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ARTICLE II.

THE ADAPTATIONS OF NATURE TO THE HIGHEST WANTS OF MAN.

BY PROFESSOR G. FREDERICK WRIGHT, OBERLIN, OHIO.

The Moral Paradoxes of Theism.

TO the end of time it will be difficult to maintain belief in the omnipotence of God while holding fast to confidence in his wisdom and goodness; for, disguise it as we may, there is an enormous aggregate of natural evil in the world, while the existence of the smallest amount would seem either to compromise the character of the Creator or to contradict the infinity of his power. Indeed so numerous are natural evils, that, if one concentrates his attention upon them, it requires no small effort to escape the morbid sensitiveness which characterizes the pessimist, and leads him to ask, in despair, whether life is worth living. So far as personal comfort of mind is concerned, it makes little difference which horn of the dilemma the pessimistic philosopher accepts. If he maintains the omnipotence of God, he rests under the gloomiest forebodings respecting his goodness, apprehensive not lest we are in the hands of a God who is justly angry because of sin, but lest we are in the hands of an implacable tyrant whose tender mercies are cruel, and who loves to tantalize his creatures, as a beast of prey delights to prolong the struggles of its helpless victim. Such a representation is by no means a caricature of a certain phase of the pessimistic philosophy, but is a fair statement of the views of a considerable class of modern writers who make no small stir in the literary world. It is also essentially the conception of deity underlying the great mass of heathen religions, both past and present.

The other horn of the dilemma supposes, indeed, that God is good, but that he is limited in power, and is thwarted by an original principle of evil. Such was the gloomy apprehension of John Stuart Mill, who from the study of nature concluded that, as philosophers, we must rest content with a Creator less than almighty, and that the limitations of that power were not those interposed by such a personal opponent as the devil is ordinarily thought to be, but "more probably result either from the qualities of the material—the substances and forces of which the universe is composed not admitting of any arrangements by which his purposes could more completely be fulfilled; or else, the purposes might have been more fully attained, but the Creator did not know how to do it; creative skill, wonderful as it is, was not sufficiently perfect to accomplish his purposes more thoroughly."¹

Such objections to the commonly received opinions concerning the power and benevolence of the Creator cannot be altogether ignored. But fortunately a satisfactory answer can be presented in short compass. We cannot, indeed, follow out all the objections in detail, and positively demonstrate their irrelevancy; but, by the consideration of certain fixed principles, and certain difficulties inherent in the nature of things, it is easy to show that these objections are not necessarily destructive either of the doctrine of divine omnipotence as properly stated, or of the perfection of the divine benevolence.

Omnipotence Defined.

The omnipotence of God is his power to do everything in the range of possibility. It is not within the range of omnipotence to do absurdities; that is, to do things which in their very statement are self-contradictions. Such are the childish puzzles, Can God make a stone so heavy that he cannot move it? Can God make two hills without a valley between them? Can God add two and two so that the sum shall

¹ Three Essays on Religion, p. 186.

be five? A teacher once asked a young lady pupil if she supposed God could make a triangle the sum of whose angles would be more than two right angles. The unsuspecting pupil replied, "Yes." Whereupon the teacher asked, "What kind of a triangle would that be?" Only the wit of a young lady could have saved one from utter confusion at such a time. But she triumphantly answered, "I think it would be an omnipotent triangle." And so it would.

The answer to all such statements of the question is, that they are in their very statements absurdities: they are mere collocations of words without any real meaning. They do not signify things, but *nothings*. In answer to the objections brought against the doctrine of the divine power and goodness based on the existence of natural evil, it is sufficient for us to show that possibly the objectors make as absurd demands upon the Creator as are involved in the foregoing puzzles. The defence of divine power and goodness is sufficient which maintains that in creating and sustaining the present universe the Divine Being, for all we know to the contrary, secures the highest *attainable* good of the whole. In order to make this proposition a component part of our faith, it is only necessary for us to be made to see the superior worth of certain classes of joy which are logically connected with incidental evils. Perhaps there is a logical contradiction in the choice of the higher good without these incidental evils. If so, it would be neither wisdom nor benevolence to decline the higher good because of the accompanying evils, though they do subtract somewhat from the absolute value of the whole. In order, therefore, to justify the ways of God in creation, it is necessary, first, to take a proper measure of the various orders of being which may come into existence, and of their various susceptibilities to pain and pleasure. Such a view must consider, also, the permanence of the system, and must keep in mind the possibilities of the future, as well as the embarrassments of the present.

According to the true doctrine of theism, there was no absolute necessity for the creation of the universe. The universe is not a mere emanation from the Deity. That is pantheism. The world was created by a free act of the Almighty. So far as the necessities of his own nature were concerned, God could have continued to exist forever without creating anything. For his own part, the Creator could have taken as great satisfaction during the last half of eternity as he did in the first half of it without the society of man and the angels. When God created man he had no counsellor, but created according to the discretion of his own benevolent and all-wise mind. The universe itself is the record of the Creator's wisdom. From this record we properly infer that there are inherent difficulties in the way of realizing the highest conceivable good.

It is clear, for example, even upon a superficial examination, that the highest satisfaction of finite beings cannot consist in a dead level of experience. If finite beings would enjoy the sweet to the fullest extent, they must also have tasted the bitter. If they would appreciate the sunlight, they must also see the shadows. But it is far better to possess the sweet with an admixture of bitter than not to have the sweet at all. It is better to have light *and* shadow than never to rise above the gloomy shades of non-existence.

If we are asked, why God could not have endowed his creatures with the capability of highest bliss, without the incumbrance of such liability to suffering, we need not hesitate to answer, that we do not fully know. We are not bound to know all the reasons for the actions of a personal being in whom we trust. As finite creatures, we are limited in our capacity of knowledge, and can more readily discern the grounds for confiding in the character of a superior being, than we can discern the principles on which that being would justify his conduct. It is a necessary incident in human experience, and indeed of all finite intellectual existence, that its

knowledge should be limited, and that the secrets of the Lord should be reserved for future unfolding. But while this is all true, it is no small satisfaction to direct our vision to the farthest extent of its penetrating power, where we can dimly discern the deep foundations upon which our structure of hope and faith reposes. While we cannot hope fully to explain the mystery of God's permission of evil, we can show by way of illustration the direction in which a solution may be possible.

If the philosophic sceptic will go with the geologist to the highlands of Canada, he will there behold some of the oldest fossiliferous rocks in the world, and will have pointed out to him that the little cells in the tubular masses composing the limestones of that region are the skeletons of something like the coral-building polyp, whose low form of life manifests itself not in highly organized centres, but in a general sensitivity pervading the whole mass. In very early times the whole bottom of the Laurentian sea, stretching from Lake Huron to Labrador, and from the St. Lawrence River far up towards Hudson Bay, was covered with this slimy, gelatinous sort of jellyfish, whose life was centred nowhere, but was diffused, like the grey twilight, through the whole mass. If the winds and waves tore off a part of it, and floated it away from the main body, this part would still continue to live and grow. If this nondescript animal was capable of pleasure or of pain, it was only in the lowest degree. No ordinary enemy could do it harm, and nothing but a sweeping change in the general conditions of the period could destroy its life.

If even a Hottentot should be asked if he were willing to be absorbed into such a life as that, he would answer in the negative, rightly insisting that there was more joy beneath the shelter of a single Hottentot's hut than in an oceanful of jellyfish. If reminded that he was subject to headaches and rheumatic pains, to bruises and sores, to hunger and thirst, to the ravages of fever and pestilence, to the hazards of war, the oppression of enemies, and the cunning guile of crafty

neighbors,—he would still answer, and answer correctly, that the well-being of a single tribe of his fellows was of more worth than that of the whole animal creation. That morbid state of mind which pronounces life not worth living, and leads the victim to leave the ills he has, and rashly fly through suicide to encounter others that he knows not of, is a product of civilization and of sin. A high state of civilization simply presents a still more forcible illustration of the truth of the proposition we are now considering. As the mountain peaks grow higher, the valleys between them grow deeper; so, with the increased capacities for happiness produced by civilization, there is incident to them an increased liability to failure and to the existence of incorporate evils. The civilized man is more sensitive to suffering than the barbarian is. Yet who in his right mind would not choose to be a civilized man, with all the attendant disabilities of civilization, rather than to possess the impassive nature of a barbarian?

“Better fifty years of Europe
Than a cycle of Cathay.”

The Equation between Hope and Hazard.

Some of the striking points recently made¹ in these pages by Dr. Hayman irresistibly commend themselves to the judgment. Among them are the following:—

“The discipline of pain is necessary on account of present ignorance.” “Pain as a stimulant is more powerful than pleasure.” “Pain is the safeguard of life.” “Pain is a bond of brotherly sympathy.” “Conspicuous pain is a most impressive instructor of the human race.” “Pain is the great stimulant of reflection through the medium of sensation. . . . It lets us into the secret of our weakness, defectiveness, corruption, which would otherwise remain unknown or be inertly known. It is the condition which makes the education of mankind possible, alike in the lower and in the higher sense. It not only safeguards the physical basis on which rest all higher faculties, not only urges on the mind to seek knowledge, not only drives the lesson home, but it draws out what is in man, shows the instinct of self-preservation what to lay hold upon and keeps it in constant exercise.” “It supplies the salt of heroism and the balm of brotherhood. A bond of operative sympathy among living

¹ Bibliotheca Sacra, Vol. xlv. 1, 465, 585.

humanity, it passes on from age to age a continuous conductor of intellectual effort, and makes the unexhausted balance of pain in one generation the platform of new problems and the pledge of progress for the next. Although most impressive in its vast masses which overshadow a lifetime, it becomes more so because those masses are rare; but most of all so because, rare anywhere, they are possible everywhere. The sparse incidence is multiplied into the ubiquitous possibility; and the two factors unite, the minimum of pain endured reinforced by the maximum of pain endurable, to give the product a maximum efficacy, and thus combine the warp and the woof of a merciful economy."

The anomalous relation of man's susceptibility of pain to the actual amount of suffering will bear further illustration. It is a familiar fact that the poisonous substances which most frequently cause death are not those which are the surest and most prompt in their action. An apothecary shop is a perfect magazine of death-dealing compounds; yet nowhere is a man's life more safe than in an apothecary's shop, for there the experience of the past has accomplished its appropriate results and brought it about that everything is clearly labelled according to its nature, and its distribution guarded by a skilful and properly accredited pharmacist. The greatest danger to human life lurks not in the strychnine, prussic acid, aconite, and the belladonna, of the apothecary, but in the alcohol of the saloon, which only at the last biteth like a serpent and stingeth like an adder; in the arsenic which goes out of the laboratory to beautify the decorations of our homes or to add attractiveness to our confectionery; and in the opium, forming a constituent of the sedative compounds administered to fretful children, or of the cigarettes calculated to allure and enslave the youth who dally with them. It is comparatively easy to prevent men from jumping off precipices, and from plunging into the breakers that dash upon a rocky shore, but vastly more difficult to prevent them from sliding down the deceptive gentler declivities, or venturing beyond their depth in placid but unknown waters.

The full explanation of this state of things, and the full justification of its place in a benevolent system, we may not be able to give; but, on the other hand, it is easy to show

that its existence is not necessarily inconsistent with the exercise of the highest benevolence on the part of the Creator of the universe. In justifying the ways of God in nature, we must at every step take account of the exalted powers of man, of the superior worth of virtue, and of the relation of the limited amount of evil permitted to the production of virtue, and of all the higher moral qualities which render life most worth living. Were there no continuous, threatening possibility of evil, the human race would be bereft of the nobler joys arising from mutual care of one another. The satisfaction of the protector and the gratitude of the protected would no longer be possible. In balancing the final accounts, it is difficult to tell which renders the highest service,—the self-denying philanthropist, who devotes his life to the relief of unfortunate sufferers, or the sufferers themselves, who afford an opportunity for the exercise of philanthropy on the part of their benefactors. Both suffer self-denial, but, as experience repeatedly shows, both rise to participate in immeasurably higher, purer, and sweeter joys, and all the world is made richer and wiser by the spectacle. Considerations like these are enough to answer all positive objections from this quarter.

The point, however, will bear additional and more familiar illustration. A railroad train in rapid motion has in it at every moment the possibilities of a frightful tragedy. The existence of a poorly cast axle in any one of the cars, of a defective bolt or bar on the engine, of a flaw in any one of the numerous rails, of a hidden spring of water beneath the road-bed, or of an insecure foundation for the abutments of a bridge; a misplaced switch, a fault in the copy of a telegram, a mistake in the adjustment of any one of numerous signals; a misunderstanding or neglect of duty upon the occurrence of some trivial accident; the overweariness or forgetfulness of an engineer; and a thousand other things, are liable to precipitate at any moment a frightful railroad tragedy, in which life and limb will be sacrificed without remedy, and the most precious plans of

many a circle frustrated forever. Yet, with all this liability to incidental evil, which with the application of modern physical forces has grown up to revolutionize our modes of travel, we continue to go on lengthening our trains and increasing their speed, until it is no uncommon thing to have the flower and hope of a whole city or commonwealth crowded together, and flying, as upon the wings of the wind, through deep tunnels, over high embankments and trestles, past innumerable switches, around the ever changing curves of steep river banks, with numerous trains before and behind,—all presenting a combination of hazards most fearful to contemplate. And the hazard is not merely theoretical; but, as experience too often shows, solemnly real. One can scarcely open his daily paper but there comes from some part of the world, and often from the best-managed railroads, the story of accident in which numerous lives are sacrificed, and a larger number of victims receive bodily injuries. And yet no man in his senses would, in order to avoid these hazards, go back to the stage-coach or the canal boat, or, since these also have their perils, to the employment of modes of locomotion which are so deliberate as to involve no hazard. The rapidity of present locomotion, so intensifies and increases the experiences of mankind, that it adds indefinitely to the sum of life's well-being.

At the same time, the existence of a hazard sets a high premium upon the cultivation and development of the higher capacities of human nature. We are so constituted that we have a natural admiration for heroism. The heroes of war have ever furnished the most inspiring themes for the sculptor, the painter, the historian, the poet, and the musical composer. Death, which sooner or later comes to all, has in the case of these heroes come in such a manner as to be the inspiration of artists, and an unspeakable satisfaction to all who contemplate heroism through the work of artists. And, now, in the halcyon days of peace which, we hope, are about to dawn upon the world, it is evident that the poet's couplet will

prove itself true in a sense which the poet himself never put upon it—

“Peace hath her victories
No less renowned than war.”

The captains and pilots and stokers, to whose vigilance are committed the countless passengers and vast cargoes of our palatial steamships; the engineers, conductors, and brakemen, who through light and darkness, through sunshine and storm, become responsible for the safety of our innumerable railroad trains,—these, and such as they, are fast coming to be the heroes of the present day, and are likely to furnish, in the near future, the most fruitful themes of heroic poetry and song. The forces of nature are so adjusted by the Creator, that man in his conquest of them is not likely to be able ever so to make himself their master that they shall cease to evoke dramatic exhibitions of man's most exalted powers. To be robbed of these exhibitions of heroism—to have taken away from us these high premiums upon the utmost exercises of our intellectual and moral powers, might prove to be the greatest calamity that could fall upon the human race. The endurance of pain does not necessarily rob us of pleasure; but such is the nobility of the human mind that out of pain it can rise to the highest pleasure, and out of the very disabilities of life it may receive the stimulus necessary to the attainment of the most coveted accomplishments.

Seeming Waste in Nature Apparent, not Real.

At this point we may profitably direct our attention to a few of the lower questions which puzzle those thoughtful students of nature who would maintain their belief in an all-wise personal Creator. According to the old-time method, the personality and wisdom of God are proved by the marks of design pervading the system of nature. But in presenting the argument from design, the student of nature at once encounters not only innumerable things in which he can directly see no evidence of design, but many things which seem directly

to militate against the evidence of pervasive design. Nature seems to abound in wasteful processes; at least when considered with reference to the designs for which man assumes it to have been established. If, as was once the case, it is assumed that the principal object of the sun's existence is to warm the earth and the planets, there is a startling incompatibility between that assumption and the relative amount of heat and light actually appropriated by the individual members of the solar system; for, if the light and heat received by the earth and planets be made the numerator, and that dispersed through empty space the denominator, the fraction is so small that in a problem of the higher mathematics it would be regarded as an infinitesimal, and set aside as of absolutely no value.

If, again, it be assumed that the principal purpose served by the clouds is to make the earth fruitful with their showers, and to make perennial the mountain springs which combine to form the majestic river systems of the continents, we find again that, as judged by this standard alone, the waste is enormous. This fact puzzled the students of natural theology as long ago as the days of Job, where the fact is alluded to as beyond the patriarch's comprehension, that "God caused it to rain on a land where no man is; on the wilderness, wherein is no man; to satisfy the waste and desolate ground." If to this question the reply should be made, that the deserts were the gathering-places for the waters which feed the springs and form the rivers, and that even the wilderness abounds in animal life dependent upon the scanty vegetation which it affords, this answer, unsatisfactory as it is, would totally fail in presence of a similar question with respect to the showers which fall upon the ocean. The surface of the ocean is vastly greater than that of the continents, and hence it receives a correspondingly larger proportion of the actual rainfall furnished by the clouds. In the ordinary conception of the doctrine of design, it would seem impossible to give any satis-

factory answer to the question, why so much of the power exerted by the sun in lifting the vapors from the ocean should at once be expended in precipitating the vapors back into the same deep from which they had been lifted.

In the organic world, also, where the idea of design seems more distinct and clearly defined, apparent waste is still a prominent characteristic, at least as judged by some of the earlier standards of purpose attributed to these organisms. It seems to be a clear statement of the case to say, that in the vegetable creation the pollen was designed to fall upon the stigma of the pistil, in order to fructify the seed and make perfect the act of reproduction. Yet in many instances nature would seem to be perfectly reckless in her waste of pollen, creating it in quantities thousands, and even millions, of times greater than the necessities of the case appear to require. So superabundant is the pollen of pine-trees, that it is often wafted long distances by the wind, and made to fall so thickly over regions where no pine-trees are, as to prey upon the superstitious fear of an ignorant people, leading them to imagine that sulphur is falling from the skies, and that some great natural convulsion, like that which overthrew the cities of Sodom and Gomorrah, is about to take place. Now every grain of pollen is most delicately and highly organized with reference to its adaptability to accomplish a specific purpose. Its waste when promiscuously scattered over the country by the wind would seem to be a complete frustration of the original design.

Again, even when arriving still nearer the accomplishment of the specific designs in the organic world, waste is still a most puzzling element in the problem. Everywhere nature seems to be needlessly prodigal of life. The proportion of plants and animals arriving at maturity to those which fail to do so is very small. The trees of the forest are, many of them, literally covered with seeds whose fate it is to fall to the earth, and under the influence of heat and moisture begin

to grow. But the most of them only begin. In the presence of unpropitious influences or active enemies, the vast majority of these tender shoots are speedily cut short in their career. Every germinating seed has in it the potency and the promise of a full-grown plant or tree or shrub. But there does not seem to be an economical adjustment between the promises put forth and the provision of the conditions necessary for their fulfilment. The vast multitudes perish, while the few survive.

A similar line of objections arises, also, when we contemplate the operation of the reproductive forces in the animal creation. Even among mankind the most critical period of life is that of childhood and youth. More than half the human race dies before the full attainment of physical growth, and among some classes of animals the proportions of deaths among the immature individuals of the species is startling in the extreme. The number of animals attaining maturity is by no means in proportion to the number of the individuals of a species which start upon a career of life. A single codfish is reported to produce more than three million eggs during a spawning season, and yet the number of mature fish remains nearly constant from year to year. The hazard of life to a young codfish is so great that life insurance companies are not likely ever to take risks upon them. Indeed, both among animals and men, the individuals who die at a good old age, having well rounded out their career, are few in proportion to the whole number.

With the narrow views of design entertained by numerous writers whose works were the standard a quarter of a century ago, this seeming waste in nature was continually growing more and more difficult to explain, until the burden became absolutely unbearable. With respect to the well-being of the irrational part of the animal creation, something, it is true, may be done, by way of relieving the difficulty, by pointing out the alleviating circumstances connected with the

death of animals, since animals do not approach death with that fear which sheds its gloom over the rational part of creation. It may also be plausibly maintained that the total amount of pleasure enjoyed by the animal creation is larger when there is a rapid succession of short-lived generations than it is when the same individuals have their existence prolonged. In the former case, there is the keener joy of fresh-born creatures, and there is an indefinite multiplication of the satisfaction accompanying the reproduction of the species. It is difficult, therefore, to prove that the satisfaction of the animal creation is not higher in the present condition of things than it would be if fewer individuals were brought into existence, and their individual lives prolonged to participate in the dull uniformity of a repetition of past experiences.

But with regard to the seeming waste in the vegetable creation, we must reason without the aid afforded by the existence of sensation in the animal creation. So far as we know, the plants have no feeling of their own. The bleeding of a grape-vine is not connected with pain, such as accompanies the wounding of a dog; nor is the cultivation of the vine connected with the pleasure of the plant, as the care of the master is connected with the pleasure of the ox. In another connection we will consider the possible and probable relations of this seeming waste to the higher intellectual ends conserved by some of the apparently wasteful processes of nature, but at present we are chiefly concerned with the uses subserved by them in the moral world.

To a rational being like man who beholds and studies this prodigality of nature in the use of material forces, certain lessons of great importance are driven in upon his attention. By these spectacles of prodigality in the use of material forces, emphasis is laid upon the relative unimportance of material things, and the attention is irresistibly directed to the higher ends which a rational being is more properly fitted to contemplate and attain. When Coleridge, who did not believe

that other planets are inhabited, was asked by a friend who ardently believed they were, What then were these vast worlds made for? his reply penetrated the very core of the question, "They were made to show how cheap dirt is." As I stood in the ranks of the army, in the early part of the Civil War, I was much impressed by a remark made in my presence by the lamented Garfield. News had just come of the destruction of the ships-of-war and the vast naval stores in Gosport navy-yard to prevent their falling into the hands of the enemy. The penetrating remark of this patriotic defender of his country was, that such sacrifices opened our eyes to the great worth of the Union. The altar of sacrifice is indispensable to the full development and expression of patriotism and other high and kindred moral sentiments. King David expressed the sentiment of all noble-minded souls when he declared to Araunah the Jebusite that he would not offer a sacrifice to the Lord which had cost him nothing. The *cost* of the sacrifice is what evokes the moral quality. This law of sacrifice is everywhere inwrought in nature. By it a high premium is set upon the exercise of virtue of every sort. The very obstacles in the way of attaining the ends enhance their estimated value, and induce that great labor which only can obtain highest excellence. It is thus that lesser evils may be turned to higher good.

A full statement of the reasons justifying an act of creation would involve the presentation of all the uses to which the thing created is ever put. As it is true, according to Scripture, that no man liveth to himself, and no man dieth to himself, so it is probably true that no single element of creation is limited to a single proximate purpose. The wisdom of the Creator, since he may be supposed to see the end from the beginning, and to weigh every minutest detail of the most complicated system, is, therefore, not to be judged altogether by what finite creatures can see. Still, finite creatures can see in part, and the part which they do

see may be so luminous as to give the surest ground of confidence that the Creator's work is perfect in the unseen realms which lie beyond. The perfection of God's work in realms which we understand is ample ground for belief in its perfection in other realms which remain to beckon us on to pleasant voyages of future exploration. At this point, therefore, we may profitably gather up the threads of the discussion, and from the standpoint attained take a rapid survey of the whole situation.

Nature Subordinate to Man.

We cannot long ponder upon the existing condition of things without seeing that the universe is arranged in a series of ascending orders of being in which the higher utilizes and feeds upon the lower. We are not, therefore, called upon to justify the ways of the Creator by considerations drawn from any one order in this hierarchy. The true way to arrive at a proper appreciation of the power, wisdom, and goodness of the Creator is to acquire at the outset a just idea of the capacity of man,—the crown and summit of the system. It is a remarkable fact that man is the latest born of the creation, and is closely limited in the realms, both of time and space, which he is permitted to occupy. No one claims that man has been an occupant of the world for more than a very brief portion of its existence. It was after countless ages of waiting that he was brought into the world, and installed over it as lord and ruler; and it is only gradually that he has learned to subdue nature, and to enlarge his control over her orderly forces. Still, notwithstanding the numerous inventions tending to annihilate distance by increasing the rapidity of travel and of the transmission of thought, the individual is restricted to what is little more than a point in space.

Much is said about the antiquity of man. But, on the part of those who hold what are regarded as extreme views upon this question, man's antiquity is moderate as compared

with the antiquity of the earth, or even of its various genera of plants and animals. No one has the hardihood to claim that men existed before the latter portion of the Tertiary period in geology. But, relatively to the preceding geological periods, the Tertiary is very short. The longest of all the geological periods is the so-called Azoic, in which the world was entirely devoid of life. How many millions of years the world continued to be devoid of life we cannot definitely say. But, if the nebular hypothesis be true, the lifeless period of the earth was many times longer than the periods since life was possible.

Since the introduction of life, also, the geological periods have been of diminishing length in proportion as organic beings have become complicated. The Archæan ages, during which the very simplest forms of life, like Dr. Dawson's Eozoön, and the Silurian age, during which only invertebrate animals had existence, together fill a space in geological history many times greater than that occupied by all the subsequent periods together. The Devonian and Carboniferous ages, which followed after, and were characterized by fish remarkable both for their form and size, while far shorter than the preceding period, are several times longer than the later ages combined. Again, the Mesozoic age (during which the chalk cliffs of England were formed), characterized by birds and reptiles, while far shorter than either of the preceding periods, is far longer than the Tertiary.

Now, as before remarked, it is only in the Tertiary period, this last born of the ages, that the extremest advocates of man's antiquity would place his advent. This is the age of mammals, that is, of animals which suckle their young, and whose young are born fully developed. In this very fact there is great moral significance. With the mammals begins the dependence of the infant upon the care of its parents; and the order of the classification of mammals corresponds pretty closely with the length of time during which

that dependence continues. With most mammals the dependence of the young continues only for a single season, but with man the dependence of the child continues many years. In law a child is counted an infant until he is twenty-one. The stability of nature requisite for the existence of mammals, with the dependence of their new-born children, has been of short relative continuance.

But the evidence which would connect man with even the later Tertiary period is defective, and fails to convince the mass of investigators. It is not until the Quaternary, or so-called post-Tertiary, period, that unequivocal evidence of man's existence appears. The close of the Tertiary period was marked by changes which lowered the temperature of the earth, (or of the northern hemisphere at any rate,) and brought on the great Ice age. With the contracted ideas of man's chronology derived from Archbishop Usher's tables, it was a startling conclusion which was forced upon us, a few years since, that man was upon the earth before the close of the glacial period. But even if Mr. Croll's calculations were correct, carrying the close of the great Ice age back one hundred thousand years or more, how short a time is even this compared with the millenniums of the Tertiary period, or the far longer cycles of the earlier geologic ages! Recent investigations, however, clearly show Mr. Croll to be in error, and prove that, in North America at least, the conditions of the great Ice age prevailed as late as seven thousand or eight thousand years ago. The famous glacial chronometer discovered by Sir Charles Lyell and Professor James Hall in the gorge below the Falls of Niagara proves to keep much faster time than they at first supposed. They estimated the gorge to be thirty-five thousand years old at least, and that it was more likely one hundred thousand years old. But the experts in glacial geology who visited the gorge with the American Association for the Advancement of Science in 1885, and had before them the most recent facts, concluded

with great unanimity that the Falls of Niagara commenced their retrocession from Lewiston less than ten thousand years ago. With this diminution in our conception of the antiquity of the close of the glacial period, we come back again more nearly to the conceptions of man's antiquity held before the science of geology began to exert its influence; and man is again looked upon as the last born of creation, and as but an infant of days.

The Earth but a Temporary Dwelling-Place for Man.

Nor can the future stay of man as a race upon the earth be looked upon as relatively of long continuance. The earth is not fitted to be a permanent abiding-place for a being with such a physical constitution as man possesses. Man must have fuel and food and clothing. But the material for these is limited, and, making allowance for all probable improvements in invention, these will in the near future be a diminishing quantity, relatively to the population of the earth. The forests are limited; the iron is limited; the coal and gas are limited, and the fertilizing elements of the soil are in process of exhaustion. By the present system of railroad extension and rapid colonization of virgin fields, the evil day may be put off for a little, but ultimately the Malthusian law, that the tendency of population is to increase by geometrical ratio, while the increase of the earth's productions can be only in arithmetical ratio, must make itself felt, and the whole race will be forced to the exercise of a degree of economy of which it now knows but little. When, according to the statistician of the *Encyclopædia Britannica*, America shall in the twenty-third century attain its maximum population, amounting to 3,600,000,000 souls, and there are no more continents to discover, the present luxury of living will be sadly curtailed, and the conflict of classes competing with one another will be intense beyond anything of which we now have any idea. Indeed, according to scientific calculation, the ultimate con-

dition of things in the world would seem to be both simple and trying in the extreme. Population can reach its limit only when the earth is made to produce the utmost possible for the sustenance of man. And, as it is demonstrated that in the torrid zone, bananas, and in the temperate zone, cabbages, yield more nutriment to the acre than anything else, we seem to see in the distant future naught but endless cabbage fields and banana gardens; while the principal study in our utilitarian colleges will be to find the safest and readiest means of destroying the bugs and worms that, under the operation of natural selection, have survived and developed, and grown more subtle in their power to blast the hopes of the husbandman.

In addition to this prospective pressure of population upon the means of sustenance, in the natural order of present forces, we have, as scientific men, to face the facts of astronomy, which point to a gradual cessation of the conditions upon which all organic life in the world depends. The earth is a cooling planet. Up to a certain period it was too hot for organic life. At a certain period in the future it will be too cold for any of the present forms of life to survive. The larger planets, like Jupiter and Saturn, have not yet cooled down to the condition of the earth in the early geologic ages. The moon, and perhaps the planet Mars, have already passed the stage when organic life, as we know it, is possible. To this stage the world is hastening. The universe is running down. Its heat is dissipating. The old age of the earth is already begun, and ere long it will be a dead and lifeless planet.

How long this catastrophe may be deferred, astronomers are not agreed in telling us. But the latest utterances of our leading authorities upon this subject are to the effect, that from twelve million to twenty million years ago the earth was too hot to admit of life, and that, within far less time than this, life will be impossible on the earth by reason of the cold.

Thus, then, according to science, the stay of the human race upon the earth is transitory. The race, as it had a recent beginning, must also, as a race, have an earthly ending, and that at no distant day, as we speak of geologic time. The earth is a railroad train which stopped at a station a few thousand years ago to take man on, and will as surely stop at a station somewhere in the future to put him off.

What, now, does all this signify with reference to the designs of the Creator? To our mind it is designed to quicken man's moral sense, to emphasize the cheapness of dirt and all material things, and to intensify our conceptions of spiritual things. One of the first lessons taught us by experience is, that the value of things is not to be measured either by their size or their antiquity. Notwithstanding the late arrival of man, and the infirmities of his physical nature, and the restricted sphere to which his bodily organization is confined, it is still a truth which must be everywhere recognized, that "in the world there is nothing great but man; in man there is nothing great but mind." The satisfaction which the mind of man derives from his dominion over the lower orders of creation is the highest and clearest evidence we have that the wisdom of the Creator is embodied in all his works.

Man can, and does, get good from everything. Not only does he get from nature food to eat and clothes to wear, coal with which to warm himself, colors with which to beautify the houses in which he lives, and atmosphere through which to transmit his musical ideas; but he finds the whole universe an object of thought, alluring him on to intellectual activity, and to the delights of ever-widening scientific discovery. Of the adaptation of nature to the intellectual and æsthetic wants, however, we will say nothing further here, but reserve those subjects for treatment in future essays. At the present time, we will limit ourselves to a partial expression of our admiration for that wisdom of the Creator which has so ordered it that good can come to man out of every seeming evil; that

the disabilities of the present serve as a stimulus to future activity and conquest; that the sorrows endured by the individual in the past, and the obstacles surmounted, become the pride of his present experience, and the means of eliciting the admiration, respect, and gratitude of his fellow-creatures. In ten thousand ways we can see that the blessings most highly prized by the human mind rise out of the seeming disabilities, restrictions, and hardships of our existence, just as the gorgeous clouds greeted by the rays of the rising sun, and made to glow with ineffable beauty, are distilled from sluggish stream, and stagnant pool, and pestilential swamp.

The solar system is but a speck in the universe; this earth is but an insignificant portion of the solar system; the historic period is but a flash as compared with the geologic ages that went before. The transformation of inert matter in the living forms of vegetation well illustrates how much of the lower is required as a basis for the existence of the higher. The vegetation which clothes the earth, though but a film upon the surface, is more wonderful than all the rest. The animals which feed upon the vegetable creation are few in numbers, and far less impressive in bulk; but the organization is higher. In them sensation and the rudiments of thought appear; so that animals have to be recognized as possessing rights which man is bound to respect. And, finally, man comes upon the scene, with bodily limitations of a peculiar sort. Unfitted to swim through the sea, unable to soar aloft with the wings of a bird, with no natural covering to protect him from the summer's heat or the winter's cold, with neither teeth nor claws nor horns nor hoofs with which to assert his lordship over the inferior creation, he is, by the very absence of these natural advantages, stimulated to put forth to his utmost the exercise of the higher endowments of his rational nature. He makes tools and weapons with which to cultivate the earth, defend himself, and assert lordship over inferior creatures. He weaves a web with which to clothe his body,

and builds houses and makes fire, to render himself independent of climate. He prepares food for a stomach incapable of digesting the raw products of nature. He invents language by which to impart his ideas to others, and unite them with himself in social organizations. He invents letters by which to transmit the lessons of the past to the inexperienced generations that are to follow. He organizes civil governments and business corporations to accomplish by combination results far surpassing the power of the isolated individual. He creates literature; and embodies his thought in the thrilling epic poem, the witty essay, the brilliant oration, the profound philosophical treatise. He discovers pigments, and displays his thought in the tones of color spread upon canvas. In lines of beauty he imparts his conceptions to the marble statue and to the noble forms of architecture. He invents musical instruments, and expresses his emotion in the tremulous notes of the orchestra, and combines it with the highest spiritual conceptions in the music of the oratorio.

Who can contemplate the variety and the nobility of uses to which man is thus able to make nature contribute, without being overwhelmed in admiration at the wisdom of that adaptation of man to nature which has rendered such past progress possible, and which opens up such immeasurable hopes for growth in the future! It matters not from which side we view the adaptation. We may say that nature is adapted to meet the wants of man, or we may say that the human mind was created to make this use of nature. In either case, the adaptation proves both the infinite foresight of the Creator and his inconceivable wisdom and power; since he brings so much light out of darkness, so much order out of seeming chaos, such supernal rapture and bliss out of the seeming disabilities of man's earthly habitation.

But, as before remarked, we are not able to explore the whole of the field, and to behold with undimmed vision the full extent of the wisdom and goodness of God. That can be

seized only by the eye of faith. We see enough, however, to establish that faith upon an immovable basis. Like the patriarch of old, we have evidence enough of the power and goodness of God to believe that he will make all things work together for good, enabling us to say, "Though he slay me, yet will I trust in him."

The Summum Bonum.

It is impossible to overestimate the satisfaction to be derived from the development and exercise of the moral powers of man. And to such development man is urged by the whole constitution of nature. It is this constitution of nature, emphasizing at every point the vanity of transitory things and man's dependence upon supernatural sources for the sustenance of all well-grounded faith and hope, which compels him to be, what he is aptly termed in some systems of classification, a religious animal.

Our strong defence, therefore, of the doctrine of the wisdom and benevolence of the Creator is not to be drawn from the mechanical adaptations of nature, wonderful as they doubtless are. That the eye was made to see, and the ear to hear, there can be no doubt. But the existence of such instruments of sense illustrates only to a limited extent the power and skill of the Creator; and they fail directly to prove his goodness. For the eye is compelled to see many revolting and ghastly sights, and the ear to hear many piercing and despairing cries of distress. But by the very disappointments and forebodings of our earthly life we are impelled to a higher range of spiritual activities. Evidently the world is not perfect as a continuing city in which man either as an individual or as a race is to abide forever. The earth is but a temporary abode, and to a large extent a house of correction, for the tutelage of man; and the natural conditions of life are his stern but beneficent masters, inviting and urging him on to the development and exercise of his noblest powers. In response to the stimuli

furnished by these agencies, the whole world becomes knit together by the tenderest ties of sympathy. The dependence of childhood evokes the mother's love and the father's care. It creates the bond of brotherly affection, and brings into being all the satisfying and sacred experiences of the home. The necessity of combination to overcome the disabilities of nature and the encroachments of enemies brings out all the noble qualities of national life, culminating in its sublime heroism on the field of battle, and compels us to learn how to obey, as well as how to win respect by appropriate commands. The common liability to evil develops the noble qualities of the philanthropist, and causes the sweet emotions of gratitude to well up from every well-ordered heart. All these results are of pre-eminent and permanent value. They are leaves which never wither, and flowers which never fade.

Finally, the very limitations of our knowledge of the universe, in revealing to us the infinity of the Creator, show us the possibilities of trusting him beyond the horizon of our vision, where darkness envelops his pathway. The inscrutability of the universe is but a type of the inscrutability of God's own nature, and is a ground of the sweet hope and belief that he doeth all things well. The joy of this well-grounded trust in the unseen is the highest which can enter the human heart.

It is often truthfully said, that the best thing which can be done for a struggling youth is to give him a chance. The gift of ability, opportunity, and stimuli to make a fortune, is far better than the direct gift of a fortune. It is thus, pre-eminently, that the Creator has manifested his wisdom and goodness in behalf of the human race. It was the prayer of Agur, "Give me neither poverty nor riches, but feed me with food convenient for me." In respect to the human race, we believe that this prayer was answered beforehand, and that the world was prepared with consummate wisdom to afford scope for man's highest development, and provide stimulus for the noblest exercise of his most characteristic powers.