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Nature is incessantly engaged in extending itself. Creation is not the work of a moment . . . millions and whole myriads of millions of centuries will flow on, during which . . . new worlds and systems of worlds will be formed, one after another. [T]he creation is never finished or complete . . . it is always busy producing new scenes of nature, new objects and new worlds . . . it needs nothing less than an eternity to animate the whole boundless range of infinite extension of space and worlds, without number and without end.

- Immanuel Kant, *Natural History of the Heavens* (1755)

**08-P9) Immanuel Kant, “Natural History of the Heavens” (1755)**

Preface

I have chosen a subject which is capable of exciting an unfavorable prejudice in a great number of my readers at the very outset, both on account of its own intrinsic difficulty, and also from the way they may regard it from the point of view of religion. To discover the system which binds together the great members of the creation in the whole extent of infinitude, and to derive the formation of the heavenly bodies them-

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selves, and the origin of their movements, from the primitive state of nature by mechanical laws, seems to go far beyond the power of human reason. On the other hand, religion threatens to bring a solemn accusation against the audacity which would presume to ascribe to nature by itself results in which the immediate hand of the Supreme Being is rightly recognized; and it is troubled with concern, by finding in the ingenuity of such views an apology for atheism. I see all these difficulties well, and yet am not discouraged. I feel all the strength of the obstacles which rise before me, and yet I do not despair. I have ventured, on the basis of a slight conjecture, to undertake a dangerous expedition; and already I discern the promontories of new lands. Those who will have the boldness to continue the investigation will occupy them, and may have the satisfaction of designating them by their own names.

I did not enter on the prosecution of this undertaking until I saw myself in security regarding the duties of religion. My zeal was redoubled when at every step I saw the clouds disperse that appeared to conceal monsters behind their darkness; and when they were scattered I saw the glory of the Supreme Being break forth with the brightest splendor. As I now know that these efforts are free from everything that is reprehensible, I shall faithfully adduce all that well-disposed or even weak minds may find repellent in my scheme; and I am ready to submit to the judicial severity of the orthodox Areopagus with a frankness which is the mark of an honest conviction. The advocate of the faith may therefore be first allowed to make his reasons heard, in something like the following terms:

‘If the structure of the world with all its order and beauty,’ he says, ‘is only an effect of matter left to its own universal laws of motion, and if the blind mechanics of the natural forces can evolve so glorious a product out of chaos, and can attain to such perfection of themselves, then the proof of the Divine Author which is drawn from the spectacle of the beauty of the universe wholly loses its force. Nature is thus sufficient for itself; the Divine government is unnecessary; Epicurus lives again in the midst of Christendom, and a profane philosophy tramples under foot the faith which furnishes
the clear light needed to illuminate it.’

Even if I found some grounds for this objection, yet the conviction which I have of the infallibility of Divine truth is so potent in me that I would hold everything that contradicted it as sufficiently refuted by that truth, and would reject it. But the very harmony and agreement which I find between my system and religion, raises my confidence in the face of all difficulties to an undisturbed tranquillity.

I recognize the great value of those proofs which are drawn from the beauty and perfect arrangement of the universe to establish the existence of a Supremely Wise Creator; and I hold that whoever does not obstinately resist all conviction must be won by those irrefutable reasons. But I assert that the defenders of religion, by using these proofs in a bad way, perpetuate the conflict with the advocates of Naturalism by presenting them unnecessarily with a weak side of their position.²

It is usual to signalize and emphasize in nature the harmonies, the beauty, the ends of things, and the perfect relation of means adapted to them. But while nature is thus elevated on this side, the attempt is made on another to belittle it again. This admirable adaptation, it is said, is foreign to nature; abandoned to its own general laws it would bring forth nothing but disorder. These harmonies show an alien hand which has known how to subdue to a wise plan a matter that is wanting in all order or regularity. But I answer, that if the universal laws of the action of matter are themselves a consequence of the supreme plan of the system, they cannot be supposed to have any other destination than just to serve to fulfil the very plan which the Supreme Wisdom has set before itself. And if this is not so, would we not be tempted to believe that matter and its general laws at least are independent, and that the Supremely Wise Power, which has known how to use it in such a glorious way, is indeed great, but not infinite; is indeed

² Compare 8.2 Augustine, “Literal Meaning of Genesis”, pp. 000 and 8.5 Pascal, “Thoughts”, pp. 000 above.
powerful, but not all-sufficient?

The defender of religion is afraid that those harmonies which may be explained from a natural tendency of matter, may prove nature to be independent of Divine Providence. He confesses distinctly that if natural causes could be discovered for all the order of the universe, and that if these causes could bring forth this order from the most general and essential properties of matter, it would be unnecessary to have recourse to a Higher Government at all. The advocate of Naturalism finds his account in not disputing this assumption. He heaps up examples which prove that the general laws of nature are fruitful in perfectly beautiful consequences, and he brings the orthodox believer into danger by adducing reasons which in the believer's hands might become invincible weapons of his faith. [. . .]

'If you admit then,' the freethinker here says, 'that useful arrangements and, such as point to ends can be derived from the most general and simple laws of nature, and that we have no need of the special government of a Supreme Wisdom, then you must in this see proofs by which you are caught, on your own confession. All nature, especially unorganized nature, is full of such proofs, which enable us to know that matter, while determining itself by the mechanism of its own forces, possesses a certain rightness in its effects, and that it satisfies without compulsion the rules of harmony. And should any one well-disposed to save the good cause of religion contest this capability in the universal laws of nature, he would put himself into embarrassment and by such a defense give unbelief occasion to triumph.' [. . .]

I accept the matter of the whole world at the beginning as in a state of general dispersion, and make of it a complete chaos. I see this matter forming itself in accordance with the established laws of attraction, and modifying its movement by repulsion. I enjoy the pleasure, without having recourse to arbitrary hypotheses, of seeing a well-ordered whole produced under the regulation of the established laws of motion, and this whole looks so like that system of the world which we have before our eyes, that I cannot refuse to identify it with it. This unexpected development of the order of nature in
the universe begins to become suspicious to me, when such a complicated order is founded upon so poor and simple a foundation. But at last I draw instruction from the view already indicated, namely, That such a development of nature is not a thing unheard of in it; nay, that its inherent essential striving brings such a result necessarily with it, and that this is the most splendid evidence of its dependence on that pre-existing Being who contains in Himself not only the source of these beings themselves but their primary laws of action. This insight redoubles my confidence in the sketch of the system which I have drawn. My confidence increases with every step I make forward, and my timidity vanishes entirely. [ . . . ]

I assume, like [Lucretius, or his predecessors, Epicurus, Leucippus, and Democritus], that the first state of nature consisted in a universal diffusion of the primitive matter of all the bodies in space, or of the atoms of matter, as these philosophers have called them. Epicurus asserted a gravity or weight which forced these elementary particles to sink or fall; and this does not seem to differ much from Newton’s Attraction, which I accept. He also gave them a certain deviation from the straight line in their falling movement, although he had absurd fancies regarding the causes and consequences of it. This deviation agrees in some degree with the alteration from the falling in a straight line, which we deduce from the repulsion of the particles. Finally, the vortices which arose from the disturbed motion, is also a theory of Leucippus and Democritus, and it will be also found in our scheme. So many points of affinity with a system which constituted the real theory of all denial of God in antiquity do not, however, draw my system into community with its errors. [ . . . .] Notwithstanding the similarity indicated, there yet remains an essential difference between the ancient cosmogony and that which I present, so that the very opposite consequences are to be drawn from mine.

The teachers of the mechanical production of the structure of the world referred to, derive all the order which may be perceived in it from mere chance which made the atoms to meet in such a happy concourse that they constituted a well-ordered whole.
Epicurus had the hardihood to maintain that the atoms diverged from their straight motion without a cause, in order that they might encounter one another. All these theorists pushed this absurdity so far that they even assigned the origin of all animated creatures to this blind conourse, and actually derived reason from the irrational. In my system, on the contrary, I find matter bound to certain necessary laws. Out of its universal dissolution and dissipation I see a beautiful and orderly whole quite naturally developing itself. This does not take place by accident, or of chance; but it is perceived that natural qualities necessarily bring it about. And are we not thereby moved to ask, why matter must just have had laws which aim at order and conformity? [. . . ]

Matter, which is the primitive constituent of all things, is therefore bound to certain laws, and when it is freely abandoned to these laws it must necessarily bring forth beautiful combinations. It has no freedom to deviate from this perfect plan. Since it is thus subject to a supremely wise purpose, it must necessarily have been put into such harmonious relationships by a First Cause ruling over it; and there is a God, just because nature even in chaos cannot proceed otherwise than regularly and according to order. [. . . ]

It seems to me that we can here say with intelligent certainty and without audacity: ‘Give me matter, and I will construct a world out of it!’ i.e. give me matter and I will show you how a world shall arise out of it. For if we have matter existing endowed with an essential force of attraction, it is not difficult to determine those causes which may have contributed to the arrangement of the system of the world as a whole. We know what is required that a body shall take a spherical figure; and we understand what is required in order that spheres, as orbs moving freely, may assume a circular movement around the center to which they are drawn. The position of their orbits, in relation to each other, agreement in the direction of their motions, the eccentricity of their paths, may all be referred to the simplest mechanical causes; and we may confidently hope to discover them because they can be reduced to the easiest and clearest principles. But can we boast of the same progress even regarding the lowest plant or an insect? Are
we in a position to say: ‘Give me matter, and I will show you how a caterpillar can be produced’? Are we not arrested here at the first step, from ignorance of the real inner conditions of the object and the complication of the manifold constituents existing in it? It should not therefore cause astonishment if I presume to say that the formation of all the heavenly bodies, the cause of their movements, and, in short, the origin of the whole present constitution of the universe, will become intelligible before the production of a single herb or a caterpillar by mechanical causes, will become distinctly and completely understood. [. . .]

Seventh Chapter

_S of the Creation in the Whole Extent of its Infinitude in Space as well as in Time._  
The universe, by its immeasurable greatness and the infinite variety and beauty that shine from it on all sides, fills us with silent wonder. If the presentation of all this perfection moves the imagination, the understanding is seized by another kind of rapture when, from another point of view, it considers how such magnificence and such greatness can flow from a single law, with an eternal and perfect order. The planetary world in which the sun, acting with its powerful attraction from the center of all the orbits, makes the moving spheres of its system revolve in eternal circles, has been wholly formed, as we have seen, out of the originally diffused primitive stuff that constituted all the matter of the world. All the fixed stars which the eye discovers in the hollow depths of the heavens, and which seem to display a sort of prodigality, are suns and centers of similar systems. Analogy thus does not leave us to doubt that these systems have been formed and produced in the same way as the one in which we find ourselves, namely, out of the smallest particles of the elementary matter that filled empty space—that infinite receptacle of the Divine Presence.

If, then, all the worlds and systems acknowledge the same kind of origin, if at-
traction is unlimited and universal, while the repulsion of the elements is likewise every-where active; if, in presence of the infinite, the great and small are small alike; have not all the universes received a relative constitution and systematic connection similar to what the heavenly bodies of our solar world have on the small scale—such as Saturn, Jupiter, and the Earth, which are particular systems by themselves, and yet are connected with each other as members of a still greater system? If in the immeasurable space in which all the suns of the Milky Way have formed themselves, we assume a point around which, through some cause or other, the first formation of nature out of chaos began, there the largest mass and a body of extraordinary attraction will have arisen which has thereby become capable of compelling all the systems in the process of being formed within an enormous sphere around it, to fall towards itself as their cen-ter, and to build up a system around it on the great scale similar to that which the ele-mentary matter that formed the planets has constructed in the small scale around the sun. Observation puts this conjecture almost beyond doubt. The host of the stars, by their relative positions towards a common plane, constitute a system just as much as do the planets of our Solar System around the sun. The Milky Way is the Zodiac of those higher worlds, which diverge as little as possible from its zone and whose strip of space is always illuminated by their light, just as the zodiac of the planets always glitters here and there although only in a few points with the splendor of these spheres. Every one of these suns, with its revolving planets, constitutes a particular system by itself; but this does not hinder them from being parts of a still greater system, just as Jupiter or Saturn, notwithstanding their being accompanied by satellites of their own, are embraced in the systematic constitution of a still greater system. With such an exact agreement in their constitution, can we not recognize the same cause and mode of production in them?
Fig. 7.8.1) Wright’s Cosmos

[Kant’s misunderstanding of Wright’s theory of the arrangement of stars; his conception of galaxies, or ‘island universes’]
If, then, the fixed stars constitute a system whose extent is determined by the sphere of the attraction of that body which is situated in the center, shall there not have arisen more Solar Systems and, so to speak, more Milky Ways, which have been produced in the boundless field of space? We have beheld with astonishment figures in the heavens which are nothing else than such systems of fixed stars confined to a common plane—Milky Ways, if I may so express myself, which, in their different positions to the eye, present elliptical forms with a glimmer that is weakened in proportion to their infinite distance. They are systems of, so to speak, an infinite number of times infinitely greater diameter than the diameter of the Solar System. But undoubtedly they have arisen in the same way, have been arranged and regulated by the same causes, and preserve themselves in their constitution by a mechanism similar to that which rules our own system.

If, again, these star-systems are viewed as members in the great chain of the totality of nature, then there is just as much reason as formerly to think of them as in mutual relation and in connections which, in virtue of the law of their primary formation that rules the whole of nature, constitute a new and greater system ruled by the attraction of a body of incomparably mightier attraction, and acting from the center of their regulated positions. The attraction which is the cause of the systematic constitution among the fixed stars of the Milky Way acts also at the distance even of those worlds, so that it would draw them out of their positions and bury the world in an inevitably impending chaos, unless the regularly distributed forces of rotation formed a counterpoise or equilibrium with attraction, and mutually produced in combination that connection which is the foundation of the systematic constitution. Attraction is undoubtedly a property of matter extending as far as that co-existence which constitutes space, seeing that it combines substances by their mutual dependence; or, to speak more exactly, attraction is just that universal relation which unites the parts of nature in one space. It reaches, therefore, to the whole extent of space, even to all the distance of nature’s infinitude. If light reaches us from these distant systems—light which is only an im-
pressed motion—must not attraction, that original source of motion, which is prior to all motion, which needs no foreign cause and can be stopped by no obstacles, because it penetrates into the inmost recesses of matter without any impact even in the universal repose of nature; must not, I say, attraction have put those fixed star-systems, notwithstanding their immense distances, into motion when nature began to stir through the unformed dispersion of her material? And as we have seen on the small scale, is not this attraction the source of the systematic combination and the lasting persistence of the members of these systems, and that which secures them from falling to pieces?

But what is at last the end of these systematic arrangements? Where shall creation itself cease? It is evident that in order to think of it as in proportion to the power of the Infinite Being, it must have no limits at all. We come no nearer the infinitude of the creative power of God, if we enclose the space of its revelation within a sphere described with the radius of the Milky Way, than if we were to limit it to a ball an inch in diameter. All that is finite, whatever has limits and a definite relation to unity, is equally far removed from the infinite. Now, it would be absurd to represent the Deity as passing into action with an infinitely small part of His potency, and to think of His Infinite Power—the storehouse of a true immensity of natures and worlds—as inactive, and as shut up eternally in a state of not being exercised. Is it not much more reasonable, or, to say it better, is it not necessary to represent the system of creation as it must be in order to be a witness of that power which cannot be measured by any standard? For this reason the field of the revelation of the Divine attributes is as infinite as these attributes themselves. Eternity is not sufficient to embrace the manifestations of the Supreme Being, if it is not combined with the infinitude of space. It is true that development, form, beauty, and perfection are relations of the elements and the substances that constitute the matter of the universe, and this is perceived in the arrangements which the wisdom of God adopts at all times. It is also most conformable to that wisdom that these relations and arrangements should be evolved out of their implanted universal laws by an unconstrained consecution. And hence it may be laid down, with good
reason, that the arrangement and institution of the universe comes about gradually, as it arises out of the provision of the created matter of nature in the sequence of time. But the primitive matter itself, whose qualities and forces lie at the basis of all changes, is an immediate consequence of the Divine existence; and that same matter must therefore be at once so rich and so complete, that the development of its combinations in the flow of eternity may extend over a plane which includes in itself all that can be, which accepts no limit, and, in short, which is infinite.

If, therefore, the creation is infinite in space, or at least has really been so in its-matter from the beginning, and is ready to become so in form or development, then the whole of space will he animated with worlds without number and without end. Will then that Systematic Connection, which we have already considered in particular in regard to all the parts of the world, extend to the whole and embrace the whole universe, the totality of nature in a single system, by the connecting power of attraction and centrifugal force? I say, Yes. If there existed only isolated systems which had no unified connection into a whole with one another, it might be imagined—were this chain of members assumed to be really infinite—that an exact equality in the attraction of their parts from all sides, could keep these systems secure from the destruction with which their inner mutual attraction threatens them. But this would evolve such an exact measured determination at the distance proportionate to the attraction, that even the slightest displacement would draw the ruin of the universe along with it; and after long periods, which, however, must finally come to an end, it would give it up to utter overthrow. A constitution of the world which did not maintain itself without a miracle, has not the character of that stability which is the mark of the choice of God. It is therefore much more in conformity with that choice to make the whole creation a single system which puts all the worlds and systems of worlds, that fill the whole of infinite space, into relation to a single center. A scattered swarm of systems, however—for they might be separated from each other—would, by an unchecked tendency, hurry to disorder and destruction, unless a certain relative disposition were made by reference to a universal
center, the center of the attraction of the universe, and unless means were taken for the maintenance of the whole of nature by systematic motions.

This universal center of the attraction of the whole of nature, both in its crude and formed state, is the point at which is undoubtedly situated the mass of the most powerful attraction which embraces within the sphere of its attraction all the worlds and systems which time has produced, and which Eternity will produce; and it may with probability be assumed that around it nature made the beginning of its formation, and that the systems are accumulated most closely there, whereas further from that point, in the infinitude of space, they will disappear more and more with greater and greater degrees of dispersion. This law might be deduced from the analogy of our Solar System; and such a constitution may moreover serve this purpose, that at great distances not only the universal central body, but all the systems that revolve next round it, may combine their attraction and exercise it as if from one mass upon the systems which are at a still greater distance. This arrangement would then be subservient to embracing the whole of nature in all the infinitude of its extension in a single system.

Let us now proceed to trace out the construction of this Universal System of Nature from the mechanical laws of matter striving to form it. In the infinite space of the scattered elementary matter there must have been some one place where this primitive material had been most densely accumulated so as through the process of formation that was going on predominantly there, to have procured for the whole Universe a mass which might serve as its fulcrum. It indeed holds true that in an infinite space no point can properly have the privilege to be called the center; but by means of a certain ratio, which is founded upon the essential degrees of the density of the primitive matter, according to which at its creation it is accumulated more densely in a certain place and increases in its dispersion with the distance from it, such a point may have the privilege of being called the center; and it really becomes this through the formation of the central mass by the strongest attraction prevailing in it. To this point all the rest of the elementary matter engaged in particular formations is attracted; and, thereby, so far as the
evolution of nature may extend it makes in the infinite sphere of the creation the whole universe into only one single system.

But it is important, and, if approved, is deserving of the greatest attention, that in consequence of the order of nature in this our system, the creation, or rather the development of nature, first begins at this center and, constantly advancing, it gradually becomes extended into all the remoter regions, in order to fill up infinite space in the progress of eternity with worlds and systems. Let us dwell upon this idea for a moment with the silent satisfaction it brings. I find nothing which can raise the spirit of man to a nobler wonder, by opening to him a prospect into the infinite domain of omnipotence, than that part of my theory which concerns the successive realization of the creation. If it is admitted that the matter, which is the stuff for the formation of all the world, was not uniform in the whole infinite space to which God is present, but was spread out according to a certain law, perhaps proportioned to the density of the particles, and according to which the dispersion of the primitive matter increased from a certain point, as the place of densest accumulation, with the distance from this center: then at the primary stirring of nature, formation will have begun nearest this center; and in advancing succession of time the more distant regions of space will have gradually formed worlds and systems with a systematic constitution related to that center. Every finite period, whose duration has a proportion to the greatness of the work to be accomplished, will always bring only a finite sphere to its development from this center; while the remaining infinite part will still be in conflict with the confusion and chaos, and will be the further from the state of completed formation the farther its distance is away from the sphere of the already developed part of nature. In consequence of this, although from the place of our abode in the Universe, we look out upon a world wholly completed as it seems, and, so to speak, at an infinite host of worlds which are systematically combined; yet, strictly speaking, we find ourselves only in the neighborhood of the center of the whole of nature, where it has already evolved itself out of chaos and attained its proper perfection. If we could overstep a certain sphere we would there perceive chaos and the dispersion
of the elements which, in the proportion in which they are found nearer this center, lose in part their crude state and are nearer the perfection of their development, but in the degree in which they are removed from the center, they are gradually lost in a complete dispersion. We would see how the infinite space, co-extensive with the Divine Presence, in which is to be found the provision for all possible natural formations, buried in a silent night, is full of matter which has to serve as material for the worlds that are to be produced in the future, and of impulses for bringing it into motion, which begin with a weak stirring of those movements with which the immensity of these desert spaces are yet to be animated. There had mayhap flown past a series of millions of years and centuries, before the sphere of the formed nature in which we find ourselves, attained to the perfection which is now embodied in it; and perhaps as long a period will pass before Nature will take another step as far in chaos. But the sphere of developed nature is incessantly engaged in extending itself. Creation is not the work of a moment. When it has once made a beginning with the production of an infinity of substances and matter, it continues in operation through the whole succession of eternity with ever increasing degrees of fruitfulness. Millions and whole myriads of millions of centuries will flow on, during which always new worlds and systems of worlds will be formed after each other in the distant regions away from the center of nature, and will attain to perfection. Notwithstanding the Systematic Constitution embodied in their parts, they will obtain a universal relation to the center which has become the first formative point and the center of the creation, through the attractive power of its predominant mass. This infinity in the future succession of time, by which eternity is unexhausted, will entirely animate the whole range of space to which God is present, and will gradually put it into that regular order which is conformable to the excellence of His plan. And if we could embrace the whole of eternity with a bold grasp, so to speak, in one conception, we would also be able to see the whole of infinite space filled with systems of worlds and the creation all complete. But as, in fact, the remaining part of the succession of eternity is always infinite and that which has flowed is finite, the sphere of developed nature is always but an
infinitely small part of that totality which has the seed of future worlds in itself, and which strives to evolve itself out of the crude state of chaos through longer or shorter periods. The creation is never finished or complete. It has indeed once begun, but it will never cease. It is always busy producing new scenes of nature, new objects, and new worlds. The work which it brings about has a relationship to the time which it expends upon it. It needs nothing less than an eternity to animate the whole boundless range of the infinite extension of space with worlds, without number and without end. [ . . . ]

The inevitable tendency which every world that has been brought to completion gradually shows towards its destruction, may even be reckoned among the reasons which may establish the fact that the universe will again be fruitful of worlds in other regions to compensate for the loss which it has suffered in any one place. The whole portion of nature which we know, although it is only an atom in comparison with what remains concealed above or below our horizon, establishes at least this fruitfulness of nature, which is unlimited, because it is nothing else than the exercise of the Divine omnipotence. Innumerable animals and plants are daily destroyed and disappear as the victims of time; but not the less does nature by her unexhausted power of reproduction, bring forth others in other places to fill up the void. Considerable portions of the earth which we inhabit are being buried again in the sea, from which a favorable period had drawn them forth; but at other places nature repairs the loss and brings forth other regions which were hidden in the depths of being in order to spread over them the new wealth of her fertility. In the same way worlds and systems perish and are swallowed up in the abyss of eternity; but at the same time creation is always busy constructing new formations in the heavens, and advantageously making up for the loss.

We need not be astonished at finding a certain transitoriness even in the greatest of the works of God. All that is finite, whatever has a beginning and origin, has the mark of its limited nature in itself; it must perish and have an end. The duration of a world has, by the excellence of its construction, a certain stability in itself which, according to our conceptions, approaches an endless duration. Perhaps thousands, mayhap mil-
lions, of centuries will not destroy it; but because the vanity which cleaves to finite natures works constantly for their destruction, eternity will contain in itself all the possible periods required to bring about at last by gradual decay the moment when the world shall perish. Newton, that great admirer of the attributes of God from the perfection of His works, who combined with the deepest insight into the excellence of nature the greatest reverence for the revelation of the Divine omnipotence, saw himself compelled to predict the decay of nature by the natural tendency which the mechanics of motion has to it. If a Systematic Constitution, by the inherent consequence of its perishability through great periods, brings even the very smallest part which can be imagined nigh to the state of disorder, there must be a moment in the infinite course of eternity at which this gradual diminution will have exhausted all motion. [. . . ]

But, finally, when admission is given to another idea which is just as probably in accordance with the constitution of the Divine works, the satisfaction which such a delineation of the changes of nature excites, is raised to the highest degree of complacency. Can we not believe that Nature, which was capable of developing herself out of chaos into a regular order and into an arranged system, is likewise capable of rearranging herself again as easily out of the new chaos into which the diminution of her motions has plunged her, and to renew the former combination? Cannot the springs which put the stuff of the dispersed matter into motion and order, after the stopping of the machine has brought them to rest, be again put into action by extended forces; and may they not, by the same general laws limit each other until they attain that harmony by which the original formation was brought about? It will not need long reflection to admit this, when it is considered that after the final exhaustion of the revolving movements in the universe has precipitated all the planets and comets together into the sun, its glowing heat must obtain an immense increase by the commingling of so many and so great masses; especially as the distant globes of the Solar System, in consequence of the theory already expounded, contain in themselves the lightest matter in all nature, and that which is most active on fire. This fire, thus put by new nourishment and the
most volatile matter into the most violent conflagration, will undoubtedly not only resolve
everything again into the smallest elements, but will also disperse and scatter these
elements again in this way with a power of expansion proportional to the heat, and with
a rapidity which is not weakened by any resistance in the intervening space; and they
will thus be dissipated into the same wide regions of space which they had occupied
before the first formation of nature.

The result of this will be that, after the violence of the central fire has been sub-
dued by an almost total dispersion of its mass, the forces of attraction and repulsion will
again combine to repeat the old creations and the systematically connected move-
ments, with not less regularity than before, and to present a new universe. If, then, a
particular planetary system has fallen to pieces in this way, and has again restored itself
by its essential forces, nay, when it has even repeated this play more than once, then at
last the period will approach which will gather in the same way the great system of
which the fixed stars are members into one chaos through the falling of their move-
ments. Here it will still less be doubted that the reunion of such an infinite multitude of
masses of fire as these burning suns are, together with the train of their planets, will
disperse the matter of their masses when dissolved by the ensuing unspeakable heat
into the old space of their sphere of formation, and will there furnish materials for new
productions by the same mechanical laws, whereby the waste space will again be ani-
mated with worlds and systems. When we follow this Phoenix of nature, which burns
itself only in order to revive again in restored youth from its ashes, through all the infinity
of times and spaces; when it is seen how nature, even in the region where it decays and
grows old, advances unexhausted through new scenes, and, at the other boundary of
creation in the space of the unformed crude matter, moves on with steady steps, carry-
ing on the plan of the Divine revelation, in order to fill eternity, as well as all the regions
of space, with her wonders: then the spirit which meditates upon all this sinks into pro-
found astonishment. But unsatisfied even yet with this immense object, whose transi-
toriness cannot adequately satisfy the soul, the mind wishes to obtain a closer knowl-
edge of that Being whose Intelligence and Greatness is the source of that light which is diffused over the whole of nature, as it were, from one center. With what reverence must not the soul regard even its own being, when it considers that it is destined to survive all these transformations. [. . . ]

Oh! happy will be the soul if, amid the tumult of the elements and the crash of nature, she is always elevated to a height from whence she can see the devastations which their own perishableness brings upon the things of the world as they thunder past beneath her feet. This happiness, which Reason of herself could not be bold enough even to aspire to, Revelation teaches us to hope for with full conviction. When the fetters which keep us bound to the vanity of the creatures, have fallen away at the moment which has been destined for the transformation of our being, then will the immortal spirit be liberated from dependence on finite things, and find in fellowship with the Infinite Being the enjoyment of its true felicity. All nature, which involves a universal harmonious relation to the self-satisfaction of the Deity, cannot but fill the rational creature with an everlasting satisfaction, when it finds itself united with this Primary Source of all perfection. Nature, seen from this center, will show on all sides utter security, complete adaptation. The changeful scenes of the natural world will not be able to disturb the restful happiness of a spirit which has once been raised to such a height. And while it already tastes beforehand this blessed state with a sweet hopefulness, it may at the same time utter itself in those songs of praise with which all eternity shall yet resound.