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ARTICLE IX.

THE DEBT OF THE CHURCH TO ASA GRAY.

THE death, in January last, of the distinguished botanist, Asa Gray, removed one of the most remarkable men of the century. He had attained the 78th year of his age, and died suddenly in the midst of a literary activity which had been unceasingly maintained for a period of fifty years. In recognition of his labors, he had from time to time been "crowned with diplomas and honors from all the principal universities in Europe." Only a few months before his death the universities of Cambridge, Oxford, and Edinburgh had severally honored themselves by conferring upon him the highest degrees which they have to bestow upon men of science.

But Dr. Gray was more than a specialist in science. In his last years, as well as in the vigor of his manhood, he took profound interest in defending and establishing the fundamental principles of religion, so far as these foundations are affected by scientific discoveries and theories. In the preface to his collected essays, entitled "Darwiniana," published in 1876, he describes himself as "one who is scientifically, and in his own fashion, a Darwinian, philosophically a convinced theist, and religiously an acceptor of the 'creed commonly called the Nicene,' as the exponent of the Christian faith." The weight of his opinions in England is illustrated in the following incident: *The Quarterly Review* appeared soon after the publication of the "Origin of Species" with an article, afterwards traced to Bishop Wilberforce, in which much is said as to the extent to which Darwin's theory "contradicts the revealed relation of the creation to the Creator." Not long after, Mr. Darwin writes, "The Bishop of London was asking Lyell what he thought of the review in the *Quarterly*, and Lyell answered, 'Read Asa Gray in the *Atlantic*.'"

This reference is to articles published in the *Atlantic Monthly* for July, August, and October, 1860, drawn out by the charges, then so freely made, that Darwinism was not only unscientific but atheistic. These articles were republished in a pamphlet, which circulated extensively in England in 1861, and they occupy ninety pages of "Darwiniana." The great botanist's comprehensive grasp of the subject is well displayed in the last paragraph of those articles:—

"The English mind is prone to positivism and kindred forms of materialistic philosophy, and we must expect the derivative theory to be taken up in that interest. We have no predilection for that school, but the contrary. If we had, we might have looked complacently upon a line of criticism which

would indirectly, but effectively, play into the hands of positivists and materialistic atheists generally. The wiser and stronger ground to take is, that the derivative hypothesis leaves the argument for design, and therefore for a designer, as valid as it ever was; that to do any work by an instrument must require, and therefore presuppose, the exertion rather of more than of less power than to do it directly; that whoever would be a consistent theist should believe that Design in the natural world is coextensive with Providence, and hold as firmly to the one as he does to the other, in spite of the wholly similar and apparently insuperable difficulties which the mind encounters whenever it endeavors to develop the idea into a system, either in the material and organic, or in the moral world. It is enough, in the way of obviating objections, to show that the philosophical difficulties of the one are the same, and only the same, as of the other."[1]

But it would be impossible to reproduce the whole of Dr. Gray's argument at that critical time without reproducing the essays themselves; for the subject is approached by him from almost every conceivable point of view, and treated with a freshness and keenness of preception which constantly surprise the reader.

Twelve years after the publication of the first series of Essays, Dr. Gray returned to the subject, and bestowed upon it some of the best and most vigorous thought of his later years, the results of which are to be found in the seventh and eighth chapters of his "Darwiniana," and more particularly in the closing chapter, entitled "Evolutionary Teleology," written specially for the book. The subject was also continued in his lectures given in New Haven, entitled "Natural Science and Religion," and prepared about the same time. It was at this period that the writer was privileged to form the acquaintance of Dr. Gray, and to obtain an insight into the motives which prompted his later writings. The statement of a few facts upon this point cannot fail to add interest to the discussion.

The occasion of Dr. Gray's return to the subject was the publication of various books and essays about that time upon the question of the Theistic Bearings of Darwinian Evolution. Among them was a small volume by Dr. Hodge, attempting to prove that Darwinism is atheism. In view of this renewed discussion, Dr. Gray was requested by some of his theological friends to reprint the essays already written, which seemed completely to cover the ground, and to be eminently adapted to meet old objections that were being revived. In response to such a request, which had been forwarded to him, is the following letter, under date of July 31, 1875:—

"I will say that while I am not unwilling to collect them for reprinting in case they are called for, it would not quite do for me, in the position I occupy (I mean as a man of science), to republish them in a collected form, without entering anew and further into some of the pending questions,—to do which would seriously interrupt the legitimate work which I have in hand, and to which I am deeply pledged. I suppose I could add, and

[1] See Darwiniana, p. 176.

should be disposed to add, a note or two, especially one upon teleology from a Darwinian point of view—a subject upon which there is something still to be said, though I do not see the way to say it conclusively..... At present, I think I should let them alone, unless there comes what you ministers recognize as a *call* for them, and such a call I should defer to.... But you don't know how I dislike to have my name bruited about."

Under date of August 14, of the same year, when the determination had been more fully formed, he writes as follows:—

"The important thing to do is to develop aright evolutionary teleology, and to present the argument for design from these exquisite adaptations in such a way as to make it tell on both sides,—with Christian men, that they may be satisfied with, and perchance may learn to admire divine works effected step by step, if need be, in a system of nature—and the anti-theistic people, to show that without the implication of a superintending wisdom, nothing is made out and nothing credible.

"Now for a month or two I am pressed by daily technical work to the extreme, and get no chance to turn these matters over in my mind.

"I don't want to handle this argument in such a way that it can be gainsaid, nor without touching the very point."

How admirably he succeeded in touching the very point is abundantly manifest to any one who reads the discussions in natural theology which have been written since the publication of these essays. For example, in a recent large and valuable work upon "Theism and Evolution," by a prominent clergyman, we find the following paragraph, which the reader familiar with Dr. Gray's essays will at once recognize as made up almost wholly of phrases from "Darwiniana," but, we are sorry to say, without acknowledgment:—

"The waste of nature is enormous—seeds, eggs, germs, infant life. The organisms which perish ere they commence individual development vastly outnumber those which leave successors. Destruction is the rule: life the exception. Not one, probably in ten million comes to perfection. Was the design destruction, or was there no design? Must dysteleology be allowed to take the place of teleology? The light of the sun is diffused in all directions—only a small portion strikes the planets. Is purposelessness written on the leaves of nature's great book? Why this immense waste everywhere? Our present teleology can give no answer. The teleology which will be possible, if evolution becomes an established theory, shall be able to answer,—Unless there were competing multitudes there could be no struggle for existence; if there were no struggle for existence, there could be no natural selection; if there were no natural selection, there could be no such thing as the survival of the fittest; if there were no survival of the fittest, there could be no improvement of the species, no new varieties resulting from adaptation to changed circumstances."

It is gratifying to the friends of Dr. Gray to see this evidence of the influence of his thought. But they cannot refrain from feeling that the truth would have been still better served if the writer of the paragraph just

quoted had referred his readers to the original source, where they would have come in contact with the carefully chosen illustrations and phraseology of the great scientist and philosopher himself. How much attention Dr. Gray was accustomed to give to every sentence and word, and to the whole literary aspect of his essays, may appear in the following brief note in reference to an article of the writer's upon Immortality, for which he had solicited Dr. Gray's criticism: "I like an article to begin or end with an aphorism or some sort of snapper. I think you may end your next article with a condensed expression something like this, 'Not vitality, but personality, is the witness for immortality.'"

In the limits of present space we can do no better service to sound Christian philosophy than to throw into proper relief, by ample quotations, some of the main portions of Dr. Gray's treatment of the profound and important themes of his later essays. Even in these quotations the reader cannot fail to recognize the source from which nearly all later writers on natural theology have drawn their supply both of argument and illustration. In the review, among other books, of Professor Hodge's book on Darwinism, Dr. Gray writes in 1874 as follows:—

"It may be well to remember that, 'of the two great minds of the seventeenth century, Newton and Leibnitz, both profoundly religious as well as philosophical, one produced the theory of gravitation, the other objected to that theory that it was subversive of natural religion; also that the nebular hypothesis—a natural consequence of the theory of gravitation and of the subsequent progress of physical and astronomical discovery—has been denounced as atheistical even down to our day.' It has now outlived anathema.

"It is undeniable that Mr. Darwin lays himself open to this kind of attack. The propounder of natural selection might be expected to make the most of the principle, and to overwork the law of parsimony in its behalf. And a system in which exquisite adaptation of means to ends, complicated interdependences, and orderly sequences, appear as results instead of being introduced as factors, and in which special design is ignored in the particulars, must needs be obnoxious, unless guarded as we suppose Mr. Darwin might have guarded his ground if he had chosen to do so. Our own opinion, after long consideration, is, that Mr. Darwin has no atheistical intent; and that, as respects the test question of design in Nature, his view may be made clear to the theological mind by likening it to that of the 'believer in general but not in particular Providence.'..... Ought not theologians to consider whether they have not already, in principle, conceded to the geologists and physicists all that they are asked to concede to the evolutionists; whether, indeed, the main natural theological difficulties which attend the doctrine of evolution—serious as they may be—are not virtually contained in the admission that there is a system of Nature with fixed laws. This, at least, we may say, that, under a system in which so much is done 'by the establishment of general laws,' it is legitimate for any one to prove, if he can, that any particular thing in the

natural world is so done; and it is the proper business of scientific men to push their enquiries in this direction."[2]

Dr. Gray's whole discussion of the subject of design in nature as affected by the Darwinian theory reveals a singularly clear conception of the fundamental questions of metaphysics underlying the whole subject. To these questions he repeatedly recurs, both in the essays collected in "Darwiniana" and in his lectures at New Haven on "Natural Science and Religion." So far from looking upon Darwinism as fatal to the doctrine of design, he aims to show that it furnished the material to strengthen the argument greatly, and contends that "in Darwinism, usefulness and purpose come to the front again as working principles of the first order; that upon them, indeed, the whole system rests." With great cogency of reasoning he shows that "the proof of purpose in any assemblage of phenomena lies in their manifest adaptation to discoverable ends." Purpose is not disproved by our failure to discover the ends. In God's work, as in man's, inferior intellects must suspend their judgment until further light gives them a fuller view of the whole. We can have faith that a complicated piece of machinery is designed throughout, even though we can see the adaptation only in a few particulars, and our faith will illumine a sphere of darkness in proportion to our conception of the skill of the artificer. "Design in Nature is distinguished from that in human affairs—as it fittingly should be—by all-comprehensiveness and system. Its theological synonym is Providence. Its application in particular is surrounded by similar insoluble difficulties; nevertheless both are bound up with theism."[3]

There are two fundamental modes of conceiving the relation of the universe to the Creator. The first conceives of him as acting from all time. This gives us a mechanical view of the universe, and is the fundamental error of deism and of fatalism. A second theory conceives of the Creator as acting through all time. This is the doctrine now more generally known as that of the Divine Immanence, so ably set forth in the articles by Dr. Douglas in the current volume of the BIBLIOTHECA SACRA. The danger of this latter theory is that it easily degenerates into pantheism. What Dr. Gray regards as an intermediate and as the more popular conception is favored by him, viz., that "events and operations in general go on in virtue simply of forces communicated at the first, but that now and then, and only now and then, the Deity puts his hand directly to the work."[4] This view allows us to retain our conceptions of reality in the forces of nature, makes room for miracles, and leaves us free whenever necessary, as in the case of the special endowments of man's moral nature, to supplement natural selection with the direct interference of the Creator. It is the exigencies of the moral world which make the demand for miracles. But God, while able to provide in the main for the wants of his moral creation through the mechanical operations of Nature, must certainly have left himself free to make special adaptations to the wants

[2] *Ibid.*, pp. 258, 259.
[3] *Ibid.*, p. 381.
[4] *Ibid.*, p. 158.

of their free moral natures. No theory of evolution can be entertained which implies impassable limitations to God's spontaneity in manifesting himself to our most deeply implanted wants.

Dr. Gray's familiarity with facts concerning the vegetable kingdom enabled him to illustrate, with rare felicity, many points in the argument for design which the ordinary mind would fail to see. There is much confusion concerning the extent of evidence necessary to prove pervasive design in a complex organ or system. We are prone to forget that our failure to discover the design may prove the incapacity of our understanding, rather than the lack of design in the thing examined. In supposing a correlation between means and ends, we presume a knowledge both of what needs to be done and of the best way to do it. In both these respects man is a most incompetent critic of the universe of God. For example, the spontaneous circular movement in the end of a twining plant expresses a generalized purpose, which does not become effective, for the advantage of the plant, until some object presents itself around which the vine can twine. But it will go on making its revolutions, irrespective of any particular advantage which may accrue; and thus, if no object interferes, its energy will be entirely wasted. This is but one of innumerable instances in nature where to the untrained observer, there seems to be an enormous amount of waste in the action of natural forces. Even the writer of the book of Job was impressed by it, when he asked who could tell why the rain is permitted to fall in the wilderness, where no man is.

We know of no other discussion of this aspect of the subject equal to the following paragraphs from Dr. Gray:—

"By the adoption of the Darwinian hypothesis, or something like it, which we incline to favor, many of the difficulties are obviated, and others diminished. In the comprehensive and far-reaching teleology which may take the place of the former narrow conceptions, organs and even faculties, useless to the individual, find their explanation and reason of being. Either they have done service in the past, or they may do service in the future. They may have been essentially useful in one way in a past species, and, though now functionless, they may be turned to useful account in some very different way hereafter. In botany several cases come to our mind which suggest such interpretation.

"Under this view, moreover, waste of life and material in organic Nature ceases to be utterly inexplicable, because it ceases to be objectless. It is seen to be a part of the general 'economy of Nature,' a phrase which has a real meaning. One good illustration of it is furnished by the pollen of flowers. The seeming waste of this in a pine-forest is enormous. It gives rise to the so-called 'showers of sulphur,' which every one has heard of. Myriads upon myriads of pollen-grains (each an elaborate organic structure) are wastefully dispersed by the winds to one which reaches a female flower and fertilizes a seed. Contrast this with one of the close-fertilized flowers of a violet, in which there are not many times more grains of pollen produced than there are of seeds to be fertilized; or with an orchis-flower, in which the proportion

is not widely different. These latter are certainly the more economical; but there is reason to believe that the former way is not wasteful. The plan in the violet-flower assures the result with the greatest possible saving of material and action; but this result, being close-fertilization or breeding in and in, would, without much doubt, in the course of time, defeat the very object of having seeds at all. So the same plant produces other flowers also, provided with a large surplus of pollen, and endowed (as the others are not) with color, fragrance, and nectar, attractive to certain insects, which are thereby induced to convey this pollen from blossom to blossom, that it may fulfil this office. In such blossoms, and in the great majority of flowers, the fertilization and consequent perpetuity of which are committed to insects, the likelihood that much pollen may be left behind or lost in the transit is sufficient reason for the apparent superfluity. So, too, the greater economy in orchis-flowers is accounted for by the fact that the pollen is packed in coherent masses, all attached to a common stalk, the end of which is expanded into a sort of button, with a glutinous adhesive face (like a bit of sticking-plaster), and this is placed exactly where the head of a moth or butterfly will be pressed against it when it sucks nectar from the flower, and so the pollen will be bodily conveyed from blossom to blossom, with small chance of waste or loss. The floral world is full of such contrivances; and while they exist the doctrine of purpose or final cause is not likely to die out. Now, in the contrasted case, that of pine-trees, the vast superabundance of pollen would be sheer waste if the intention was to fertilize the seeds of the same tree, or if there were any provision for insect-carriage; but with wide-breeding as the end, and the wind which 'bloweth where it listeth' as the means, no one is entitled to declare that pine-pollen is in wasteful excess. The cheapness of wind-carriage may be set against the over-production of pollen.

"Similar considerations may apply to the mould-fungi and other very low organisms, with spores dispersed through the air in countless myriads, but of which only an infinitesimal portion find opportunity for development. The myriads perish. The exceptional one, falling into a fit medium, is imagined by the *Westminster Reviewer* to argue design from the beneficial provision it finds itself enjoying, in happy ignorance of the perishing or latent multitude. But, in view of the large and important part they play (as the producers of all fermentation and as the omnipresent scavenger-police of Nature), no good ground appears for arguing either wasteful excess or absence of design from the vast disparity between their potential and their actual numbers. The reserve and the active members of the force should both be counted in, ready as they always and everywhere are for service. Considering their ubiquity, persistent vitality, and promptitude of action upon fitting occasions, the suggestion would rather be that, while

> '. . . . thousands at His bidding speed,
> And post o'er land and ocean without rest,
> They also serve (who) only stand and wait.'

"Finally, Darwinian teleology has the special advantage of accounting for imperfections and failures as well as for successes. It not only accounts for them, but turns them to practical account. It explains the seeming waste as being part and parcel of a great economical process. Without the competing multitude, no struggle for life; and without this, no natural selection and survival of the fittest, no continuous adaptation to changing surroundings, no diversification and improvement, leading from lower up to higher and nobler forms. So the most puzzling things of all to the old-school teleologists are the *principia* of the Darwinian. In this system the forms and species, in all their variety, are not mere ends in themselves, but the whole a series of means and ends, in the contemplation of which we may obtain higher and more comprehensive, and perhaps worthier, as well as more consistent, views of design in nature than heretofore. At least, it would appear that in Darwinian evolution we may have a theory that accords with if it does not explain the principal facts, and a teleology that is free from the common objections."[8]

We conclude this brief notice by repeating that no student of natural theology can afford to neglect the original store-houses of argument and illustration which Dr. Gray has placed within reach in the two volumes to which attention has been called. Philosophy has been enriched and the possibility of religious faith broadened and deepened by the enlarged views of nature which naturalists have come to have concerning the origin of species through the operation in part of natural selection. To the late lovable, devout, and profoundly philosophical botanist of Harvard College the church owes more than it yet appreciates for its deliverance from such another mistake as was made in the time of Galileo. The world even yet is slow to learn that we may find out *how* God does a thing without shaking our faith in the fact *that* he does it.

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[8] *Ibid.*, pp. 375-378.