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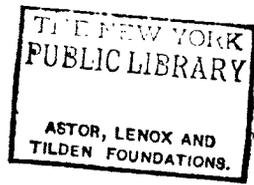
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THE BIBLIOTHECA SACRA.

ARTICLE I.

CREATION; OR, THE TRANSMUTATION OF ENERGY.

BY PROFESSOR JACOB COOPER, D.D.

THE origin of the world is a problem in philosophy first both in time and importance. For its reality appeals to the senses with a certainty, which, however much denied by speculation, returns in all its original vigor in the common consciousness, and forces equally explicit testimony from the idealist who denies it in theory, by his invariable conduct in practice. So the world of spirit, be it in the form of Intellect, Force, Energy, or whatever name we choose to call that which acts, moves, and causes material things to be full of life, is equally patent to consciousness. The existence of something which causes the phenomenon is as certain as it, and is absolutely necessary to its production. As there cannot be an effect without an adequate cause, so there must be a force or energy to produce movement, change, or sensible phenomena. There can be no shadow without a substance to produce it; neither can there be any internal or external manifestation without a "sufficient reason" for its existence.

The earliest thinker who reflected upon what appealed to his senses felt the problem of the origin of things with

as much force as does the modern scientist or speculator. Perhaps he felt it even more, because his mind was more at leisure for original thought. He was untrammelled by theory, and not perplexed by the ultimate consequences of his speculations. He thought with greater originality because more naïvely. He was face to face with Nature, and felt the throbbings of that reality which had not become hackneyed through the use of words for things which they imperfectly express. But the origin of the world, which to the earliest philosophers was the universe, while it constantly appealed to them for solution, remained an unanswered riddle. Their thoughts rebounded from this Gordian knot of philosophy in helpless impotence. No other conclusion seemed possible to them than that the world was eternal; for absolute creation is unthinkable even by "Plato's brain," and, if made known at all, must be disclosed by a Being of higher powers than man.

Hence, every cosmogony, whether Indian, Chinese, Egyptian, or Greek, assumes, as an acknowledged fact, that there never was, or could be, the production of something out of nothing. Therefore, the primordial elements had existed eternally, and creation was simply growth or evolution from these as materials. These might be one or four; they might be in constant flux, or forever at rest, and their motions only apparent. The constant flux changes form, but not reality. The original substance could not be known to us except through the attributes, which, while they do not constitute its essence, are inseparable from it except in thought. These, our senses are enabled to perceive on the principle that "like knows by like";¹ and, by the same method, the substance, the essence, being in-

¹ γαίη πέν γάρ γαῖαν ὁπώπαμεν ἰδατι δ' ἕδωρ,
αἰθέρι, δ' αἰθέρα δῖον, ἀτάρ πῦρ πῦρ αἰθῆλον,
στοργῆ δὲ στοργῆν, κ.τ.λ.

—Empedocles: As quoted in Aristotle, *De Animâ*, i. 2.

tangible, was apprehended by the mind, itself the essence of knowledge. But whatever form Reality might take, whether material or spiritual, be it dual or single, yet was at bottom the same, and all that the keenest speculators could hazard was that this never had a beginning. And yet they were not consistent. For as we learn from Aristotle's *Metaphysics*, which is the only authoritative history of early philosophy, that while the material of which the world is composed was eternal, and that which moved was so also, yet the aim of this *chef d'œuvre* of the Stagirite was to prove that motion was prior to the thing moved, and action prior to potentiality. While this must necessarily be admitted, yet, according to Aristotle's view, the former did not create the latter. There had to be something which underwent the change when any change occurred, either in the way of generation or decay; some substratum which persisted through all the modifications which a thing might experience, and through which it became apprehensible by the senses.¹ And the thing moved or changed is, in all Greek philosophy, admitted to be different from the power which caused its changes.²

But at the same time it may be safely assumed, that the idea of absolute creation, that is the formation of something out of nothing, never entered the Greek mind, and that any enunciation of this doctrine would have seemed absurd. Their conception, which is to be gathered by inference rather than by formulated statement, was that matter was eternal, and that energy or force was coeval. There is, however, as we have seen, an inconsistency in the Aristotelic doctrine. For he clearly holds that the power to produce motion must exist before the thing which is

¹ Vide Arist., *Met.* i. 3. 9; xi. 2. 1, 2.

² *Met.* 1010. 13. *καὶ τοῦ γιγνομένου ἤδη ἀνάγκη τι εἶναι. Ὅλως τε εἰ φθέρεται, ἀπάρξει τι ὄν. καὶ εἰ γίγνεται, ἐξ οὗ γίγνεται καὶ ὅπ' οὗ γεννᾶται ἀναγκαῖον εἶναι, καὶ τοῦτο μὴ εἶναι εἰς ἀπειρον.*

moved, and actuality antedate potentiality. Hence the legitimate, in fact the only, conclusion which we can draw from these statements is, that matter came into existence subsequent to productive energy. And if we add Finality (the τὸ οὐ ἐνεκα, upon which Aristotle laid so much stress), we have involved the idea of creation of the materials and their arrangement into the universe according to a plan.

We say this is *involved* in the notions admitted to be true by this philosopher, though this is not *asserted* by him; nor is there any evidence that he believed this doctrine. Still we find in Aristotle's admissions enough for a beginning of cosmology. Given activity, that is power in act before potentiality, i.e. power *in esse*, and we have the basis for a theory of creation; though, as was said, the Greek mind did not grasp this conception. The mode of action after these factors are assumed is Development. φύσις from φύω is the root idea of Greek cosmology, and precedes the theory of Darwin both in time and simplicity. But this does not constitute a creation any more than the conception of the Hindu mythology. The Indian cosmology starts with a supreme architect, Brahma, who contains within himself the whole universe of matter and spirit—not merely potentially but actually. By evolution he draws forth from the exhaustless treasures of his own being the phenomenal universe. It is all in him as the material of the web is in the body of the spider. Creation is Brahma objectified, not materialized; for everything existed before in him, and after evolution remains Brahma still. Hence the whole spirit of this system is pantheistic to such an extent that there is no individuality or responsibility; and so, if consistently carried out, there could be no moral character in man, and no religion but the Divinity worshipping himself. There is really no creation, no transference of energy into equivalent matter, nothing but simple change of form. Nor is the idea of destruction or

death different,—whether of the individual, if we can call a man such, or of the whole universe of earth and suns. For the soul of man at death is simply reabsorbed into Brahma, as a drop of water when it falls into the ocean; and the whole world is taken back again, as we could imagine the spider's web drawn back and transferred into the material of its own body.

But the idea of creation as given to us in the revelation of the Bible is radically different; for we are told that in the beginning God created the heavens and the earth. This idea recurs again and again, under various forms of expression, but always with an equivalent meaning. Whether in the book of Genesis, which enumerates the works of the six days of creation, or in the ninetieth Psalm, in the Gospel of John, or in the Second Epistle of Peter, the doctrine taught everywhere is that God really created the universe by Almighty power, out of nothing—that is, its materials as such did not previously exist. This has been the accepted interpretation of the word creation, and the meaning attached to the act of forming the world of material and spiritual existence. We accept this interpretation heartily and in perfect faith. But we believe that a meaning can be given to the word creation which in no way contravenes the plain teaching of the Bible; but at the same time is consistent with the accepted facts of science. To this problem let us now address ourselves.

Something must have existed from eternity, that is, without any beginning.¹ We do not stop to inquire whether this something was matter or spirit, power, intelligence, will or law; visible or invisible, phenomenal or real; for unless this something—in whatever form it may be is of no consequence to our present inquiry—existed forever in the past eternity, nothing could at any time have arisen. For what is absolutely nothing could not by any possibility

¹ Arist., Met. 1071. b, ἀλλὰ δεῖ τι αἰεὶ ὑπάρχειν.

produce anything. And so, provided that at any time in the past there had been nothing, there would be nothing now, and nothing forever. There can be no fact clearer than this so well expressed by the brocard: *Ex nihilo nihil fit*. There is no possibility of gainsaying this dogma. It carries its own proof with it as soon as the terms of the statement are understood. No intuition can be plainer, no demonstration more cogent. Therefore, because there is something *now*, there must have been something in existence forever; and, according to the accepted scientific laws of the conservation of force and indestructibility of matter, there was from all eternity the equivalent of the present universe. This much being granted by everybody,—and it cannot be denied without stultifying our reason,—we may inquire next, Under what form did this Something exist?

Geologists and physicists are pretty much agreed on the fact that our earth, and those members of the solar system of which we have the most knowledge, show conclusive evidence of having been in previous ages hotter than they are now. They do not agree as to the time required for the several stages of formation through the agency of heat. Some scientists require more, others less; and the impression they leave on us is that one theory of the time is as trustworthy as another. For they all show evidence of being evolved out of the inner consciousness of their authors, rather than of ability to tell the age of the world by the record we find in its materials. But yet all the evidences derived from the presence of tropical vegetation, the materials for making deposits of coal and oil, near the poles, show that the earth was once even there far hotter than it is now at the surface under the equator. And we find, by deep borings, that the earth itself is but a thin crust of solid matter encircling a mass of liquid fire, where the heat is so intense that gold, platinum, granite, diamond, are in a

state of fusion. The admitted facts of the earth's history harmonize with this theory. For the whole fiery contents, seething and bubbling, find temporary relief in seismic agitation, volcanic eruptions, and upheaval of continents—which phenomena were much more frequent in past ages than now, as is evidenced by innumerable extinct craters.

Advancing now farther in this line, with our infallible geologists for guides, we come to a time, some hundreds of millions or billions of years ago,—for our guides are very accommodating in the time allowed for our journey into the past,—when the earth was wholly an incandescent mass, an ocean of fire. And we are not yet at our journey's end, nor, fortunately, have our faithful guides deserted us. For they declare that, some millions or billions of years earlier in the life of our planet, the mass of molten materials which at a later date constituted the earth, were rarefied, by intense heat, to such a degree that they occupied the entire space of its orbit. These, whirling around the polar diameter, after they had become segregated from the general mass of star-dust, which before had been whisking about in stellar space, gradually grew denser until they became a concrete mass in a spherical form. Up to the time of segregation, the dust of all the stars in a chaotic mass had been dancing about at random—according to the infallible dictum of Clifford—until they got tired of disorder. Then, seized with a sudden impulse of intelligence, of order, of teleology, or what not, they said to each other: "Go to! Let us mend our ways, and move in regular paths. But in order to do so we must divide off into separate spaces, and each take care not to encroach on his neighbor's bailiwick. We have been trying random movements for a time, whereof the memory of star-dust runneth not to the contrary. Let us try circular motion, according to the suggestion of certain wise men called Greek geometers who shall live a few billions of years hence, and who,

as competent authority on motion in their day, may be summoned now as potentially existing already in the star-dust. They will tell us that the circle is the most perfect figure for our gyrations in space. But, stay! The circle will not quite answer our purpose; for we intend to become habitable worlds, with changes of temperature which will be called seasons. Those of us who propose to keep in our own paths had better try the ellipse, according to the advice of an astronomer named Kepler, who will live a few moments later in the order of time than the Greek geometers; and who, after trying with the most careful investigation fourteen methods, will find that this is the proper figure for the orbits of habitable worlds. But our unruly brethren the comets will try parabolas; and *les enfants terribles* among them may go off, ungovernable as they are, in hyperbolas, and run the risk of bumping their heads against some other body, which may knock them to pieces for their temerity."

Thus originated the universe, according to the infallible theories advanced by those interpreters of Nature who give evidence that they have hit upon the true solution, by the fact that each has a different one, and any two of them will destroy each other!

But our scientific friends do not tell us how star-dust arose. Was it star-dust from eternity, and never anything else? It certainly did not remain star-dust, for now we have men like Clifford and Büchner, who know how the whole thing was done; who can tell us not only how, but the time required for all the small items of the world's history; such as, segregation of the materials for each planet from the common mass, the condensation, cooling, etc., of each body; and their accidental start on their everlasting journey, propelling themselves by at least forty-three different motions at the same instant. But they have not told us how the star-dust was formed, whence it came,

or what were its attributes—points of first-rate importance in any adequate theory of creation. They have told us so much, and with such absolute certainty; that they make us eager for more. They assuredly do not lack the knowledge, at least in their own estimation; and therefore we are listening to hear about the origin of the star-dust. For if it had been this, and nothing more, it must have remained such forever; and we would not have had the benefit of the unlimited knowledge which our friends the Materialists possess to explain the entire process of world-making.

We therefore pass to the question, How did the star-dust come into existence? Did it create itself; or had it been lying around loose, and "waiting for something to turn up"? Was it pure matter, or had it the qualities of intelligence lying dormant, and awaiting the occasion to spring from the head of each molecule, like Minerva from Zeus' head, fully equipped for world-building? If so, where was Vulcan's ax to be used for purposes of midwifery? Such seemingly irrelevant questions are asked only in our despair at the silence of our omniscient friends. Was this star-dust endowed with force so as to be the factor necessary for mere mechanical causation? For inert dust could not move itself, could not expand into dust or vapor more attenuated; or contract into embryo worlds, without some force to help. Nor was force enough, since this would certainly act at random, unless intelligence should direct its movements. Did it possess a telic principle? If it had all these prerequisites, then our friends the materialists have enough to erect their workshop and begin business; *and we are ready to begin with them.* For if they assume all these factors as inherent in matter, and these conceive and develop an intricate system, they tacitly assume a personality which wills in Nature. They in fact postulate just as much as we who believe there was Something ex-

isting from eternity, and this Something was possessed of sufficient power and intelligence to effect all that has been done, or shall be, forever. For there is a universe existing. It is the effect of power and matter working together, assisted—at least sometimes—by design. Without these we could have no cosmos, which, as its name signifies,—even as understood by Humboldt,—consists of a material universe arranged in an orderly manner, subject to such well-regulated and efficient laws that its great interpreter Laplace said it would run on without disorder forever. Such a universe we have before our senses; a reality acknowledged by intuition, by testimony, by instinct, by demonstration. How did this arise? is the question which confronted Thales and Plato as completely as Leibnitz and Kant. It demands of us a solution, and will forever obtrude itself on the best thought of man. It cannot be put aside by ignoring, nor satisfied by sophistries founded on the untrustworthiness of our senses.

There are three possible conceptions as to the origin of the world: 1. Matter and spirit are coeternal; 2. One created the other; 3. Both were created by a third factor acting *ab extra*. No other alternative is possible in thought. To begin with the third alternative.

The universe fills all space, since no bounds can be fixed; for whatever place be considered its limit, is still space. This universe has continued the same reality, either potentially or in action, with the conservation of matter and force, through all time. And no limit can be fixed here, any more than in space, because any boundary is still a part of time. Besides, if we were to admit that our universe—provided any limit could be fixed for its existence—was created by a power working *ab extra*, this would only remove the difficulty a step farther, without solving it.

But, secondly, if matter and spirit were coeternal, one must influence the other; one must control the other to

make it assume new forms, or both must act in unison, being pervaded by the same spirit. For there cannot be two warring principles, opposing each other, in perfect equilibrium, because this would render any change impossible. If one be stronger than the other in any degree, this preponderance, in time, must finally lead to a complete victory for the more powerful. Ahriman and Ormuzd cannot live together as coequals forever, but one must eventually yield to the other. If they are in accord, and their action controlled by one purpose, we have two factors which really are but one; and the idea of Monism satisfies the conditions so far as interaction is concerned, but does not meet the analogy which we see both in external nature and our own experience. Matter and force are in perpetual partnership to produce effects; but one is passive, and the other active. Besides, neither factor acts at haphazard,¹ but both of necessity are directed by intelligence working through a prearranged plan; else no definite result would be secured. The principle of teleology is so well established in science that no one who is *compos mentis* can fail to see it everywhere. The failure to be guided by this principle stamps a man as a fool; and we surely should not make the mother who bore us, even if we are materialists, more senseless in her action than any of her children. Whether the teleology be mechanical and immanent, or spiritual and working *ab extra*, the fact remains, that such a mode of action prevails everywhere. For without it there could be no law, material, governmental, or moral. For teleology enables facts to be codified under fixed principles, and without it there could be no connecting thread which renders classified knowledge possible. A world of pure chance is a monstrosity which no philosopher can create even as a figment of his brain. And if he could, it would be impos-

¹ Arist., Met. 989, μή πεφικέναι τῷ τυχεῖντι μίγνυσθαι τὸ τυχεόν.

sible to own his offspring without stultifying the principle according to which he begat it.

The second and third alternatives are closely allied, and are both consistent with theism—the one favoring pantheism, the other a personal God. As regards the question, Which is the more rational? we can be guided only by analogy. But this, when reduced to its last analysis, is the only method of reasoning which we can employ. The similarity between that which is known and that which is unknown is a necessary assumption in all our thought processes; and must, therefore, be our exclusive guide to knowledge. For we cannot find any two things in nature which are the same. All things differ either in the material of which they are composed, in the space they occupy, or in the relations they sustain to something else—generally in all these particulars. Hence there cannot be two things in any realm of nature which are precisely the same. Though there cannot be two things which are the same, they may resemble in every degree from the faintest likeness up to that resemblance which makes them indiscernible except to Omniscience. This resemblance is their analogy, and upon this principle one fact is colligated with another, two objects are placed in the same category, until natural science has genera and species; until logic arrives at a middle term for comparison, and so can reason syllogistically. And we must always bear in mind that all our knowledge of nature is arrived at *anthropomorphically*, because we cannot reason about anything external to ourselves except by the application of that rule according to which *we* think. For we can neither enter into the thoughts of other men nor avail ourselves of the results of reasoned knowledge, except on the supposition that they think in the main as we do. The Protagorean dogma, *Homo mensura*, is true when correctly understood. It is not the *mensura* of one man, but of the many whose

true conceptions unite—as all that is true coalesces—and whose false judgments neutralize each other. We have examples of both in the testimony rendered by the senses, and that of witnesses, whether true or false, before a court of justice. No single sense can be trusted in all cases until its testimony is verified by that of others, and the result formulated by the dialectic process, and this in turn submitted for rectification to the common experience of man. Hence this brocard does not signify that nature must be exactly what she is presented to the consciousness of each individual. This would be a manifest absurdity, and make reality an ever-varying and meaningless panorama. But as one sense is corrected by another, so the measure of each man is compared with that of his fellows, and the judgments are corrected by the resolution of the personal equation.

We, therefore, believing that our senses combined furnish true presentations, and our intellects interpret these presentations correctly, maintain that we have a standard of judgment which is an absolute necessity to enable a man to think or act. Projecting this measure out, and applying it to others, because we see that they act in the same manner as ourselves, and by experience find this to be true, we both think and act in concert, else there could be no scientific knowledge, nor combined effort on the basis of acknowledged truths. Without this united action which arises from our confidence in the principle of analogy, there could be no culture or progress, no civilization or religion; no concerted movement—nay not even speech or conventional signs.

We apply this principle everywhere, because we have no other mode of thought or action. By means of this we interpret the past, we foretell the future; and do this correctly, just in the proportion that we know the facts and can interpret them. Infinite knowledge would see that

the present is an inevitable product of the past, and both combined the warrant for the future. Nor do we stop, in the application of design, at human action. The world around us is evidently regulated by some laws, which belong to some system of universal validity. In itself it is a system concatenated with unerring certainty. All are agreed as to the infallible veracity of the laws of Nature. Cause and effect and uniformity must be admitted by any one who would live in the world or understand the principles by which it is governed. And every man of science is just as certain that these laws prevail beyond the range of his present knowledge as within its narrow limits. Why is this? Because he has discovered that uniformity exists as far as he has progressed; that the history of scientific ideas shows that progress was made because there was implicit confidence in past time at each successive step. The analogy of the past and present was applied to the future, with the assurance that the past as yet unknown is like that which had already been surveyed. And if at any time facts did not seem to agree with the theories held heretofore, and the claim of uniformity was apparently invalidated, the investigator did not think of abandoning his principle. He distrusted his own accuracy, and his limitations in the discovery of facts; felt that only a small segment of the circle of truth had been measured, and therefore he had not enough data for a true induction, or else had interpreted them incorrectly. He always proceeded on the principle that Nature acts rationally, with some end in view; and one which, to be understood by man at all, must correspond with the laws of thought. Moreover, in the innumerable instances in which men had applied this principle accurately, had corrected their own errors by comparison with the work of others, they were enabled to disclose the secrets of Nature, and understand the forces which control all her movements.

Not only has Nature regularity of movement, uniformity in the facts disclosed, but, if we apply the rule of *Homo mensura*, we are compelled to believe that there is some Intelligence which directs the movements with unvarying certitude; and in all cases with a telic purpose. There must be Intelligence, immanent or external, and in either case acting according to design, and not chance. For it would be mathematically impossible that chance should always light upon the right toss of the die. If it did, it would cease to be chance, and must be expressed by the same terms as Design. On no other method could the physical universe continue its movements, more intricate than the profoundest calculus can investigate, more perfect than our intellect can comprehend. Hence there must be intelligence as well as power at the helm of the universe; else this uniformity, ever tending toward definite results, could not be secured. Man can judge in no other way, because he has no other guide than the analogy derived from his own actions; which he must apply not only to the actions of other men, but to the course of Nature both material and immaterial.

Again, as to the third alternative, one of the factors, matter or force, must act on the other; and if we follow the analogy of our own actions, it must be the latter upon the former. Though it may be difficult in thought to bridge the chasm between mind or immaterial force and matter, yet in action this is constantly done. The two factors are distinct by the testimony of consciousness, which is our court of last resort. For the members of the body move in obedience to the metaphysical force, be it will, intelligence, life—there is *something* different from the matter of which they are composed which causes them to act. There are τὸ κινεῖν and τὸ κινούμενον,¹ as certainly as the forms of thought petrified into words and signs can make

¹ Arist., Phys. Aus. 224. 3.

anything. Admit that they are found together and necessary for action, yet it is equally true when they are separated there is no phenomenal action; and their condition, both when together and apart, proves alike this thesis. When separate, the matter remains passive,¹ at rest, effecting nothing. But we know the force necessary to produce action exists, as in the case of the paralytic moving the limb, but not with wonted success; or the telegraph wire when the current is cut off—the power is in existence to exert the limb when recovery has been made, and to move the machinery when the circuit is again complete. It is just as true in the animal or vegetable organism as in the telegraph wire or the gearing of machinery. The instrument is one thing, and may be ready for action, but it does nothing until the application of power. It is inert, helpless, until charged with energy, which changes its inner condition and external connections. The living organism may be in a swoon, the vegetable, either in the form of seed or full grown, be in suspended animation, but ready at once to begin growth as soon as the vital forces quicken it. Our own knowledge gained through consciousness, intuition—by methods clearer and more cogent than demonstration, for they are its indispensable elements—declare to us that *Mens agitat molem*; that power moves the wheels of traffic, and passes through the wire that carries the message. As truly as the earth is held in its orbit by attraction, as certainly as the heat vaporizes the water, so certainly does the mind of man, that secret something which the vitalized forms of speech call spirit, direct the body to do the bidding of that acknowledged authority.

If we deny this, and make the whole action physical, material, or mechanical, we belie our consciousness, we nullify the judgment of mankind; and, as a result, we neither can know any fact ourselves nor trust any testimo-

¹ Arist., Met. 1071. b, οὐ γὰρ ἡ γέ ἕλη κινήσει αὐτὴ ἑαυτήν.

ny. But if action be prior to potency, if the maker be prior to the thing made; if there must be a plan devised before it can be realized in fact, then, as the third alternative, mind, or force pervaded by intelligence, which is the same thing, must be anterior, or, if coeval with, must control, must fashion and direct, that which is material, passive, and inert. Analogy—from our own consciousness, corroborated by that of all men when they speak naturally and have no pet theory to maintain, and *always when they act*, no matter what theory they hold—teaches us that mind moves material, changes its form, and directs its action. There is no analogy, however far fetched, that gives contrary testimony; and through lack of any other form of judgment we apply the norm of our own thoughts and actions. We are constrained to apply this for the obvious reason that we have no other. We are neither gods nor demons, but men, and must think as men. Hence if the world can be understood by us at all, if there can be any science, it must be constructed according to the principle of anthropomorphism. Whether, therefore, force and matter be coeternal or not, the former directs the latter, and exercises the right to command. Our consciousness tells us which exercises this prerogative, and we project this conviction by analogy to our fellow-men. We find the application warranted, because all the facts of our experience accord with this theory, and we therefore are assured that the same method obtains throughout the universe and during all time. The question, therefore, is no longer, which of the two factors controls the other—it is mind that moves matter. Energy, force, intellect, directs the material world. But the question remains, Did one create the other, or are they both coeternal.

The words Substance, Essence, Being, are hard to define, because we can through sensible perception get a clear conception only of attributes. For it is the attribute

through which the substance acts to produce phenomena, and these only, as far as we know, affect the senses. But we know by intuition, we are convinced because we are conscious that the fact cannot be otherwise, that there is a Something in which the several attributes inhere, or that the several attributes constitute a framework by the combination of which the Many become the One. Philosophy in all ages has generally held that the former is the truth. But where the effort was made to define the subject or substance, difficulty was experienced in expressing this imperceptible Reality. The Schoolmen fought over this subject with the pertinacity of their disputes, which were generally acrimonious inversely to the practical importance of the issue involved. In all their efforts made for its elucidation, no definition was more significant than the quaint designation! "Subject, the Old Man who remains at home when all the attributes go out visiting." This probably is as near as human language can approach to that which is, *per se*, indefinable. Yet all are agreed that there is something actual which constitutes the identity of the thing. In the case of living organisms, and especially intelligent agents, the personality is distinct: a unit which must act for itself and be responsible. In material things, however, the reality is not easy to specify, but is felt to exist as truly as the other, and to constitute the thing to be an individual. The word Essence is used to express the real quality of the thing, segregated from those which are accidental. Without this the subject would be something else; while with it the thing is complete, whatever other accidental qualities might be absent.

We are now at a stage in our inquiry to ask, What constitutes the earth or the universe which makes them to be what they are, and to perform their functions? Does it consist solely of inert matter, divested of force, intelligence, will—those attributes which we deem essential to consti-

tute personality? Or does it include those factors which in our experience give significance to material things, which differentiate them into individuals, and in their last and highest forms constitute them responsible persons? If this be admitted, we must consider these the characteristic factors, anterior both in logical and temporal importance. For the material factors would never act unless first acted upon. They await action from without so far as they are, in their proper nature, concerned; even if we accept immanent or mechanical causality. Since then of necessity the immaterial or spiritual must be prior to the material both in potential and actual force, we now inquire how the process of cosmical change began. For this is equally pertinent, whether we accept the absolute Monism of Spinoza, or the Duality of Philosophy generally, both ancient and modern. If God be the only Substance, according to the former view, this assuredly is manifested under two forms in the phenomenal world in the construction of a Cosmos. There is something which acts and something which is acted upon, even if the actor and the recipient are the same person or thing. For if a man strikes himself, if he in any way influences himself, the same fact holds good. The forms of language which embody the substance of human thought, render this truth indisputable. Monism, in fact, offers no objection to a system of creation. For if the one Substance of Spinoza be *ab initio* in two forms, as it unquestionably is now, the duality of manifestation as active and passive, presents no difficulty. Matter, force, and intelligence are now combined in some way to produce change; and the bridge between two apparently disparate natures is crossed incessantly. Some facts are indispensable to any theory of cosmology, and admitted alike by all thinkers, whether they believe in Monism or Dualism, Immanent, or Intelligent conscious Finality:

1. Force acts upon matter, and through it as an instrument to effect change.
2. This Force acts not by chance, but by design.
3. The Quantity of Matter remains the same, under all changes of form, if we make allowance for that which is transmuted into power.
4. The Quantity of Force is neither increased by gathering for application, nor diminished by dissipation after it has done its work—provided its equivalent that has become matter be included.
5. These two factors, Matter and Force, are interchangeable.

We have already traveled with our friends the physicists back through the geological periods; finding the earth, as we recede, in a fluid state, then gaseous, then particles of star-dust more attenuated than incandescent hydrogen. Though our friends leave *us* when we have arrived at this point, let us take *them* farther back, until this rarefied matter was as much more subtle as the star-dust is more than the heaviest known metals. It then approaches our conception of spirituality, though it was really matter embodying all the attributes—according to a materialistic interpretation—which are now found in the various elements constituting the earth's substratum. Yet this attenuated matter must, according to mechanical causation, have contained within itself every element of material, of energy, of intelligence which are now found in the universe. For both matter and force are constant quantities, and when they develop into intelligence and laws of morality, they are simply evolving what was innate. For all external influence is by the theory of evolution excluded, and we accept the thesis of the physicist—though we may not be bound by his applications. We most willingly accept the thesis that there is no increase or diminution of force, or of material, if we are permitted to consider that there may

be an equivalent of the latter, and this equivalent is obtained by transference of the spiritual or subtle energy into the grosser forms which are disclosed as phenomena and can be grasped by the senses. From eternity this Essence, this Substance, this Being, whom the world in all ages and among all nations has recognized as a self-existent Personality, under the names of Jehovah, Zeus, God, has existed, and summed up in himself all reality whether spiritual or material. And under whatever form or modification, He was the same, including all the potency and intelligence, and controlling absolutely all the material through which these attributes are to be manifested to finite creatures, when they shall have been formed and endowed with a proper personality. The creation—to reverse the process of successive attenuation—begins by the transmutation of pure force or energy which is infinitely subtle, into that which is finitely so; that is, crossing the bridge between spirit and matter where the chasm, if chasm there be, is the narrowest. And it must be observed that the dividing line between parts of nature in any of her aspects, is invisible. The *saltus* which she makes everywhere is an imperceptible progression. The transition between genus and species is an intangible differentia. The shading of one color into another in the spectrum, the transition from large to small on any basis of relation, or from young to old—each of these offers the insoluble puzzle of the Sorites.

The Primordial Essence or Power is transmuted into that which, though inconceivably subtle, is yet, in its basis, material. The invisible line of division between the two has been passed, and creation, which is evolution, begins. For this attenuated substance in turn develops itself into forms less subtle, until it can be apprehended as phenomenal matter; star-dust if you please; incandescent and immeasurably expanded hydrogen, nitrogen, oxygen, carbon—all the bases found by spectrum analysis. This pro-

cess of condensation continues until the masses of these particles by some process segregate themselves—we know the $\delta\tau\iota$, but not the $\delta\iota' \delta\tau\iota$, as is the case in all ultimate facts—and become parts of a system. But if these particles came together, either by accident or design, the union could effect nothing unless there was an immanent or externally applied fitness of the one to the other. This indispensable condition of union and combined action is conveniently ignored by all the advocates of Mechanical Finality. For surely, if the atoms did not possess this adaptation before union, the fact of accidental jumble would not impart it to them. But under controlling Design, which adapts each atom to its fellow, the earth, the planets which are to be, but as yet are only in gaseous form, arrange themselves in their appropriate spheres around their primary the sun, which, in the meantime, has also been getting ready. As we are told, the Spirit of God moved, *brooded* over, the chaos of elements as yet without form and void, but through this Intelligence they were preparing, segregating, solidifying, into the members of the system which was to be created. This process, according to the analogy which we see prevailing at a later stage, would require *æons* of years of our reckoning; yet with God—with whom there is no time—would be done as soon as commanded. But when the sun and stars had been formed, and light shone upon the dawning creation, then “it was evening and it was morning, day one”; and anthropomorphic Time began.

The Energy which had always existed, the “Wisdom” which was “from the beginning, or ever the earth was,” now are by transference changed into material things, and into the laws which regulate their movements. The idea of forming something out of nothing is to be understood by accommodation to our methods of thought. “The worlds were framed by the word of God, so that the

things which are seen were not made of the things which do appear."¹ There was no material thing at the beginning, and therefore the creation was literally out of no thing apprehensible by our senses. The analogy proves this by retrogression. As we go back toward the beginning of time we find, according to the best results of science, the solid earth to be in a molten state, even as its center, held in by the hard crust on the outside, and its oblate sphericity, now clearly indicate. No substances, even the most obdurate rocks and refractory metals, existed then save in a state of fusion. Still earlier they were in the form of an immeasurably heated and expanded gas. Yet earlier we have the star-dust floating in space, no nearer perhaps to the subtlety of the Spiritual Essence, than the ether which now fills the interstellar regions is to the heaviest substances known to science. We follow the process backward till imagination wearies; but the processes of Nature do not stop where we find ourselves unable to travel even in thought. If, therefore, matter is eternal, it was at one time in such a degree of subtlety that by no thought of ours could it be distinguished from pure spirit or energy. This view is in strict accordance with the most advanced theory of mechanical cosmology; and we are prepared to accept it, because we conceive that it is perfectly reconcilable with the most orthodox theistic system revealed in what purports to be the word of God.

Science which is true is never to be dreaded by religion. That which rests on imperfect deductions, theorizing from arbitrarily assumed premises or pretentious ignorance, will fall to pieces of itself if not bolstered by controversy. We have abundant proofs of this fact in the wrecks of scientific theories. We have had vaunted systems of geology which interpreted the earth's crust with absolute confi-

¹ Heb. xi. 3.

dence, only to be superseded each decade by another equally confident and equally absurd. And the fate of abortive systems of cosmology, founded on the alleged testimony of the rocks, has its counterpart in the "higher criticism," which—by an infallible criterion in each critic's modest opinion of himself—will rip up the Bible with the buzz-saw of inner consciousness, and leave nothing of the Sacred Record but dust. These critics will tell with unerring precision the particular age, and will assign to the proper one of twenty or a hundred *redacteurs* each chapter, verse, and time of compiling Genesis or Deuteronomy. With the confidence which only ignorance can inspire, they will tell you what style belongs to each several author engaged in the composition—forgetting the well-known fact that the same author varies his style at different periods of his life, or accommodates it to his subject—they give us a Bible more variegated than Joseph's coat, and by their inspired spectrum analysis separate the light of God into a Rainbow Bible!

But we are well content to let them fight the battles of their theories out on their own lines; knowing, from past experience, that each rival will destroy his fellow; while the truth stands secure, and receives side-lights from their hostile attacks. From the side of religion there can be no danger from a conflict with science; though overzealous attendants on the ark may fear for its safety when the cattle temporarily attached to its wain stumble, or leave the main road. Every true advance made in knowledge of any sort must be beneficial to all other kinds. For truth is one, even as the universe, and the Author of Nature, is one. As each particle of material in the most distant star is bound to every other, no matter where found, or under what form, even so every grain of truth—mathematical, physical, moral—is united with all portions, and goes to constitute one whole, which is the embodiment of Him

who is the truth; "the Father of lights, with whom is no variableness, nor shadow of turning."

There are exhaustless analogies in the transference and transmutation of power. We may begin in the descending scale of cosmology at the point where Nature first left a record of her movements. The heat of the sun from above, added to that of the earth beneath its thin crust, caused the tropical vegetation, first at the poles and later, as it cooled, on the whole surface, to grow with unchecked rankness and vigor. This combined heat caused watery vapors to ascend continuously. These when they reached a sufficient height in the atmosphere to be condensed by the cold, as constantly descended in copious showers. Ferns, palms, and conifers were evolved, by the transmutation of the various energies into living organisms. Their decaying trunks and leaves formed immense beds of vegetable material. In the upheaval of the earth's crust from earthquakes and volcanic action, wide tracts of this vegetation, grown thick by prolonged accretions, were submerged. For as yet the earth was so hot, and its solid crust so thin, that bubbles, caused by the ascending heat, would burst through the surface, forming volcanoes, and large ebullitions of the seething mass, even lifting continents. The misplaced strata, subjecting this decaying vegetation to tremendous pressure, reduced the firmer portion to solidity, while the liquid was forced out in the form of oil: thus making both the coal-beds and oil-fields, where the accumulated energy of the sun's rays and the moisture of the earth's seas were stored. Thus we see both the transference and transmutation of force from the subtlest agents of the sun and earth, viz., heat and vapor, into the grossest forms of matter. There they lay hidden in all their richness of energy until such time as in the earth's development they should be called for, and applied to the transference of energy for the uses, and changed into the

spiritual realities, of a progressive civilization. There was no more heat, electricity, or potential motion at the stage when the coal and oil measures were complete, than when these agents were floating as star-dust in space, or when the earth and sun had assumed their relative positions as science now sees them.

But now there was the arrangement of these agents in such forms and quantities as would be ready for man's use in the application of power, to effect definite results when he had become ready for them. No doubt there are countless forms of power as energetic, more easily secured and docile, awaiting the call of advancing science to summon them to activity. The earth, the air, and the sea are full of life and energy. But its forces are too subtle to be recognized by the present stage of scientific progress. They may become more gross, or man's intellect more refined and piercing, until the two meet and recognize each other. But there will be no more force in the universe than now. There will be simply a transference of that which already exists, but in a form too subtle for man's present attainment to discover and utilize. There may be an immeasurable distance between power and intelligence as they exist in themselves, and the gross forms in which they must appear if recognized by the senses. But the senses are being quickened, and possibly their number may be greater than now admitted, and either case will enlarge the capacity to recognize, and the discernment to interpret intuitively, the subtler forms of energy; or, possibly what force is in itself. Should that point ever be reached by the mind of man, the transmutation of force into its equivalent in the form of matter, which is the act of creation, will then be comprehended. By analogy we get a glimpse of it already, and it will probably be just as simple as the transmission of power from the coal through the boiler and piston, crank and screw, to drive the steamer

across the ocean; to send the message along the telegraphic wire; to change the food which Gladstone eats into the statesmanship which sways an empire, or the moral forces which enlighten and direct human character.

The order of Nature is alternating. It is not merely a flux, according to the doctrine of Empedocles, but also a reflux. This discloses itself constantly in our experience, and in the history of the world. Progress can be made to a certain stage in each individual, and when the instrument by which the power is manifested has arrived at its greatest efficiency—that is when the material has reached its greatest capacity for work—the retrogression begins. The power is not exhausted nor even diminished; but the instrument for wielding it has undergone a change by which it can no longer transfer an equal amount which was to be dissipated through its action. The coal and oil which hold in store the energy of the sun's rays are structurally destroyed. The latent power has become active, and therefore set free from its prison. This does its work, leaving only a residuum of smoke and ashes, is dissipated and passes beyond our ken into the realms of space; possibly to be gathered up again by the vital processes of Nature and applied to new organisms; or added to that great sum of forces which seem to be set entirely free, and to have disappeared utterly. Still analogy teaches us again that there is nothing lost either in matter or force. For careful tests made by chemists show that when a substance is dissolved by acids or consumed by fire, the residuum, when the process is carefully guarded, equals the original material in bulk, if due allowance be made for the transference of material into energy. The greater part of all materials disappear during the process of transference; and it is the constant effort of practical science to prevent waste, and so utilize the whole energy. The adaptation of machinery so as to utilize all the forces contained in the

fuel, the wind, or the water, is the goal toward which all applied science is striving; and the degree to which this is effected is a test of the efficiency of mechanical appliances.

For if the entire momentum could be rendered available, the same amount of fuel, etc., would effect, in general, twice the work now achieved, because so much is lost in the transfer. In the processes of Nature the plant decays, the rock disintegrates, but their forces are preserved in the vegetable world, and they continue to nourish new growths. The principle of life, which is properly called vital force, seizes upon and appropriates energy from every source. This it displays for a time in the vegetable, the animal, or, last of all, in man. He lays every domain of nature under contribution, and draws energy to himself, which in him passes from physical into spiritual power. For the food which a man eats is undoubtedly one of the elements of his ability to employ the forces of his mind already acquired, and also to add to his acquisitions. For there is such an intimate relation between mechanical and spiritual forces that the one passes into the other with entire facility, and the gradation between them, like all lines of demarcation between portions of Nature, so delicate that we cannot discern where one ends and the other begins. They both seem to be parts of a higher unity so closely akin to each other that they cannot be entirely divorced. They may separate for a season, but they return in closer communion than ever, and show, in physical things as in moral, that what God has joined together, no man can put asunder.

The act of creation, according to this theory, is the change of spiritual energy into its equivalent mechanical force, and this is transmuted farther until it becomes embodied in matter for its phenomenal action. God was from eternity all in all; the only substance, essence, power, intelligence, goodness, combined: The Many united in the absolute One. He contains within himself potentially

whatever was at any time, past, present, or future, in spiritual or material form. For whatever he could do by his almighty power was actually summed up in his being. Therefore any change of form that this might be made to assume—and it could be made to assume any by his determination—was simply a transmutation, a change of form, a materializing and localizing that which already existed in him.

By this view the doctrines of revealed religion come into complete harmony with the fundamental principles of science. There is no other doctrine of science which so completely underlies and supports the structure of physical knowledge as the conservation of force, with its kindred principle, the transference of energy. These are the cornerstones of every system of inductive science. They are the middle terms of reasoning, and must be assumed in every form of philosophic thought. Any scheme of theistic cosmology must assume that all was potentially in God, and that in creation this potentiality became actualized, by some process, in material which is apprehensible by the senses. Creative energy went out from him at His command, and was transformed into a universe of matter and spirit, of intelligence and goodness. The One becomes the Many; and all, like their source, were very good. Each portion of energy becomes a separate individual, a *monad*, a microcosm, a perfect organization in itself. Each was endowed with a spirit proper to its sphere of actions. Yet all were united by the golden chain which reaches not only from heaven to earth, but to the most distant star in the firmament, and binds them together in an organic whole. These become separate in space and time, which are conditions of finite things. But they are still united with their Creator, who is limited by no conditions, being absolute. The Many in their individuality are distinct; in their oneness they are the same. Great is this mystery,

but no greater than the union of body and spirit, or force and the instrument which transfers it to productive uses. The world is full of mysteries as insoluble as the method by which is wrought the change of force into matter, and back again from material into force, which does its work and then seems to be destroyed, but is absolutely indestructible. In truth the whole business of scientific knowledge, nay of every species of knowledge, is the investigation and classification of phenomena which are the expression of this alternate transmutation.

There are dark problems concerning the presence of imperfections in being created by a perfect Artificer, or of sin finding entrance into a scheme of moral government established by a holy God. These mysteries are not for us to solve, and can in no way affect our responsibility to duty. For, whatever the solution be, we are conscious that we have the power to render ourselves happy or miserable, and that no one can do this for any one but himself. We come from God and have the power, despite the fact of our estrangement from him by reason of sin, to return and be one with him in purpose and action. "Our wills are ours to make them His." The knowledge of these facts is enough to enable us to fulfill every duty to our Master and our fellow-men; to make ourselves fit for communion, and perfect oneness with Him in motives and character. Our consciences, armed with this assurance, teach us that whatever is gross in us should be refined; whatever is physical force may be changed into moral energy, and our whole nature so transformed that we shall again be one with Him. Manifesting itself first in man, the highest grade of created being, this process shall continue until there shall be a new heaven and a new earth, wherein dwelleth righteousness. For the creature that was made subject to vanity, was subjected to this in hope and shall be delivered from the bondage of corruption into the glorious

liberty of the sons of God. The philosophical conception of creation which is in harmony with the revealed will of God looks to a restoration of that which was marred by sin, and its reunion with the Creator, whose life and energy constitute its existence. Then all things shall return and be subject to his law, and, by perfect oneness with him, God may again be all and in all.