

1. The Mystery of Matter

Approaching our general theme from the points of view of human experience, science, and language, it is necessary, first of all, to inquire what is meant by "spirit." Does the word signify anything real; that is, for anything existing in fact, or not just as an idea in the mind?

In all ages there have been thinkers who have answered this question in the negative. Matter, they say, is the sole reality; everything in the universe is reducible ultimately to matter and motion, or rather matter-in-motion. All such persons are commonly designated "materialists."

Obviously, the primary connotation of "spirit" is a negative one, in essence, namely, that of *immateriality*. Perhaps the best approach, therefore, to a satisfactory definition of "spirit" is by way of an understanding of what is meant by "matter."

Ordinarily, we define matter as anything that occupies space. Spirit, then, in the light of this definition, must be regarded as a something that transcends space altogether. Or, if matter is defined as something that affects one or more of our physical senses, then spirit becomes a something that transcends the physical senses, or that is not apprehensible by means of the physical senses. Cf. 2 Cor. 4:18, "the things which are seen are temporal; but the things which are not seen are eternal." As A. Clutton-Brock has written: "We are aware of matter with our senses; and, if we are aware of spirit at all, it is not with our senses."¹ Therefore there need be nothing surprising in the fact that, as the same writer puts it, "spirit is a name given to something the very existence of which is often denied, and those who believe in its existence often give an incredible account of it."²

What, then, do we mean by "matter"?

In common parlance we mean the *stuff* of things around us and in a sense, that of ourselves, or at least of our bodies. *Hyle*, the Greek word for "matter," used in that signification first by Aristotle, meant originally and primarily, "wood," that is, (1) a real wood, or forest; and also (2) wood cut down, firewood, etc.³ Why Aristotle selected this particular word to signify the ultimate stuff of things is a mystery. The German word, *Stoff*,

1. Art., "Spirit and Matter," in a work entitled *The Spirit*, 309, edited by B. H. Streeter.

2. *Ibid.*, 309.

3. Liddell and Scott, *Greek-English Lexicon*, New Edition, by Stuart Jones and McKenzie, s.v.

is far more expressive than even our word, "matter," which derives from the Latin *materia*.¹ For matter is in fact the stuff of things. This, of course, is merely a substitution of one word for another; it does not tell us *what* the stuff of things is.

Now from ordinary observation we are led to classify the stuff of things in two general categories, namely, that of *living* (animate) stuff or matter, and that of *non-living* (inanimate) stuff or matter. Classification, however, gives little or no insight into the real essence of matter. Is matter ultimately homogeneous? If so, then what is it *per se*, that is, in its ultimate constitution? The answer to this question has been sought by scientists and philosophers in all ages and the quest is still going on.

Speculation regarding the ultimate constitution of all things physical—the ultimate ("irreducible") cosmic "substance"—had its beginning with the ancient Ionian "natural" philosophers, the first of whom was Thales of Miletos (c. 640-548 B.C.). Thales is alleged to have contended that *water* is the ultimate or primal substance. Just what Thales meant by "water," however, or whether he had reference to water (H₂O) as we know it, is problematical; he may have meant only that the primal stuff was of a fluid or plastic character. Again, Anaximander of Miletos (c. 610-547 B.C.), an associate of Thales, posited an ultimate matter undetermined in quality and scattered throughout infinite space, which he designated *To Apeiron*, that is, the Indeterminate or Undifferentiated, generally translated "The Boundless." Anaximenes (c. 598-524 B.C.), also of Miletos, put forward the view that the ultimate principle of all physical existence is *air*, by the thinning and thickening of which, fire, wind, clouds, water, and earth are formed. According to Herakleitos of Ephesus (c. 534-475 B.C.), the whole cosmos is a continuous flux, having for its mobile element *fire*. From the testimony of Aristotle it is evident that the Fire of Herakleitos was a very subtle substance of much the same character as the Air of Anaximenes. Indeed, fire, as we know it, is a *process* rather than an entity; and this may have been the meaning Herakleitos intended to convey by his use of the term. For reality was, for him, an ever-flowing stream, a ceaseless process of change, of becoming and ceasing to be—a view revived in recent years by the French philosopher, Henri Bergson. Empedokles of Akragas in Sicily (c. 495-435 B.C.) synthesized these earlier views into

1. The Latin word having the same original signification as the Greek *hyle*, was *silva*. *Harper's Latin Dictionary*, Lewis and Short, *s.v.*

the famous theory of the "four elements." The four bodies—water, air, earth, and fire—were named together by him as the elements constitutive of all things, the movements—dissociation and re-combination—of these elements being governed by the two forces of attraction and repulsion, which Empedokles poetically termed Love and Hatè respectively. This theory of the "four elements" was preserved by science as a sacred deposit down to the time of Lavoisier (c. 1790).

Demokritos of Abdera (c. 460 B.C.), or probably Leukippos of Miletos before him, was the first to put forward the so-called "atomic" theory. Demokritos proclaimed the homogeneous character of all matter. According to his theory, corporeal things are made up of infinitely small, physically indivisible particles (*atomos* means literally "incapable of being cut," i.e., *indivisible*), full and solid, and eternally in motion. These atoms were conceived as differing in shape, size, weight, order and position, the soul being made up of fire-atoms of a more refined character than the atoms of gross matter. In reality, said Demokritos, nothing exists but atoms and the void, i.e., empty space. In his theory, the birth and death of all material things is sufficiently explained by the association and dissociation of these atoms in the process of their whirling in all directions throughout space in response to the blind forces of impulse and reaction. The theory of Demokritos was subsequently championed by Epikouros (341-270 B.C.), with one important difference: whereas in the former theory the cause of all motion was assumed to be in the external movement of matter, in that of Epikouros the atom was conceived to be self-moving and self-determining. In later years this early materialistic theory was elaborately presented by the Roman philosopher-poet, Lucretius (98-51 B.C.) in his famed didactic poem, *On the Nature of Things*. This theory was so completely overshadowed, however, by the metaphysical systems of Plato and Aristotle that it made little headway among ancient thinkers.

Plato (427-347 B.C.) appears never to have given much thought, if any, to the problem of the constitution of matter. Indeed, as far as I am able to determine, he does not even use any Greek equivalent for our word "matter," but puts the main emphasis rather on the opposition between body (*soma*) and soul (*psyche*), a dualism which he seems to have inherited from Pythagoreanism. This dualism stemmed also from his basic conception of the universe as a Living Being, a World-Body animated by a World-Soul; a conception which he carried down

and applied to all subordinate beings including even the heavenly bodies and man himself. In the *Timaeus*, a cosmological treatise in which it is impossible to determine whether Plato is presenting his own views or merely echoing those of contemporary Pythagoreanism, he describes the cosmos and its constituent creatures as having been carved out of empty Space—the Receptacle—by the Demiourgos, after the respective patterns provided by the eternally-existent Forms and according to strict mathematical relations. The Forms alone are declared to have real existence. Material things are but images, empty shadows, so to speak, of the eternal and immutable Forms. In fact, throughout his writings Plato denies any real existence to the material world; at best it is but the transitory, everchanging copy of the eternal pattern, the world of Forms; its sole reality inhering in the determinate geometrical configurations which the Demiourgos caused its four primary bodies—earth, water, air, and fire—to conform to, in the process of generating it. In Plato's thought, matter is relegated to the realm of non-being, or at best to that of pure becoming. In another dialogue, for instance, the *Theaetetus*, he tells us that the physical objects which give rise to our sensations and perceptions have no permanent qualities residing in them.¹ They are described as being actually "slow changes," that is, qualitative changes, or motions which produce sensations in a recipient. About the only thing we know, or can know, about them is that they have the power of acting on our sense organs and on one another.²

(Incidentally, John Locke, the English philosopher (1632-1704), showed that, after all, we do not know what the material substratum is in itself, but rather we know only our sensations of it; hence, he defined matter as "permanent possibility of sensation," as "something-I-know not what." This, as a matter of fact, is about as close as anyone has ever come to a "definition" of matter *per se*.)

Again, "soul," for Plato, was the source and cause of all motion. Hence, in the *Timaeus*, the World-Soul is pictured as the prime mover of the World-Body, the energizing and vitalizing principle of the cosmic Living Being. In this remarkable treatise, which is presented in the form of a "likely story," a typical Platonic *mythos* and nothing more, the Demiourgos apparently stands for the Divine Reason which is probably to be identified with the World-Soul itself and which is portrayed

1. *Theaet.*, 155 D ff.

2. Vide F. M. Cornford, *Plato's Cosmology*, 204.

as working only for ends that are ultimately good. For Plato the physical world was not a reality but only an "image" of the real.

This conception of matter as essentially non-being was enlarged upon subsequently by Plotinus (c. A.D. 204-270) and became one of the principal tenets of Neoplatonism, the system sired by him. For Plotinus, matter was the principle of evil; he is said by tradition to have been ashamed that he had a body; he would never name his parents or remember his birthday. Moreover, in the theory of Creation by Emanation which he originated, matter was regarded as at the farthest remove from the One, the source of all being; and gross matter was identified with non-being wherein there is no reality at all. Incidentally, in this connection, the fact should not be overlooked that Neoplatonism was the system which exerted such a profound influence on the thinking of some of the Church Fathers, notably Origen and Augustine.

To Aristotle (384-322 B.C.), a pupil of Plato, must go the credit for having originated the first thoroughgoing metaphysical theory of matter, and by "metaphysical" I mean a conception arrived at primarily by inductive reasoning. Aristotle evolved what is known as the theory of Prime Matter, a theory which was incorporated and made basic in the Scholastic metaphysics of medieval times and which remains basic in the Neo-Scholasticism of our time. According to the Stagirite, two principles combine to give being to all things. The one, *prime matter*, is the passive principle; it is indeterminate, homogeneous in all bodies, and the permanent subject of all the changes effected in the physical world; obviously akin, by the way, to the *Apeiron* of Anaximander. The other, *substantial form*, is the active principle which resolves being into its different species of objects. All contingent things are, according to Aristotle, the product of the union of these two principles, matter and form; hence the theory is technically designated the *hylomorphic*, that is, *matter-form* theory. The reasoning which gives rise to this theory is, in my opinion, quite valid. It may be stated in a sentence or two as follows: In any substantial change as, e.g., the change of a stick of wood into ashes by burning, there must be something which retains its identity throughout the change; otherwise there would be no change at all, but rather in every case of so-called change actually an annihilation followed by a creation. Hence there must be something that is ultimate and that persists throughout all change. That something, said Aristotle, is prime

matter. Prime matter plus substantial form: this is the formula by which every contingent thing is to be accounted for. Perhaps it should be made clear too that the prime matter of this theory is not to be identified with gross matter, nor in fact with anything palpable to the senses, not even with the atom or any of its constituent parts. Prime matter lies altogether beyond the realm of sensible apprehension: it is the principle of pure passivity in things, but is always found in combination with substantial form.

Jacques Maritain, one of the foremost living Neo-Scholastic philosophers, states the Aristotelian view as follows:

The Aristotelian philosophy recognises in corporeal substance two substantial principles: (1) *matter* (*first matter*, *materia prima*), which, however, in no way represents, as in the conception of the mechanists, the imaginable notion of extension, but the idea of matter (that of which something else is made) in its utmost purity—it is what Plato called a sort of non-entity, simply that of *which* things are made, which in itself is nothing actual, a principle wholly indeterminate, incapable of separate existence, but capable of existing in conjunction with something else (the form); (ii) an active principle, which is, so to speak, the living idea or soul of the thing, and which determines the purely passive first matter, somewhat as the form imposed upon it by the sculptor determines the clay, constituting with it one single thing actually existent, one single corporeal substance, which owes to it both that it is this or that kind of thing, that is to say, its specific nature, and its existence, somewhat as the form imposed by the sculptor makes a statue what it is. On account of this analogy with the external form of a statue (its accidental form) Aristotle gave the name of *form* (*substantial form*), which must be understood in a sense altogether special and technical, to this internal principle of which we are speaking, which determines the very being of corporeal substance. The Aristotelian doctrine, which regards a body as a compound of *matter* (*hyle*) and *form* (*morphe*), is known as *hylomorphism*.¹

Thus it will be seen that whereas for Plato the Forms existed and functioned in a world apart, and material things only “participated” in them, an expression which Plato uses frequently but nowhere clarifies satisfactorily, in Aristotle’s thought the Forms existed, it is true, but they existed only in combination with prime matter *in things*. According to Aristotle, says Nys,

the two constitutive elements of the corporeal essence are real and intrinsically interdependent. According to Plato, matter is non-being and the forms alone have real existence. Platonic forms are ideal, self-subsistent types which, without impairing their character of universality, can project themselves into space and assume the appearance of sensible, mutable, and perishable things. Hence between these two conceptions of matter, a great and actual difference exists.²

Although Plato apparently never so states explicitly, he clearly intimates in the *Timaeus* that the Forms exist as eternal ideas

1. *An Introduction to Philosophy*, 166, 167.

2. D. Nys, *Cosmology*, II, 3, 4. Translated by Sidney A. Racmers.

or patterns in the Mind of Deity; hence they are the archetypes according to which the Demiourgos, or Divine Reason, created the various species of contingent things which go to make up our physical world. The concept is not far removed from the doctrine of the conjoint activity of the Spirit and the Logos in Creation, as that doctrine is presented in Scripture.

Gen. 1:1-3—In the beginning God created the heavens and the earth. And the earth was waste and void; and darkness was upon the face of the deep; and the Spirit of God was brooding upon the face of the waters. And *God said*, Let there be light: and there was light. Psa. 33:6, 9—By the word of Jehovah were the heavens made, And all the host of them by the breath of his mouth. . . . For he spake, and it was done; He commanded, and it stood fast. John 1:1-3—In the beginning was the Word [Logos], and the Word was with God, and the Word was God. The same was in the beginning with God. All things were made through him; and without him was not anything made that hath been made. Heb. 11:3—By faith we understand that the worlds have been framed by the word of God, so that what is seen hath not been made out of things which appear.

This theory of Prime Matter, as described in the foregoing paragraphs, was taken over by the Scholastic philosophers in medieval times and made basic in their metaphysic. It continues to be basic in the Neo-Scholastic philosophy of our own day. To quote again from Nys, a contemporary exponent of Neo-Scholasticism:

Whatever falls within the range of sense-perception is concrete and determined; and these phenomena of material substances, or, to be more exact, these compounds of substance and accident, are called *bodies*. . . . Prime matter exhibits none of these properties natural to bodies, hence it cannot be known by any one of our organic faculties. We know the existence of prime matter through reason alone, but even this faculty never affords us an exact and immediate conception of it. Since the intelligibility of a being is measured by the degree of actuality it possesses, it is evident that the purely potential eludes all direct perception. Consequently, it is by the route of reason and the analysis of substantial change alone that the intelligence of man arrives at some idea, partly positive, partly negative, of this principle of passivity, and is able to conceive it as the incomplete subject or permanent substratum of the specific types existing in the material world.¹

It is a well-known historical fact, of course, that both Neoplatonism and Aristotelianism provided the foundations for the Jewish, Arabian, and Christian philosophical systems in vogue in the Middle Ages. Generally speaking, the Neoplatonist metaphysic was championed in Christian circles by the followers of Augustine, and the Aristotelian by Thomas Aquinas and his school. The medieval Arab philosophers followed Aristotle, as did also the Jewish philosophers down to the time of Spinoza.

1. *Op. cit.*, II, 18, 19.

Perhaps attention should be called here to a strangely up-to-date theory which sprang up in the thirteenth century, one of the most intellectually brilliant and prolific periods, by the way, in the history of human thought. The theory in question, which has been designated the "light metaphysics," was offered as supplementary to hylomorphism, which was in vogue everywhere. It was suggested, no doubt, by certain passages in the writings of Augustine, particularly by some of those in his treatise on the book of *Genesis*. The theory was developed by the English philosophers, Robert Grosseteste (died 1252) and Roger Bacon (1214-1294), and by the Italian mystic, Bonaventura (1221-1274). According to this theory, along with the creation *ex nihilo* of unformed matter, God brought into existence the first form, *lux spiritualis*. This *lux*, conceived, it would seem, as an extraordinarily rarefied form of corporeal light, something in fact which approximated spirit, originated space; and, as the form of corporeity in primordial matter, was the primary source and cause of all created things. As McKeon puts it:

The characteristic of all light is to engender itself perpetually, and diffuse itself spherically about a point in an instantaneous manner. Originally, the luminous form and matter were equally unextended, but the first form created by God in the first matter, multiplies itself infinitely, and spreads equally in all directions, distending thus the matter to which it is united and constituting thus the mass of the universe.¹

Moreover, according to this theory, just as light is the power by which Pure Spirit produces the corporeal world, so too it is the instrument by which the soul comes into contact with the body and the things of sense; hence, viewed in this aspect, the *lux* becomes *lumen*. Commenting on Grosseteste's theory of *lux*, D. E. Sharp writes as follows:

It appears that Grosseteste experienced the same difficulties as modern physicists. The functions he assigns to light . . . show that he regards it as an energy; but his desire to speak of it as resembling body is strikingly like the present-day application of such terms as "wave lengths" and "rays" to the ether, which in itself is admitted to be imperceptible to the senses and is thought of only as the subject of activity or as that which is conserved throughout change. As a principle of unity in the universe, this light is comparable to the modern ether, which fills all space from the most distant stars to the inter-spaces of the atom. Again, Grosseteste's theory is not unlike the modern hypothesis of the convertibility of matter and energy. Lastly, we find something resembling the modern ethereal attributes of electricity,

1. Richard McKeon, *Selections from Medieval Philosophers*, I, 261. In the Modern Student's Library series.

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magnetism, and chemical activities in his view of *lux* as the source of all movement and life and as the basis of sound.¹ [The concept of the ether has, of course, passed out of the most up-to-date physics. What this author has to say, however, about Grosseteste's difficulty in conceiving *lux* as energy and "body" at one and the same time, certainly reminds us of the difficulties encountered by modern physicists in attempting to describe the ultimate constitution of matter: they are at a loss whether to describe it in terms of "fields," "waves," "particles," "corpuseles," or what not.]

Two other pertinent facts should, I think, be pointed out in this connection, namely: (1) that Grosseteste's theory of *lux*, and its creative function is strikingly parallel to the tendency among present-day physicists to regard *radiant energy* as the ultimate form of matter,² and (2) that this "light metaphysics" is strikingly adaptable to the Biblical doctrine of the ultimate glorification of the bodies of the redeemed, and it was used by its formulators, especially by Bonaventura, to elucidate that doctrine. Grosseteste evidently thought of visible light as the primary phenomenon of *lux*.

Dan. 12:3—They that are wise shall shine as the brightness of the firmament; and they that turn many to righteousness as the stars for ever and ever. John 14:2—[Jesus speaking]: In my Father's house are many mansions; if it were not so, I would have told you; for I go to prepare a place for you. 2 Cor. 5:1—For we know that if the earthly house of our tabernacle be dissolved, we have a building from God, a house not made with hands, eternal, in the heavens. Rom. 8:22, 23—For we know that the whole creation groaneth and travaileth in pain together until now. And not only so, but ourselves also, who have the first-fruits of the Spirit, even we ourselves groan within ourselves, waiting for our adoption, to wit, *the redemption of our body*. Rom. 8:11—But if the Spirit of him that raised up Jesus from the dead dwelleth in you, he that raised up Christ Jesus from the dead shall give life also to your mortal bodies through his Spirit that dwelleth in you. Phil. 3:20, 21—the Lord Jesus Christ, who shall fashion anew the body of our humiliation, that it may be conformed to the body of his glory, according to the working whereby he is able even to subject all things unto himself. Rom. 8:29, 30—For whom he [God] foreknew, he also foreordained to be conformed to the image of his Son . . . and whom he foreordained, them he also called; and whom he called, them he also justified; and whom he justified, then he also glorified [*i.e.*, in His eternal purpose]. 1 Cor. 15:42-49: So also is the resurrection of the dead. It is sown in corruption; it is raised in incorruption; it is sown in dishonor; it is raised in glory; it is sown in weakness; it is raised in power: it is sown a natural body; it is raised a spiritual body. If there is a natural body, there is also a spiritual body. . . . The first man is of the earth, earthy: the second man is of heaven. As is the earthy, such are they also that are earthy; and as is the heavenly, such are they also that are heavenly. And as we have borne the image of the earthy, we shall also bear the image of the heavenly, etc. [Cf. also the glorified body in which Jesus was presented to the Apostles Peter, James, and John, on the Mount of Transfiguration

1. D. E. Sharp, *Franciscan Philosophy at Oxford in the Thirteenth Century*, 23.

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(Matt. 17:1-8); also the glorified body (which outshone the brightness of the noonday sun) in which the risen Lord appeared to Saul of Tarsus before the gates of Damascus (Acts 26:12-15). Immortalization, according to Christian doctrine, seems to embrace the three processes of resurrection, revivification, and glorification.]

Modern philosophy is generally regarded as having had its beginning with Descartes (1596-1650). Gifted with an essentially mathematical mind, this French thinker attempted to construct a cosmology along strictly geometrical lines. Hence, since geometry proceeds from the simplest propositions by a process of deductive reasoning to the most complex, Descartes sought among the attributes of bodies for the single attribute that is at once the most fundamental, most evident and most universal. This search led him to the conclusion that the essential property of material substance is *extension*. Now by extension is meant, according to Descartes, that property whereby (1) matter has parts, (2) the parts exist outside one another, (3) only one part can be in a given place at a given time, and (4) the whole is equal to the sum of the parts. Having established it to his own satisfaction that extension is the essence of matter, Descartes then denied to matter all properties which can not be deduced logically from an analysis of extension. One can see at a glance, of course, that the Cartesian theory of matter is at variance with the atomic hypothesis. For if mathematical extension is the essence of matter, then matter is divisible *ad infinitum*, and there simply can not be such a thing as an indivisible ultimate or atom. The theory, however, exerted considerable influence on subsequent scientific thinking about material substance, and was indirectly responsible for the "building-block" concept of the atom which came into vogue in the nineteenth century.

It was Robert Boyle, an English chemist, who introduced the modern period of the concept of matter by discrediting forever the long-standing theory of the "four elements." In his book, *The Sceptical Chymist*, published in 1661, Boyle formulated an entirely new definition of an element, describing it as a substance which cannot be decomposed into anything more ultimate. This was revolutionary. Over one hundred years later, in 1773 and 1774 to be exact, the independent experiments of Scheele in Sweden and Priestley in England resulted in the discovery of oxygen. Not long afterward, about 1790, the French chemist, Lavoisier, introduced the balance as an instrument of precision in the study of chemical processes, and as a result of

his experiments discovered that in all chemical operations it is only the *kind* of matter that is changed, the *quantity* remaining the same. By this discovery of the principle of the conservation of matter, Lavoisier not only laid the foundation on which modern chemistry has grown to be an exact science, but also prepared the ground for the formulation of the scientific atomic theory. For, whereas the early Greek philosophers, Leukippos, Demokritos, and Epikouros developed the philosophic concept of the atom, it remained for the chemists of the nineteenth century to discover, by the scientific method, the scientific—or shall we say, *real?*—atom.

The modern atomic theory of the constitution of matter was first formulated, as a result of laboratory experimentation, by the great English chemist, John Dalton, of Manchester, between the years 1803 and 1808. In its simplest form, the theory is as follows: 1. Each element of matter is reducible to "ultimate particles" which can not be further subdivided. 2. The "ultimate particles" of the same element are all alike and of equal weight, while those of different elements are unlike. 3. Chemical combination takes place by the union of atoms of different elements in simple numerical proportions. Dalton pictured his "ultimate particles" or atoms as definite, concrete "grains" of matter, indivisible, and unaffected by the most violent chemical change. Dalton's work revolutionized the current conception of the constitution of matter and inaugurated the search for the chemical elements as we know them today. It was not until the year 1869, however, that the Russian scientist, Mendeleeff, first formulated with great completeness and gave to the world the Periodic Table of the elements, some ninety-two in all, of which all the myriad forms of matter in the world around us are composed.

The scientific world, however, inherited from Dalton what we now call the old "building block" or "billiard ball" concept of the atom. That is to say, atoms were conceived to be solid, inert, indivisible bits of matter, the bricks, so to speak, of which the whole material world is constructed. As Will Durant puts it:

The "matter" of Tyndall and Huxley was indestructible; it rested and slept, like the fat boy in *Pickwick Papers*, wherever it was put; and it resisted, with all the dignity of its volume and weight, every effort to set it moving, or to change the direction of its motion once it had condescended to move.¹

This view prevailed throughout the greater part of the nine-

1. *The Mansions of Philosophy*, 61.

teenth century. Then came the more recent discoveries in the fields of electricity, magnetism, and radiation, realms so vast and so full of wonders that physicists now readily admit they have only begun to penetrate the mysteries of their amazing phenomena. The net result is that the old inert matter of the nineteenth-century physics is gone. We are now being told that the atom must no longer be regarded as a "substance" at all, that it is, rather, just a "field" in which "units," or perhaps only "waves," of energy are constantly playing; and that these units or waves of energy seem to be unrestricted by any of the conditions of distance or space. We are now told that an electric current is capable of traveling around the earth several times in a second; and that electrons can, like angels, move in all directions at once, and from one point to another without being found at any intermediate point. As a matter of fact, electrons seem to manifest some of the attributes which men have hitherto ascribed only to spirit.

We may summarize the conclusion of the latest physical science regarding the ultimate constitution of matter as follows: 1. The atom itself is no longer regarded as a compact something, a kind of building-block, but more properly as a "field" of energy. In the center of this field is a concentration of protons and neutrons (and interlocking mesons, according to the most recent pronouncements), the number of protons in each case specifying the particular element to which the atom belongs. Surrounding this concentration, which is designated the nucleus, is a kind of orbit in which electrons play (from 1 electron in the hydrogen atom up to 92 in the uranium atom), the number of electrons—which are negatively charged—corresponding, in each atom, to the number of protons in the nucleus. Physicists generally speak of these ultimates of the stuff of things as "particles" of energy, although conceding that perhaps it would be just as correct to call them "waves" or "charges." The paradoxical nature of these particles consists in the fact that they can hardly be described as having spatial magnitude, and yet obviously they do have magnitude of a sort. For this reason physicists are at a loss to determine which of these designations—"particle," "wave," "charge," etc.—is precisely the proper one to indicate their essential nature. 2. In the general field of electromagnetic radiations, which includes all forms of radiant energy, such as light, heat, x-rays, gamma rays, cosmic rays, etc., the ultimates are pictured as discontinuous or discrete bits or "grains" of energy. In this field the waves of energy, we are

told, travel throughout the cosmos, and frequently impinge upon the sense organs of percipients, in the form of what are usually designated "quanta" or "corpuscles." In a word, these radiations are essentially "corpuscular" as to nature. 3. In no sense can any of these ultimate bits of energy, either in the structure of the atom or in the electromagnetic field, be thought of as "substances" within the scope of the philosophical definition of that term. In a word, the ultimate constitution of matter has been found to be receding into the "immaterial." 4. Mass and energy are now shown to be equivalent. The property which hitherto has been called mass is now demonstrated to be concentrated energy. That is to say, matter is energy, and energy is matter; the distinction is simply one of temporary state. As Lincoln Barnett puts it, gross or solid matter is in reality only temporarily "frozen" energy.¹ And in addition to all this, we are told, the dissolution of matter into radiation and the dissipation of energy into empty space appears to be a fundamental cosmic process which now goes on without cessation. This means, of course, that the universe is slowly but surely moving toward a state of "maximum entropy," a state that may rightly be described as one of "perpetual and irrevocable stagnation" in which time shall be no more.² To offset this gloomy picture somewhat, there is a very great possibility, say some physicists, that somewhere out in the incalculable vastness of space—"somewhere beyond the blue"—matter is in the process of being formed anew. This notion, be it simply wishful thinking or not, gives us a faint ray of hope at least that the space-time continuum in which we now live and move and have our being may never actually become an unoccupied void.

Cf. in this connection 2 Pet. 3:1-13: This is now, beloved, the second epistle that I write unto you; and in both of them I stir up your sincere mind by putting you in remembrance; that ye should remember the words which were spoken before by the holy prophets, and the commandment of the Lord and Savior through your apostles: knowing this first, that in the last days mockers shall come with mockery, walking after their own lusts, and saying, Where is the promise of his coming? for, from the day that the fathers fell asleep, all things continue as they were from the beginning of the creation. For this they wilfully forget, that there were heavens from of old, and an earth compacted out of water, and amidst water, by the word of God; by which means the world that then was, being overflowed with water, perished; but the heavens that now are, and the earth, by the same word have been stored up for fire, being reserved against the day of judgment and destruction of ungodly men. But forget not this one

1. *The Universe and Dr. Einstein*, 59.

2. Barnett, *ibid.*, 100.

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thing, beloved, that one day is with the Lord as a thousand years, and a thousand years as one day. The Lord is not slack concerning his promise, as some count slackness; but is longsuffering to youward, not wishing that any should perish, but that all should come to repentance. But the day of the Lord will come as a thief; in the which the heavens shall pass away with a great noise, and the elements shall be dissolved with fervent heat, and the earth and the works that are therein shall be burned up. Seeing that these things are thus all to be dissolved, what manner of persons ought ye to be in all holy living and godliness, looking for and earnestly desiring the coming of the day of God, by reason of which the heavens being on fire shall be dissolved, and the elements shall melt with fervent heat? *But, according to his promise, we look for a new heavens and a new earth, wherein dwelleth righteousness.* [Certainly the fiery destruction portrayed here could have reference to, and be fulfilled by, global atomic warfare.] Cf. Isa. 65:17—Behold, I create new heavens and a new earth; and the former things shall not be remembered, nor come into mind. Isa. 66:22—For as the new heavens and the new earth, which I will make, shall remain before me, saith Jehovah, so shall your seed and your name remain. Cf. Rev. 21:1, 2—And I saw a new heaven and a new earth: for the first heaven and the first earth are passed away; and the sea is no more. And I saw the holy city, new Jerusalem, coming down out of heaven from God, made ready as a bride adorned for her husband. Cf. also v. 3—And I heard a great voice out of the throne, saying, Behold, *the tabernacle of God is with men, and he shall dwell with them, and they shall be his peoples, and God himself shall be with them, and be their God.*

Some commentators have suggested that there may have been a "pre-Adamic" cosmos, which suffered a tremendous cataclysm of some kind; hence they describe the cosmogony that is given in *Genesis* as the "Adamic Renovation."¹ The excerpts from the Prophets and Apostles, quoted above, seem to indicate that the present cosmic age will terminate in a similar cataclysm, after which the Golden Age will be ushered in, with the banishment of sin and its consequences from the whole creation. *There is absolutely nothing in the Bible that can be construed as teaching the ultimate annihilation of matter.* I contend, moreover, that if matter is not to be annihilated, it is inconceivable that intelligent spirits or persons should suffer such an ultimate destiny. Indeed the Scriptures teach clearly that they are destined to live forever, either in eternal union with God, and clothed in immortal or ethereal bodies, which state is designated Heaven,—or in eternal separation from "the face of the Lord and from the glory of his might" (2 Thess. 1:8, 9), which is Hell, the penitentiary of the moral universe, originally "prepared for the devil and his angels" (Matt. 25:41). This is all in accord with the scientific laws of the conservation of matter and energy.

1. Vide R. Milligan, *Scheme of Redemption*, 23-30.

With regard to modern views of the ultimate constitution of matter, C. C. Furnas writes as follows:

The atom which was once the very smallest bit of matter that could exist has now become a menagerie. It first resolved itself into a nucleus and a surrounding swarm of electrical charges. Now the nucleus is too large a unit to be final, so the greeting between physicists is: What's new in the nucleus? To explain the atom requires seven distinct fundamental physical entities: electron, positron, neutron, photon, proton, deuteron, and alpha particles. Either that is not enough or it is too much, for the explanations of the atom are only as clear as a thick fog. Perhaps the atom is unexplainable but one hates to admit it.¹

Again:

Today the pure physicist seems to be reverting to metaphysics. He is always dabbling on the borderland of the unknowable and inconceivable. His idea of the atom is something that cannot be pictured. It is expressible as formulae, but it is something which our minds cannot visualize because it is not the kind of thing that can be visualized. Physicists have space that bends back on itself and universes that in some way expand without end. Energy sometimes acts like matter and matter is sometimes like energy. If it could be broken down it would release an enormous amount of energy for our own use, if we could catch it.²

To this we might add: Since these words were written, matter, that is, the atom, has been broken down. And what the future holds in store for man as a consequence, God alone knows!

The following excerpts from a volume entitled *The Advance of Science*, edited by Watson Davis, set forth clearly present-day conceptions of the constitution of matter:

The atom has evolved from a little hard ball which was considered the ultimate particle of matter, into an entity so complex and multiplex that the best advice is not to try to visualize it. The components of atoms are at some times considered particles of matter and at other times, waves of energy. The picture of an atom as a heavy but minute kernel surrounded by circling bits of negative electricity—a nucleus of tightly packed protons and neutrons surrounded by orbital electrons, forming a miniature solar system with nucleus as sun and electrons as planets—has given way to a dim and indistinct mathematical entity that may best be visualized, if at all, as an equation.³

Ernest Rutherford, now, as Lord Rutherford of Nelson, the presiding genius of the famous Cavendish Laboratory at Cambridge University in England . . . decisively blasted the idea that the atom was solid stuff. Some of the alpha particles flung at atoms bounced back, and from a study of the speeds of their recoil he showed that the atom is mostly space with its weight concentrated in an almost infinitesimal bit, with its diameter about one-one-hundred-thousandth of that of the atom itself.⁴

1. *The Next Hundred Years*, 187.
2. *Ibid.*, 186.
3. *Op. cit.*, 35.
4. *Ibid.*, 40.

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Electrons have proved to be nearly omnipresent.¹

Matter and energy are merely different aspects of the same thing. The famous principle of relativity, formulated by Professor Albert Einstein in 1905, included the idea of the equivalence of matter and energy. Lose mass and gain energy, or lose energy and gain mass. There is a very simple equation that allows the computation of just how much energy is equivalent to so much mass.²

Just because we may be practically interested in the obtaining of energy at the expense of matter, we must not overlook the importance of experiments that show the reverse process, the conversion of energy into the mass of matter. The discovery of what seems to be the creation of matter out of energy came in the train of research that followed upon the discovery of the positron. In many respects the making of matter out of energy is far more amazing and thrilling than the atom smashings that have liberated energy. The theory, well supported by experimental facts, is that *the positive electron is born out of radiant energy or "light" photons*. It is supposed that a highly energetic photon can transmute itself into a pair of electrons, one positive and one negative. Two particles of matter come into existence where only a bundle of energy existed before. That tested and famous Einsteinian equivalence of mass and energy tells us that the mass of two electrons at rest is equal to about one million electron volts. When this is put to the test by studying what happens in the formation of the electron pairs, it is found that the energy with a pair of electrons is moving after its formation is never within a million volts of the energy contained in the creating photon. This gives strong support to the idea that "light" is changing into matter.³

Attention has already been called to the striking correspondence between the "light metaphysics" of the thirteenth century philosophers, Grosseteste, Bacon, and Bonaventura, and the view expressed in the foregoing excerpt.

Physicists are now telling us that "cosmic rays bombard the earth from outer space every second of the day and night," that they "penetrate everything including our own bodies," that they "carry the mightiest packets of energy yet known to science," and that they "give rise to bursts of material particles."⁴ The first scholar to put forward the view that these rays emanate from the depths of interstellar space was Madame Curie, who announced herself as suspecting the existence of a penetrating radiation disseminated throughout the universe. Some physicists have held that these rays are the super-radioactive outpourings of a primordial atom which Abbe Lemaitre considered to have formed the whole universe some ten thousand million years ago before it began to expand. The British physicists, Eddington and Jeans, think that cosmic rays result from the transformation of matter into radiation. Millikan, to the contrary, be-

1. *Op. cit.*, 53.

2. *Ibid.*, 71.

3. *Ibid.*, 73. Italics mine—C.

4. *Ibid.*, 26.

believes that these strange rays are the "wailing cries" that attend the birth of matter from radiation. Harvey Brace Lemon writes:

It is with mixed emotions that we find ourselves getting far beyond our depth in the contemplation of the vast horizons to which we have been led by our simple curiosity about a leaking electroscope. . . . What story is further going to be decoded by the human mind as it goes on seeking further into these hidden matters, no man can now tell.¹

Again, what is an electron? "Is it a bit of 'matter' manifesting energy," asks Will Durant, "or is it a measure of energy quite dissociated from any material substance? The latter is inconceivable to us."² It would no doubt be possible, writes Le Bon,

for a higher intelligence to conceive energy without substance . . . but such a conception cannot be conceived by us. We can only understand things by fitting them into the common frame of our thoughts. *The essence of energy being unknown, we are compelled to materialize it in order to reason about it.*³

Le Bon asserts, however, that "matter is a variety of energy."⁴ "Some of the ablest men in the world at present," writes J. B. S. Haldane, "regard matter as merely a special type of undulatory disturbance."⁵ Matter, says Eddington, is composed of protons and electrons, *i.e.*, positive and negative charges of electricity. What we call a solid body, he explains, is really empty space containing sparsely scattered electric charges. Concerning the "porosity" of the atom, he says:

The atom is as porous as the solar system. If we eliminated all the unfilled space in a man's body and collected his protons and electrons into one mass, the man would be reduced to a speck just visible with a magnifying glass.⁶

Whitehead writes:

The notion of mass is losing its unique pre-eminence as being the one final permanent quantity. . . . Mass now becomes the name for a quantity of energy in relation to some of its dynamical effects.⁷

John Dewey rightly concludes that "the notion of matter actually found in the practice of science has nothing in common with the matter of the materialists."⁸

1. *Cosmic Rays Thus Far*, 124, 125.
2. *The Mansions of Philosophy*, 62.
3. G. Le Bon, *The Evolution of Matter*, 13. Italics mine.
4. *Op. cit.*, 10.
5. *Possible Worlds*, 296.
6. *The Nature of the Physical World*, 1-3.
7. *Science and the Modern World*, 149.
8. *Experience and Nature*, 74.

In a word, "matter," in the sense of spatial or extended substance, has ceased to exist. The matter of the twentieth-century physicist has become at least *metaphysical*, if not ultimately immaterial. Sir James Jeans puts it as follows:

Physicists who are trying to understand nature may work in many different fields and by many different methods: one may dig, one may sow, one may reap. But the final harvest will always be a sheaf of mathematical formulae. These will never describe nature itself, but only our observations on nature. Our studies can never put us into contact with reality; we can never penetrate beyond the impressions that reality implants in our minds.¹

And Eddington seems to intimate that what we call "material things" are in reality only symbols by means of which intelligent beings or spirits communicate with one another. He says:

That environment of space and time, of light and color and concrete things, which seems so vividly real to us is probed deeply by every device of physical science and at the bottom we reach symbols. Its substance has melted into shadow.²

Le Bon writes:

The elements of atoms which are dissociated . . . are irrevocably destroyed. They lose every quality of matter—including the most fundamental of them all, weight. The balance no longer detects them. Nothing can recall them to the state of matter. They have vanished in the immensity of the ether. . . . Heat, electricity, light, etc., . . . represent the last stages of matter before its disappearance into the ether. . . . Matter which dissociates *dematerializes* itself by passing through successive phases which gradually deprive it of its material qualities, until it finally returns to the imponderable ether whence it seems to have issued.³

It should be noted, in this connection, that physicists are now prone to write about what they call the *dematerialization* of electrons. De Broglie, for instance, says:

It has become tempting to imagine the photon as consisting of a corpuscle of negligible mass and charge obeying Dirac's equations, and associated with an anti-corpuscle of the same character. It is an attractive hypothesis, and from the mathematical point of view it can be completely worked out. It is easy to understand how a photon constructed in this way could be annihilated in the presence of matter by transferring to it the whole of its energy, a process analogous to the annihilation of a pair of electrons in the phenomenon of dematerialization. This annihilation—a quantum transition—would then constitute the photo-electric effect . . . and it ought then to be possible to define the electro-magnetic field as a function of this transition.⁴

Here, again, we have a clear intimation that light itself may be the primal energy.

1. *Physics and Philosophy*, 15.
2. *Op. cit.*, 37.
3. *The Evolution of Matter*, 14, 12, 7.
4. Louis de Broglie, *Matter and Light*, 159-160.

"Ether?—but what is this ether?" asks Will Durant, and goes on to say:

The ether, said Lord Salisbury, is only a noun for the verb, to undulate;¹ it is a fiction created to conceal the learned ignorance of modern science; it is as mystical as a ghost or a soul. Einstein, by re-interpreting gravitation, deposed the ether; latterly he has decided to restore it for a while, with a limited sovereignty; whenever a physicist is puzzled, he answers, "Ether." The ether, says the latest authority, Professor Eddington, "is not a kind of matter"; it is "non-material."² That is to say, a non-material something, by certain mysterious contractions (vortices, as Lord Kelvin called them), transforms itself into matter; that which is without dimension or weight becomes, by adding bits of it together, spatial and ponderable matter. Is this theology restored, or a new Christian Science, or a form of psychical research? At the very moment when psychology is attempting by every prestidigitation to get rid of consciousness in order to reduce mind to matter, physics regrets to report that matter does not exist.³

Perhaps the latest word on the present-day view of the ultimate constitution of matter is contained in a little book, published several years ago, written by Lincoln Barnett, entitled *The Universe and Dr. Einstein*. This work is of special importance to us in view of the fact that its content bears the stamp of approval—the imprimatur, so to speak—of Dr. Einstein himself. (Barnett's book, published in 1948, contains a "Foreword" by Dr. Einstein himself, in which the latter expresses his personal approbation of the content of the book. This fact alone is sufficient to show that the volume contains the conclusions of the most up-to-date physics. This is the reason, of course, why I quote from the book rather freely in the present treatise. Its authoritative character can not be questioned.—C.) Concerning the subject before us—the ultimate constitution of matter, Barnett writes as follows:

No one doubts today that all matter is made up of atoms which in turn are composed of even smaller building blocks called electrons, neutrons, and protons. But Einstein's notion that light too may consist of discontinuous particles clashed with a far more venerable theory that light is made up of waves. There are indeed certain phenomena involving light that can only be explained by the wave theory. . . . The phenomena—diffraction and interference—are strictly wave characteristics and would not occur if light were made up of individual corpuscles. More than two centuries of experiment and theory assert that light *must* consist of waves. Yet Einstein's Photoelectric Law shows that light *must* consist of photons [i.e., "particles" or "grains" of energy, discrete *quanta*, according to Planck's Quantum Theory]. This fundamental question—is light waves or is it particles?—has never

1. In William James, *The Meaning of Truth*, 19.
2. Eddington, *The Nature of the Physical World*, 32.
3. *The Mansions of Philosophy*, 63, 64.

been answered. The dual character of light is, however, only one aspect of a deeper and more remarkable duality which pervades all nature.¹

The "duality" alluded to here is that of the apparent "particle" and "wave" structures which seem at one and the same time to characterize the ultimate stuff of things, both in the electromagnetic field and in the basic structure of the atom. Hence Barnett goes on to say:

The first hint of this strange dualism came in 1925, when a young French physicist named Louis de Broglie suggested that phenomena involving the interplay of matter and radiation could best be understood by regarding electrons not as individual particles but as systems of waves. This audacious concept flouted two decades of quantum research in which physicists had built up rather specific ideas about the elementary particles of matter. The atom had come to be pictured as a kind of miniature solar system composed of a central nucleus surrounded by varying numbers of electrons (1 for hydrogen, 92 for uranium) revolving in circular or elliptical orbits. The electron was less vivid. Experiments had shown that all electrons had exactly the same mass and the same electrical charge, so it was natural to regard them as the ultimate foundation stones of the universe. It also seemed logical at first to picture them as hard elastic spheres. But little by little, as investigation progressed, they became more capricious, defiant of observation and measurement. In many ways their behavior appeared too complex for any material particle. . . . Shortly after De Broglie had his vision of "matter waves," a Viennese physicist named Schrodinger developed the same idea in coherent mathematical form, evolving a system that explained quantum phenomena by attributing specific wave functions to protons and electrons. This system, known as "wave mechanics," was corroborated in 1927, when two American scientists, Davisson and Germer, proved by experiment that electrons do exhibit wave characteristics. . . . But further surprises were in store. For subsequent experiments showed that not only the electrons but whole atoms and even molecules produce wave patterns when diffracted by a crystal surface, and that their wave lengths are exactly what De Broglie and Schrodinger forecast. *And so all the basic units of matter—what J. Clerk Maxwell called "the imperishable foundation stones of the universe"—gradually shed their substance. The old-fashioned spherical electron was reduced to an undulating charge of electrical energy, the atom to a system of superimposed waves. One could only conclude that all matter is made up of waves and we live in a world of waves.*²

Barnett then continues:

The paradox presented by waves of matter on the one hand and particles of light on the other was resolved by several developments in the decade before World War II. The German physicists, Heisenberg and Born, bridged the gap by developing a new mathematical apparatus that permitted accurate description of quantum phenomena either in terms of waves or in terms of particles as one wished. The idea behind their system had a profound influence on the philosophy of science. They maintained it is pointless for a physicist to worry about the properties of a single electron; in the laboratory he works with beams or showers of electrons, each containing billions of individual particles

1. *Op. cit.*, 19-21.

2. *Ibid.*, 21-23. (Italics mine.—C.)

(or waves); he is concerned therefore only with mass behavior, with statistics and the laws of probability and chance. So it makes no practical difference whether individual electrons are particles or systems of waves—in aggregate they can be pictured either way. . . . Born took the mathematical expression used by Schrodinger in his equations to denote wave function and interpreted it as a "probability" in a statistical sense. That is to say, he regarded the intensity of any part of a wave as a measure of the probable distribution at that point. Thus he dealt with the phenomena of diffraction, which hitherto only the wave theory could explain, in terms of the *probability* of certain corpuscles—light quanta or electrons—following certain paths and arriving at certain places. And so "waves of matter" were reduced to "waves of probability."¹

The same author then concludes:

It no longer matters how we visualize an electron or an atom or a probability wave. The equations of Heisenberg and Born fit any picture. And we can, if we choose, imagine ourselves living in a universe of waves, a universe of particles, or as one facetious scientist has phrased it, a universe of "wavicles."²

Again, concerning the reciprocal transmutation of matter and energy, as described by the Einsteinian principle of the equivalence of mass and energy, Barnett writes:

In the light of this broad principle, many puzzles of nature are resolved. The baffling interplay of matter and radiation which appears sometimes to be a concourse of particles and sometimes a meeting of waves, becomes more understandable. The dual role of the electron as a unit of matter and unit of electricity, the wave electron, the photon, waves of matter, waves of probability, a universe of waves—all these seem less paradoxical. For all these concepts simply describe different manifestations of the same underlying reality, and it no longer makes sense to ask what any one of them "really" is. *Matter and energy are interchangeable. If matter sheds its mass and travels with the speed of light, we call it radiation or energy. And conversely if energy congeals and becomes inert and we can ascertain its mass, we call it matter.* Heretofore science could only note their ephemeral properties and relations as they touched the perceptions of earth-bound man. But since July 16, 1945, man has been able to transform one into the other. For on that night at Alamogordo, New Mexico, man for the first time transmuted a substantial quantity of matter into the light, heat, sound, and motion, which we call energy.³

The "conclusion of the whole matter" is given by the same author in the following paragraph:

Yet the fundamental mystery remains. The whole march of science toward the unification of concepts—the reduction of all matter to elements and then to a few types of particles, the reduction of "forces" to the single concept "energy," and then the reduction of matter and energy to a single basic quantity—leads still to the unknown. The many questions merge into one, to which there may never be an an-

1. *Op. cit.*, 23-24.

2. *Ibid.*, 24.

3. *Ibid.*, 59. (Italic mine—C)

swer: what is the essence of this mass-energy substance, what is the underlying stratum of physical reality which science seeks to explore?"

Again, one of the most amazing facts about these discoveries of modern physics is that they were arrived at by the human mind, and not by the human eye or any other physical sense organ, by the way of mathematical formulae, many years before they were actually confirmed experimentally. To any thinking person, this mathematical accuracy points unmistakably to the Universal Intelligence and Will, to whom men in all ages have reverently given the name "God"—that Will which is the constitution of the cosmos. Moreover, with each succeeding discovery of modern physics, our world of the physical senses has lost more and more of its traditional character as the "real" world, and has become correspondingly a world of appearance, the *phenomenal* world. The real world has come to be more and more, in fact, that "region above the heaven" described by Plato as "the colorless, formless, and intangible truly existing essence, with which all true knowledge is concerned," which "is visible only to the mind, the pilot of the soul."¹ In short, it is the world of the Eternal Spirit, from whose very Being, perhaps, the phenomenal world has been projected and has taken shape before the eyes of created living beings. In this connection, I shall take the liberty of indulging another lengthy quotation or two from Barnett:

But the irony of man's quest for reality is that as nature is stripped of its disguises, as order emerges from chaos and unity from diversity, as concepts merge and fundamental laws assume increasingly simpler form, the evolving picture becomes ever more abstract and remote from experience—far stranger indeed and less recognizable than the bone structure behind a familiar face. For where the geometry of a skull predestines the outlines of the tissue it supports, there is no likeness between the image of a tree transcribed by our senses and that propounded by wave mechanics, or between a glimpse of the starry sky on a summer night and the four-dimensional continuum that has replaced our perceptual Euclidean space.

In trying to distinguish appearance from reality and lay bare the fundamental structure of the universe, science has had to transcend the "rabble of the senses." But its highest edifices, Einstein has pointed out, have been "purchased at the price of emptiness of content." A theoretical concept is emptied of content to the very degree that it is divorced from sensory experience. For the only world man can truly know is the world created for him by his senses. If he expunges all the impressions which they translate and memory stores, nothing is

1. *Op. cit.*, 59-60. *Vide* in a subsequent part of the present treatise a final word on the First Principle, the Principle of the Unity and Generation of all things.

2. *Phaedrus*, 247 C-E. Translation by H. N. Fowler, Loeb Classical Library Edition.

THE ETERNAL SPIRIT—HIS PERSON AND POWERS

left. That is what the philosopher Hegel meant by his cryptic remark: "Pure Being and Nothing are the same." A state of existence devoid of associations has no meaning. So paradoxically what the scientist and the philosopher call the world of appearance—the world of light and color, of blue skies and green leaves, of sighing wind and murmuring water, the world designed by the physiology of human sense organs is the world in which finite man is incarcerated by his essential nature. And what the scientist and the philosopher call the world of reality—the colorless, soundless, impalpable cosmos which lies like an iceberg beneath the plane of man's perceptions—is a skeleton structure of symbols.¹

Again:

In the evolution of scientific thought, one fact has become impressively clear: *there is no mystery of the physical world which does not point to a mystery beyond itself.* All highroads of the intellect, all by-ways of theory and conjecture lead ultimately to an abyss that human ingenuity can never span. For man is enchained by the very condition of his being, his finiteness and involvement in nature. The farther he extends his horizons, the more vividly he recognizes the fact that as the physicist Niels Bohr puts it, "we are both spectators and actors in the great drama of existence." Man is thus his own greatest mystery. He does not understand the vast veiled universe into which he has been cast for the reason that he does not understand himself. He comprehends but little of his organic processes and even less of his unique capacity to perceive the world about him, to reason and to dream. Least of all does he understand his noblest and most mysterious faculty: the ability to transcend himself and perceive himself in the act of perception.

Man's inescapable impasse is that he himself is a part of the world he seeks to explore; his body and proud brain are mosaics of the same elemental particles that compose the dark, drifting dust clouds of interstellar space; he is, in the final analysis, merely an ephemeral conformation of the primordial space-time field. Standing midway between macrocosm and microcosm he finds barriers on every side and can perhaps but marvel, as St. Paul did nineteen hundred years ago, that "the world was created by the word of God so that what is seen was made out of things which do not appear."²

But is it necessarily true that man—a living, conscious spirit himself, created in the Divine image, we are told in Scripture, the noblest product of the Divine handiwork—is "merely an ephemeral conformation of the primordial space-time field"? Perhaps, after all, he, who has the power himself of transcending both space and time in his experience, has the possibility of a higher destiny than this world has to offer, by conforming his will to the will of the Divine, as he is urged again and again to do in the Word of God. Moreover, is it necessarily true, as this author seems to affirm, that the real world as envisioned by the present-day physicist, has no meaning for man? Certainly it has all the meaning which the human imag-

1. *Op. cit.*, 109-110.

2. *Ibid.*, 113-114. (Italic mine—C.)

ination is capable of grasping, for the man of the Spirit, who sees beyond the realm of flesh and sense. In fact, to him alone, it is the only world that can have fulness of meaning—simply because it is the abode of his God, and his God is Love (I John 4:7, 8). It is sheer presumption, sheer “earthboundness,” to assert that sensory experience is the noblest and most satisfying of which man is capable. Such a view is derogatory of the very dignity and worth of the human individual; it is a view which spiritually-minded of all ages would repudiate and hurl back with scorn. To the man of the Spirit, the very hope of some day “seeing God face to face,” of apprehending Him, that is, with the understanding and with the affections, is an infinitely greater source of pleasure even than the sensory apprehension of this present “world of light and color, of blue skies and green leaves, of sighing wind and murmuring water.” Beautiful as this world is in many of its aspects, it can be only a shadow of that world which is filled with the presence of God, and is therefore filled with joy and thanksgiving and praise. And if the hope of such a state of spiritual satisfaction and peace is a source of great joy to the man of the Spirit, what indeed will the fruition be! It simply cannot be described in human language! Eye has not seen, nor ear heard, nor has it entered into the imagination of man to conceive the things which God has prepared for those who love Him. This Beatific Vision, Jesus tells us, is reserved only for the “pure in heart” (Matt. 5:8), for the obvious reason that it can be appreciated only by the pure in heart, by those who prepare themselves, by cultivating the fruit of the Spirit in themselves (Gal. 5:22-24), to apprehend and to appreciate it. Man’s natural and proper end is the union of the individual mind with the Mind of God in knowledge, and the union of the individual will with the Will of God in love. In that heavenly state, what Spinoza has termed “intellectual love of God”¹ will indeed be realized to the full, but it will be supplemented by the blissful affection of Love which shall bind God and all His redeemed creatures in that everlasting holy fellowship which shall mark the consummation of the entire Creative Process. Small wonder that St. Paul was prompted to cry out at times, “For to me to live is Christ, and to die is gain” (Phil. 1:21), and again, “I am in a strait betwixt the two, having the desire to depart and be with Christ; for it is very far better; yet to

1. Spinoza, *Ethics*, Propositions XXV-XLIII.

abide in the flesh is more needful for your sake" (Phil. 1:23, 24). No wonder he was prompted to shout, as his valedictory, "I have fought the good fight, I have finished the course, I have kept the faith; henceforth there is laid up for me the crown of righteousness, which the Lord, the righteous judge, shall give to me at that day; and not to me only, but also to all them that have loved his appearing" (2 Tim. 4:7, 8)!

Then, again, there is the mystery of Space, and the equally profound mystery of Time. The suggestion has been made in recent years that Matter might be an emanation from Space. Einstein predicted some years ago that the next forward step in science would be the attempt to solve the mystery of Space. He is reported to have said something to this effect: It appears that Space will have to be regarded as a primary thing with matter only derived from it, so to speak, as a secondary result. But—we may reasonably ask—what is Space to our minds but a possible location for matter in motion? This, however, is not in any sense a definition. The word "space" seems to convey the idea of an intangible something (or nothing?), let us say an expanse, that is everywhere, in whatever direction one might go and no matter how far in any direction one might go; a something that one could never leave behind, never get away from or out of; something akin, in its intangibility and everywhere-ness, to our notion of Spirit. One might well recall in this context Pascal's statement: "The eternal silence of infinite space is terrifying." Or the cry of the Psalmist:

O Jehovah, thou hast searched me, and know me.
 Thou knowest my downsitting and mine uprising;
 Thou understandest my thoughts afar off. . . .
 Whither shall I go from thy Spirit?
 Or whither shall I flee from thy presence?
 If I ascend up into heaven, thou art there;
 If I make my bed in Sheol, behold, thou art there.
 If I take the wings of the morning,
 And dwell in the uttermost parts of the sea,
 Even there shall thy hand lead me,
 And thy right hand shall hold me.

(Psa. 139:1, 2, 7-10).

Is Space, then, a *sui generis* being, capable of indefinite extension in all directions, and, although completely independent of matter, yet the container—Plato, in the *Timaeus*, calls it the "Receptacle"—of the finite world of material objects? Are these

so-called "material" objects, after all, in a state of continuous flux, and hence only illusory changes? Newton, Clarke, and Fenelon, for example, identified absolute Space with the Divine immensity or ubiquity; and Spinoza regarded Space as the extension of the Divine Substance, and essential attribute of the Divine Being. Or, on the other hand, is Space merely an ideal being, a concept of the human mind, purely subjective in character? Kant, the German philosopher, for example, explained both Space and Time as "forms of perception" inherent in the perceiving mind, forms which the mind itself brings to bear upon the raw material of sensation. Leibniz, while rejecting the innateness of the idea, nevertheless regarded Space as a subjective representation formed in the presence of, or under the impact of, external objects. And Bergson held that Space is "an ideal scheme or a symbol appended to matter to render the latter divisible and subject to our conscious actions."¹ Bergson says:

The glance which falls at any moment on the things about us only takes in the effects of a multiplicity of inner repetitions and evolutions, effects which are, for that very reason, discontinuous, and into which we bring back continuity by the relative movements that we attribute to "objects" in space. The change is everywhere, but inward; we localize it here and there, but outwardly; and thus we constitute bodies which are both stable as to their qualities and mobile as to their positions, a mere change of place summing up in itself, to our eyes, the universal transformation.²

For Hegel, Space was the *exteriorization of the Absolute* (whatever this phrase may mean!); and for Herbert Spencer it was an abstract concept of all the relations between co-existents, real space itself being unknowable. And so the problems attached to the term persist in persisting: Is Space one? Is it absolute or relative? Is it mobile or immobile? Is it finite or infinite? Is it a vacuum or a plenum (and if the latter, is it filled with ether?)? Are there intervals in the cosmos that are empty of all matter? Is Space homogeneous or heterogeneous? And the basic problem of all: Does Space exist objectively, or is it merely an idea in the human mind? About all that can be said in answer to any of these questions is: Who knows?

(It is interesting to note at this point how many of our "modern" pundits have been indulging the pastime of poking fun at the medieval scholars who are said to have spent much

1. *Vide*, D. Nys., *Cosmology*, II, 347-432.

2. Henri Bergson, *Matter and Memory*, trans. by Paul and Palmer, 277.

time in discussing the problem as to *how many angels could dance on the point of a needle*. The modern theologian might reply in kind by asking the scholars of our day, *How many atoms can dance on the point of a needle?* We must remember, of course, that the medievals were dealing with the problem as to how a spiritual (non-corporeal) entity could be thought of as occupying space. In our time, such questions as, In what sense does an atom occupy space, or, Does it occupy space in any sense of the term? are apparently as insoluble.)

Or, take the mystery of Time: what is it? "Time," said Plato, "is the moving image of eternity." That is to say, the things of sense-perception, the "objects" of our phenomenal world of Becoming, are but copies, and copies in a state of continuous flux, of the fixed, unchangeable, and eternal Forms of the world of true Being. Says Plato, by the mouth of his Pythagorean spokesman, in the *Timaeus*:

Time came into existence along with the Heaven, to the end that having been generated together they might also be dissolved together, if ever a dissolution of them should take place; and it was made after the pattern of the Eternal Nature, to the end that it might be as like thereto as possible; for whereas the pattern is existent throughout all eternity, the copy, on the other hand, is through all time, continually having existed, existing, and being about to exist.¹

Time, therefore, being cotemporaneous, so to speak, with the Creation itself, God the Creator must transcend all Time and indeed all Space as well. Or, as Scripture puts it: "One day is with the Lord as a thousand years, and a thousand years as one day" (2 Pet. 3:8). But what is Time *per se*? It was St. Augustine who wrote, centuries ago: "What is time? If nobody asks me, I know; but if I were desirous to explain it to one that should ask me, plainly I know not."² Is Time simply duration, a duration that is *felt* rather than measured, as Bergson contended?³ Is it merely the measure of the relative imperfections of human beings? Is Time strictly identical with movement or change? Is it reversible or irreversible? Is it absolute, or relative? Did it have a beginning? Will it come to an end? Is such a distinction as that of *real* time and *mathematical* time legitimate? Is time an objective element in the scheme of things, or again is it merely subjective, an idea that the human mind imposes upon the facts of experience? Again,

1. *Tim.* 37 D ff. Trans. by R. G. Bury, Loeb Classical Library Edition.

2. Augustine, *Confessions*, XI, ch. 17. Pusey translation, Everyman's Library Edition, 262.

3. Bergson, *Time and Free Will*.

about the only honest answer we can give to any of these questions is: Who but God knows?

Suffice it to say that the tendency among physicists at present is to unite Space and Time in theoretical wedlock, so to speak; that is to say, to regard Space-Time as one, as fourth dimensional. As Lincoln Barnett puts it:

Since time is an impalpable quantity it is not possible to draw a picture or construct a model of a four-dimensional space-time continuum. But it can be imagined and it can be represented mathematically. And in order to describe the stupendous reaches of the universe beyond our solar system, beyond the clusters and star clouds of the Milky Way, beyond the lonely outer galaxies burning in the void, the scientist must visualize it all as a continuum in three dimensions of space and one of time. In our minds we tend to separate these dimensions; we have an awareness of space and an awareness of time. But the separation is purely subjective; and as the Special Theory of Relativity showed, space and time separately are relative quantities which vary with individual observers. In any objective description of the universe, such as science demands, the time dimension can no more be detached from the space dimension that length can be detached from breadth and thickness in an accurate representation of a house, a tree or Betty Grable. According to the great German mathematician, Herman Minkowski, who developed the mathematics of the space-time continuum as a convenient medium for expressing the principles of Relativity, "space and time separately have vanished into the merest shadows, and only a sort of combination of the two preserves any reality."¹

This author continues:

It must not be thought, however, that the space-time continuum is simply a mathematical construction. The world *is* a space-time continuum; all reality exists both in space and in time, and the two are indivisible. All measurements of time are really measurements in space, and conversely measurements in space depend on measurements of time. Seconds, minutes, hours, days, weeks, months, seasons, years, are measurements of the earth's position in space relative to the sun, moon, and stars. Similarly latitude and longitude, the terms whereby man defines his spatial position on the earth, are measured in minutes and seconds, and to compute them accurately one must know the time of day and the day of the year. Such "landmarks" as the Equator, the Tropic of Cancer, or the Arctic Circle are simply sundials which clock the changing seasons; the Prime Meridian is a co-ordinate of daily time; and "noon" is nothing more than an angle of the sun.

Even so, the equivalence of space and time becomes really clear only when one contemplates the stars. Among the familiar constellations, some are "real" in that their component stars comprise true gravitational systems, moving in an orderly fashion relative to one another; others are only apparent—their patterns are accidents of perspective, created by a seeming adjacency of unrelated stars along the line of sight. Within such optical constellations one may observe two stars of equal brightness and assert that they are "side by side" in the firmament, whereas in actuality one may be 40 light years and the other 400 light years away.

1. *Op. cit.*, 64.

Obviously the astronomer has to think of the universe as a space-time continuum. When he peers through his telescope he looks not only outward in space but backward in time. His sensitive cameras can detect the glimmer of island universes 500 million light years away—faint gleams that began their journey at a period of terrestrial time when the first vertebrates were starting to crawl from warm Paleozoic seas onto the young continents of Earth. His spectroscope tells him, moreover, that these huge outer systems are hurtling into limbo, away from our own galaxy, at incredible velocities ranging up to 35,000 miles a second. Or, more precisely, they *were* receding from us 500 million years ago. Where they are "now," or whether they even exist "now," no one can say. If we break down our picture of the universe into three subjective dimensions of space and one of local time, then these galaxies have no objective existence save as faint smudges of ancient enfeebled light on a photographic plate. They attain physical reality only in their proper frame of reference, which is the four-dimensional space-time continuum.¹

After all, is there not an obvious kinship between this Space-Time continuum of the twentieth-century physicist and the connotations of the term "Spirit"? Not only with respect to the *everywhereness*, but also with respect to the *inexhaustibility*, of both. And would it be too far-fetched to regard Matter, that is, in its ultimate character of, perhaps, radiant energy, as a projection of Space-Time or Spirit? Bergson certainly approximates this view in his presentation of the *Elan Vital* as a Cosmic Consciousness—in one or two instances he speaks of it as "Spirit"—ever pushing its way upward like a fountain that gushes higher and higher, and of which the particles that fall back toward the source of the movement constitute what we call "matter."²

Mr. Walter Russell, then President of the Society of Arts and Sciences, was quoted in the daily press a few years ago as saying, in an address delivered in New York City:

The question arises, Is there any line of demarcation between a spiritual and a physical universe? And have we not been calling the invisible universe "spiritual" just because we could not see it? We have begun to see something tangible and inspiring beyond place, mass, and dimension. There must be a limitless source of static energy somewhere back of all this dynamic expression.

Speaking with reference to the ultimate particles of which matter is composed, which seem to constitute light, and which carry energy, scientists, said Mr. Russell, find them all acting suspiciously like some of the processes of human thought. He then added:

Tomorrow physics will undoubtedly divorce energy from matter and give it to space. . . . What we call the spiritual universe may

1. *Op. cit.*, 65, 66.

2. H. Bergson, *Creative Evolution*. Trans. by Arthur Mitchell.

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prove to be the static source in space of electric energy. If Einstein's prophecy is fulfilled it would cause a far greater upheaval in science than Copernicus caused in the concept of Ptolemy. Basic conclusions of today would be either reversed or discarded entirely, for if energy belongs to space as the new cosmogony suggests, light would belong to space, as Jesus inferred. When energy is found to belong to space, light will be understood to be an emergence from space, and God will be found to be what Jesus said He was—Light. As we study Jesus' teaching from the point of view of science, we become convinced that He understood light, energy, motion, and space, and knew what filled space. Jesus taught that life is eternal, that there is no death. Science may prove this to be literally true, and that the body, like all other material phenomena, merely registers the intensity of the thinking of a Supreme Intelligence. If science proves this, it will give meaning to the words of Sir James Jeans that "matter may eventually be proved to be pure thought."

As we read these excerpts in which are set forth the views of the most distinguished physicists of our day, the words of the first three verses of the Bible come to mind:

In the beginning God created the heavens and the earth. And the earth was waste and void; and darkness was upon the face of the deep; and the Spirit of God was brooding upon the face of the waters. And God said, Let there be light; and there was light.

In the light, therefore, of the most recent scientific view of the essential constitution of matter, are we not justified in believing that creative activity began with the initial putting forth of radiant energy as a result of the activity of the Divine Spirit? And that this projection of primal energy resulted in the vast accumulation of matter: the stuff of which the Spirit of God, through the instrumentality of successive fiat's of the Divine Word, subsequently moulded, arranged and constituted our cosmos? We may well ask then: Was this primal energy inherent in the Being of God? Or was it a *primary* creation, what theologians have termed a creation *ex nihilo*? Science has no answer for this question, and probably never will have one. Faith, however, answers that it was, in some sense, a primary creation. "By faith we understand that the worlds have been framed by the word of God, so that what is seen hath not been made out of things which appear" (Heb. 11:3). "By the word of Jehovah were the heavens made, and all the host of them by the breath [spirit] of his mouth. . . . For he spake, and it was done; he commanded, and it stood fast" (Psa. 33:6, 9). *All of which boils down to the fact that pure Spirit-Power, which is pure Thought-Power, is capable of generating what we call "physical" power: a fact of which, as we shall see later, we have*

1. I have misplaced the original of this press story. However, I vouch for the accuracy of the excerpt presented here.

an imperfect analogy in the powers of the pure spirit of man.
As Dr. Michael I. Pupin has said:

Sixty years ago, Clerk-Maxwell, the great electrical mathematician, spoke like a prophet when he made the startling announcement that . . . radiation of light is a manifestation of moving electricity. The most precious among the fruits of this discovery of Maxwell is that the origin of all light radiation is in the motion of the tiny electrons, which are, as far as we know, the unchangeable, primordial building stones of the material universe. Everything that moves seems to be deriving its breath of existence from the electrical forces which have their origin in these tiny electrons. These little workers, infinitely small, but infinitely numerous, by their combined activities make up the larger activities of that stupendous thing which we call the universe. And this busy little worker, the electron, is the most law-abiding creature in the universe. It loves, honors and obeys the laws, and its eternal mission is to serve. God employed the heavenly host of electronic workers to build the atoms, the molecules, and the galaxies of burning stars. These celestial furnaces, throbbing with the blazing energy of the electronic host, are moulding all kinds of planetary castings, and tempering them so as to be just right for organic life. One of these planetary castings is our Mother Earth. It is a mere dust speck in the universe, but this dust speck is the home of the soul of man, and this lifts our tiny earth to a place of honor near the throne of God. The soul's very breath of life is the beautiful electronic music, and to be thrilled by the melody of that cosmic song is the highest aim in our study of electrical science.

Again:

What is the only mystery today in electrical science? It is this: Where, when and how did the electron come into existence? The sensible man will answer; God created the electron, and therefore only God knows where, when and how. This eliminates the mystery at once. The rest we can see for ourselves. God created a host of electrons to be His assistants in building the universe. And when science discovered the electrons and learned to use them in man's service, it was our first glimpse of the method of creative operation.¹

There are those "unbelieving" scientists, of course, who dislike the name of God, and who choose to begin with electrons and atoms (or some other kind of particles of primal energy), holding these to be the unoriginated First Principle (or Principles) of all things. Under such a view, of course, it becomes necessary to conclude that these primal particles—whatever name may be given to them—have always contained, and still contain, within themselves the potentialities of all the higher phenomena of human experience, such as life, consciousness, thought, conscience, personality, and the like. Is it not obvious, therefore, that such a Primal Energy as the First Principle, that is, one embracing the potentialities of life, consciousness, and thought, certainly approximates what is designated "God" in the vocabu-

1. Quoted by A. E. Wiggam, *Exploring Your Mind*, 385-407.

lary of the Christian? Obviously, there must be an unoriginated or self-existent First Principle of all things—a Someone or Something that has always been and will always be, that is without beginning or end; the human mind revolts against the notion that Something could ever have been generated by an “eternal Nothing.” It is to just such a First Principle that religion applies the name “God.” And no matter how zealously the scientist tries to avoid this designation, the fact remains that his Primal Energy bears the same relation to the Cosmos and its processes as does the believer’s God. I therefore affirm that there are no actual atheists in the world; those who profess to be “atheists” are simply hiding behind a mass of verbiage. Every thinking person is compelled by both logic and common sense to accept the fact of a First Principle, either monistic, dualistic, or pluralistic in character. Therefore, the question primarily is not, Where did God come from?—but, Why is there Something instead of Nothing? And, secondarily, What is the nature of this Someone or Something that is without beginning or end, which is the Source of Cause of the whole Creation? Now if the First Principle be Primal Energy of some kind—radiant, electronic, atomic, or what not—that Primal Energy is God. This is the long of it, the short of it, and the all of it. There is simply no getting away from an eternal Something.

The difference, then, between the “non-believer” and the believer is that, whereas the former holds the First Principle of all things to be the nature of matter or energy (materialism), the believer holds that the First Principle is of the nature of Spirit or Person (theism). The “non-believer” bows in adoration before electrons, atoms, and molecules; the believer worships the Eternal Spirit, the Eternal Spirit of the Bible. For Jesus Himself tells us that “God is a Spirit, and they that worship him must worship in spirit and truth” (John 4:24). The whole issue boils down, therefore, to this: Which view—laying aside the claim of revelation altogether, for the moment—is the more reasonable, and which is more in accord with human experience?

I choose, for strictly experiential reasons, to take my stand for the Eternal Spirit of the Bible—the Spirit of God or Holy Spirit. In the first place, science has not one iota of evidence to offer in support of the hypothesis that pure energy or matter has within itself the powers of producing life, consciousness, or thought. The gaps between these successively higher phenomena are just as great as they ever were: not one of them has even

been begun to be bridged. Neither life, consciousness, or thought has ever been reduced to purely physiochemical or even cellular activity; all assertions to the contrary that one may read occasionally in textbooks are sheer bravado. In the second place, the essentially mathematical structure, and the obviously theological aspects (in the form of adaptation of means to ends), of the Cosmos and its processes, both point unmistakably to Spirit, that is, to Universal Intelligence and Will, rather than to unthinking, purely chance-operative particles of energy. Besides all this, the application of energy, in the form of force, to any particular end, as occurs constantly throughout Nature, presupposes the exercise of a Sovereign Will,—that Will which is the constitution of the universe. There is no accounting for the framework of Order which Nature presents to our view, and without which there never could have been a science, without a Sovereign Orderer. As the Psalmist puts it: "God spake, and it was done; He commanded, and it stood fast" (Psa. 33:9). I contend, therefore, that it is far more reasonable, and more in accord with human experience, to begin with Pure Spirit as the First Principle, as the One who embraces within Himself both potentially and actually all these higher phenomena, and who has infused them, one by one, progressively, into the Creative Process. It is far more reasonable to begin with the all-pervading Spirit as the Source of all orders of Being—electronic, atomic, vital, conscious, rational, moral, and spiritual—than it is to begin with nothing but irrational "waves" or "particles" of "brute" force. The former view accounts for all known phenomena of experience; the latter, one might well say, for none. If called upon to make the choice between the Eternal Spirit, on the one hand, and purely chance-operative particles of non-thinking, amoral particles of primal energy on the other hand, as the First Cause of all things, it seems to me that any intelligent person would take his stand on the side of Spirit. For man *knows*—if he will but look into himself—that he is infinitely more than an aggregate of physiochemical processes; that he is, in a word, a being who has been created "in the image of God" (Gen. 1:27).

To summarize: It must have become perfectly apparent by this time that in speaking of "matter" we may have, primarily, either of two *referents* in mind: (1) gross matter, the matter of everyday experience, palpable to the senses; or (2) ultimate matter, that of the present-day physicist, which is essentially energy rather than extension, and which, though none the less

real, is intelligible only in terms of mathematical formulae. There is a third sense too in which we may speak, secondarily, of "matter," namely, as designating the imperceptible, unknowable cause of our sensations: a universal substratum, a support "we know not what" which "is the same everywhere," to use John Locke's phraseology. This is a view which has prevailed quite generally throughout the history of philosophic thought, the *Apeiron* of Anaximander oft repeated. And finally, we may use the word "matter" merely to signify a something that is the opposite of "mind" or "spirit." It is with this signification, perhaps, that the word is most commonly used in everyday speech.

What practical conclusions are to be drawn, from this excursus into the history of the concept of matter, for our present purpose? I suggest the following lines of thought:

In the first place, At what point is the line of demarcation between matter and spirit to be drawn, or perhaps it would be more correct to say, between the ontological *referents* designated by the words "matter" and "spirit"? Where shall we find—or locate—the line that divides the "material" from the "non-material" or "immaterial"? Does such a line of demarcation actually exist? Or, is this an antithesis, like that perhaps of "natural" and "supernatural," probably formulated and arbitrarily imposed upon reality by the human mind itself? Perhaps the Totality of Things is, after all, a *continuum*, with the "material" shading into the "non-material," and vice versa, at certain points and under certain conditions. We might, for instance, approach the solution to this problem by asking, What is the essential property of matter? That is, what is the characteristic of matter lacking which it would not be *matter*? A great many thinkers, following Descartes, have contended that the essential property of matter is *extension*; others, the Neo-Scholastics, for example, say that it is *divisibility*. Now these conclusions may be true of gross matter, the matter common to our everyday experience. But they simply cannot be true of the ultimate matter as it is described by our present-day physicists. The ultimate "particles" which go to make up the atom can hardly be said to have spatial magnitude at all, and yet, paradoxically, they must have spatial magnitude of a sort. Moreover, as previously stated, the word *atomos* means "indivisible"; hence, the moment the atom is postulated as the ultimate *unit* of matter, the bridge has been crossed from the realm of the divisible and "material" into that of the indivisible and hence by definition "immaterial." The same reasoning applies to the proton, neutron,

electron, and like subordinate particles of the atom. The issue is not resolved in any respect by conceiving the atom as a "particle," "wave," or "field" of energy. As a matter of fact, the atoms of the new physics are not in the strictest sense indivisible; rather, they are found to be composite and occasionally to lose or gain their "parts," and even to change their nature. But in view of the fact that these "parts" ("particles" or "charges"?) are themselves indivisible, our argument still stands. If the essential property of matter is divisibility, there can be no ultimate indivisible unit at all, for the obvious reason that any indivisible unit would be not-matter or "non-material." We must therefore conclude that matter is not indivisible *ad infinitum*: that there is a point at which, by definition, the "material" becomes "immaterial."

Are we not justified in concluding, therefore, that matter, in its ultimate form has to be, in that form at least, "immaterial," that is, *qualitative* rather than *quantitative*? To put the same proposition in another form: In the realm of matter, we say, the whole is equal to the sum of the parts. But in the realm of spirit, any "part," speaking by way of analogy, is "equal" to the "whole." Why is this true? Because in the realm of spirit we are in the qualitative again rather than in the quantitative. The life that pervades a human organism, for example, is equally and qualitatively present in all parts of that organism. It simply can not be divided into "parts" as we divide a material object, nor can it be analyzed or measured quantitatively. More than this, it is an *inexhaustible* something. We are safe in saying then, it seems to me, that if the essential property of matter be divisibility, the essential property of spirit is *inexhaustibleness*. No matter how much of spirit-power is expended, the source of supply is never exhausted, nor even diminished. But here again we are speaking qualitatively rather than in terms of quantity.

In the second place, if by this process of regression we actually pass from the "material" into the "immaterial" or "non-material"—not only logically, but ontologically as well—it naturally follows that the opposite may well be true, namely, that matter, in its ultimate form, perhaps that of radiant energy, is either a creation of, or an emergence from, the "non-material," that is, from the activity of Pure Thought or Spirit. And certainly the tendency among physicists of the present day is toward the adoption of this view. As Sir James Jeans says:

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Today there is a widespread measure of agreement which on the physical side approaches almost to unanimity, that the stream of knowledge is heading toward a non-mechanical reality; the universe begins to look more like a great thought than like a great machine.¹

Again, the same author says elsewhere:

To my mind, the laws which nature obeys are less suggestive of those which a machine obeys in its action than of those which a musician obeys in writing a fugue, or a poet in composing a sonnet. The motions of electrons and atoms do not resemble those of the parts of a locomotive so much as those of the dancers in a cotillion. And if the true "essence of substances" is for ever unknowable, it does not matter whether the cotillion is danced at a ball in real life, or on a cinematograph screen, or in a story of Boccaccio. If all this is so, then the universe can best be pictured, although still very imperfectly and inadequately, as consisting of pure thought, the thought of what, for want of a better word, we must describe as a mathematical thinker. . . . Creations of an individual mind may reasonably be called less substantial than creations of a universal mind. A similar distinction must be made between the space we see in a dream and the space of everyday life; the latter, which is the same for us all, is the space of the universal mind. Again we may think of the laws to which phenomena conform in our waking hours, the laws of nature, as the laws of thought of a universal mind. The uniformity of nature proclaims the self-consistency of this mind. . . . If the universe is a universe of thought, then its creation must have been an act of thought. Indeed the finiteness of time and space almost compel us, of themselves, to picture the creation as an act of thought; the determination of the constants such as the radius of the universe and the number of electrons it contained imply thought, whose richness is measured by the immensity of these quantities. Time and space, which form the setting for the thought, must have come into being as a part of this act. Primitive cosmologies pictured a creator working in space and time, forging sun, moon and stars out of already existent raw material. Modern scientific theory compels us to think of the creator as working outside time and space, which are part of his creation, just as the artist is outside his canvas. It accords with the conjecture of Augustine, "*Non in tempore, sed cum tempore, finxit Deus mundum.*"² Indeed, the doctrine dates back as far as Plato: "Time and the heavens came into being at the same instant, in order that, if they were ever to dissolve, they might be dissolved together. Such was the mind and thought of God in the creation of time."³ And yet, so little do we understand time that perhaps we ought to compare the whole of time to the act of creation, the materialization of the thought.⁴

Obviously, the Biblical presentation of the Spirit of God as the energizing and vitalizing Agent in the Creation—in a word, as the Spirit of Power—is in harmony with these conclusions of the latest physics. We need not be surprised, therefore, to read in Scripture of instances, as we have already seen,

1. *The New Background of Science*, 158.

2. "Not in time, but with time, God fashioned the world."

3. *Vide Timaeus*, 37 D ff.

4. Sir James Jeans, *The Mysterious Universe* (New Revised Edition, 1943), 167-168, 175, 181-182.

in which the Spirit of Jehovah "came mightily upon" certain divinely appointed individuals (e.g., Samson, Saul, David, etc.), to clothe them with extraordinary physical and mental powers for special divine ends. Nor is there anything incredible about this, for it is a well-known fact that psychic power is capable of greatly intensifying the physical powers of the human organism under certain conditions. This is true even in cases of insanity: the abnormal physical strength of frenzied persons is a well-known fact, and has been known for ages. (*Vide* especially the *Bacchae* of Euripides. Phenomena of this kind have always characterized orgiastic "religions.") Hence we may reasonably conclude that the operation of the Divine Spirit at the very lowest level of being, produces energy (shall we call it "physical"?), which has the inherent power to build itself up into the gross matter, with its manifold representations, of our present physical world. The transmutations of energy into matter and of matter into energy are now known to be ontological facts.

Dr. Harold Paul Sloan seems to have given us the "conclusion of the whole matter" quite forcefully, in these words:

The new science itself is now pointing us to philosophy. It is now affirming that the ultimate ground of objective things is spirit. Matter, these leaders say, is not *stuff*; it is force; it is a complex of interacting forces; and these forces seem to resolve into mental values—into the "mathematical formulae" of Jeans—into ideas of an Infinite Mind.¹

2. The Mystery of Sensation

Some further light is thrown upon the problem of the ultimate constitution of matter by a study of the phenomenon of sensation as experienced by sentient beings.

Alexander Polyhistor, a writer of the first century B.C., has put posterity everlastingly in his debt by his formulation of a brief account of the metaphysical cosmogony of the ancient Pythagoreans, in a treatise no longer extant, entitled *Successions of Philosophers*. Fortunately, however, this account has been preserved by another writer, Diogenes Laertius, in his work written in the early part of the third century of the Christian era, a work entitled *Lives and Opinions of Eminent Philosophers*.²

1. *He Is Risen*, 127.

2. This work, in two volumes, may be found in the Loeb Classical Library, Harvard University Press. Translation by R. D. Hicks.