, yet it was also shown that plants have many inexplicable idiosyncrasies, and that many unknown or obscure factors enter into the results of experiment. Over and over the series we are reminded of the late Jeffries Wyman’s aphorism: “No single experiment in physiology is worth anything.”

It seems reasonably made out that the benefit of a cross is, ceteris paribus, in direct relation to a certain difference in constitution between the two parents, or to some difference in their surroundings or antecedents, from which diversity of constitution may be inferred. The benefit is more decided when the parents come together from a distance than when grown side by side for several generations, and “a cross between two flowers on the same plant does no good, or very little good.” The qualification is a proper one. It would be easy to infer that it does absolutely no good, even though the advantage be inapplicable in any single instance. Still,
is the criticism itself in the very worst style of that crude and abusive early period of American literature; not only does it show us Poe as introducing puffs of himself, over and over again, as thus: "Edgar A. Poe, who has spent more time in analyzing the expression of our language than any living grammarian, critic, or essayer," (p. 384), but it specifically refutes the precise argument for whose sake it is introduced. This review by Poe was aimed at the third edition of Griswold's tedious book; whereas any one who will refer to the first edition will find that the author had already implied there, very distinctly, the same low moral estimate of Poe which he later showed. In short, it was not Griswold, who wrote under a granite.

More to the point is the matter, that Mr. Gill adds little if anything to our knowledge of Poe; and that little tells against the case which the biographer so vehemently maintains. This leaves it in doubt why the book was written until we reach the appendix, and there learn that, at the dedication of the Poe monument in Baltimore, Mr. Gill cited the "Raven" publicity; that "the large audience was absolutely spell-bound by his perfect elocution" (p. 270); and that he "was made the recipient of an ovation at its close" (p. 308). We fear that he will not win a similar tribute from his readers.

Frithjof's Saga: A Legend of Ancient Norway. By Esajas Tegnér, Translated from the original Swedish by L. A. Sherman. With illustrations. (Boston: James R. Osgood & Co.)—Bishop Tegnér, of Wexley, Sweden, who died on the 11st of November, 1848, is better known outside of his native country than any other Scandinavian poet. His great popularity is mainly due to the beautifully entitled 'Frithjof's' (or perhaps more properly Frithjof's) Saga,' a poem, or rather the compilation of twenty-four cantos or ballads, based on two old Norse Sagas; that of Thorstein Viking's son and that of Frithjof the Bold. These two Sagas furnished the plot of the story; but Tegnér found many of the finest passages of the poem in the 'Elder Edda' and in other Old-Norse lays. The poem was published complete by the author in 1822, and in 1871 the twelfth Swedish edition appeared. Sweden has had greater poets, but none whose influence upon the Swedish people has been so decisive. Numerous editions of 'Frithjof's Saga' have been published in Denmark and Norway, and in Iceland there is an excellent translation by Matthias Jochemson. Translations have appeared in nearly all modern languages including Russian, Polish, and Greek. Sixteen volumes have appeared in Germany, and of the best one of these (Mohr's) the ninth edition was published in 1863.

The English language boasts just twenty translations, eighteen of which have been made in England and two in America. 'Frithjof's Saga' was first made by Americans by Longfellow, who about the year 1837 spent some time in Sweden, where he made the personal acquaintance of Tegnér, and on his return to the United States wrote a complete translation of Tegnér's 'Children of the Lord's Supper,' and an exhaustive, enthusiastic, and critical review of 'Frithjof's Saga,' interspersed with copious translations. In 1867 Bayard Taylor published the first complete American edition of the poem, selecting for this purpose the translation by William Lowery Blackely, one of the eighteen English versions referred to above. Mr. Taylor supplemented the Blackley translation with an original introduction and notes. In 1877 Professor R. B. Anderson published in his 'Viking Tales of the North' the two Old-Norse Sagas upon which Tegnér based the poem, and added by way of appendix George Stephen's version of the poem. 'Viking Tales' also contains an introduction, a biography of Tegnér, copious notes, a mythological vocabulary, etc., and is the only edition in any language containing the Old-Norse Sagas complete.

The first American translation of the whole poem was made by Mr. and Mrs. Thor. A. E. Holcombe, and was published in 'Chicago about a year ago, and now we have Mr. Sherman's. A peculiar feature of both is that every canto is printed on precisely the same metre as the Swedish original, that the feminine rhyme is everywhere preserved, and that the alliteration in imitation of the scaldic lays is reproduced. The only new feature in Mr. Sherman's book is the illustrations from plates purchased in Sweden, being wood engravings from Malmström's celebrated pencil sketches. It is safe to say that both these versions are very creditable to the translators and cannot fail to become popular. Mr. Sherman seems to have taken great pains with the hexameters, as there are but few lines that will not "read themselves." This is, however, a point to which English readers are not apt to pay much attention, from the fact that we have scarcely any perfect hexameter verse in the English

The Life of Edgar Allan Poe. By William F. Gill. Illustrated. Fourth edition, revised and enlarged. (New York: W. J. Widdelton.)—The disappointed reader may at least recognize the truth of one sentence in this most unsatisfactory book—the passage, namely, in which it is asserted that "the relentless fate that pursued the unhappy poet [Poe] during his lifetime followed him after death" (p. 208). It is quite true up to a point. Mr. Gill and Mr. Gill's biography is simply fate's latest instrument. The "phenomenal catastrophe," which, it is stated, preceded the erection of a slab over the poet's grave, has in fact followed the poetic catastrophe involved in the production of this memoir. Yet, after all, Mr. Gill is simply the last and worst of those relentless friends of Poe who persist in seeing in every criticism upon his sad career only a new proof that "his temperament was totally at variance with the spirit of the age in which he lived" (p. 241). If these deluded people could only recognize the fact that the cloud which rests over the poet's grave is not of Mr. Griswold's creating; that Mr. Griswold himself is almost forgotten; that nobody is lighting censers over the grave; that the world would only be too thankful to anybody who should prove that Griswold was wrong and Poe right! Yet they do not prove it—they do not even attempt proof; they only rain down epithets with a vulgarity worthy of Poe himself, and end by conceding, and even reaffirming, almost every charge that ever was made against the unhappy poet.

Here comes Mr. Gill, for instance, and issues an angry controversial pamphlet of more than three hundred pages. Yet he adds not one fact of importance to our knowledge of Poe, and the only real value of the book is in its concessions. He frankly admits that Poe quarrelled with his adopted father for refusing to pay the gambling debts of his unworthy protege (p. 40); that he made his child-wife very unhappy in the early days of their marriage (p. 140); that his word was utterly worthless when speaking of his own life and writings (p. 132); that he insulted one of his most intimate female friends, Mrs. Ellet, in a way which he afterwards owned to be "a dishonor," though he never seems to have apologized for it. As to the poet's fits of drunkenness, Mr. Gill admits them again and again, and abundantly confirms what he calls a statement of "ferocious cruelty" when Griswold makes it, that "his [Poe's] habit of frequent intoxication and his inattention to the means of support had reduced him to much more than common destitution." (p. 185).

The biographer goes so far as to print a fac-simile of a letter of the poet's, during his disastrous visits to Washington, and this for no apparent purpose but to show by the handwriting "the unfortunate condition of the author" (p. 190). If it is desirable to cover up the infirmities of genius, Mr. Gill has thus hit upon a refinement of cruelty that never would have occurred to the drier hostility of Griswold.

If as finally to refute his own theory of the malice of the previous biographers, Mr. Gill plagiarizes at the end of his book a review by Poe of Griswold's 'Poes of America,' alleging that this was what stung that remorseless compiler into blackening the memory of the poet. Now, not only

however just and fairly well sustained the principle of Darwin's aphorism may be, it is confronted by the immense and seemingly endless variety of the most minute and inconspicuous things which do not seem at all