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World

INTRODUCTION

He who does not know what the world is," writes Marcus Aurelius, "does not know where he is. And he who does not know for what purpose the world exists, does not know who he is, nor what the world is." According to the Stoic emperor, for whom "there is one universe made up of all things, and one God who pervades all things," man has only to exercise the divine spark of reason in himself in order to be at home in a world which reason rules.

He does not hesitate long before the dilemma that "it is either a well-arranged universe or a chaos huddled together." In the belief that it is through and through an orderly world—a cosmos rather than a chaos, governed by providence rather than by chance—Aurelius is willing to assume whatever place destiny allots him in the universal scheme. "Everything harmonizes with me," he says, "which is harmonious to thee, O Universe."

With a Christian's faith in God's plan and providence, Montaigne is also willing to conceive the universe as the stage on which man acts his destined part. But suppose, Montaigne adds, that we consider "man alone, without outside assistance, armed solely with his own weapons, and deprived of divine grace and knowledge, which is his whole honor, his strength, and the foundation of his being." How then does the world appear? Is it, in all its vastness, the human habitat—the home of man, its lord and master?

Man deceives himself, Montaigne thinks, if he pictures the world thus, in terms of his own reason and knowledge. What could lead him to believe, he asks, that the "admirable motion of the celestial vault, the eternal light of those torches rolling so proudly above his head, the fearful movements of that infinite sea, were established and have lasted so many centuries for his convenience and his service? Is it possible to imagine anything so ridiculous as that this miserable and puny creature, who is not even master of himself . . . should call himself master and emperor of the universe, the least part of which it is not in his power to know, much less to command?"

If, as Montaigne thinks he should, man "feels and sees himself lodged here, amid the mire and dung of the world, nailed and riveted to the worst, the deadest, and the most stagnant part of the universe, on the lowest story of the house and the farthest from the vault of heaven," how absurd for him to imagine himself "above the circle of the moon, and bringing the sky down beneath his feet." Except "by the vanity of this same imagination" by which "he equals himself to God," how can he regard himself as occupying an exalted position in the universe?

Deprived of the religious faith that he is made in God's image and that all the rest of the visible universe is made for him, only presumption or conceit can save man from being dwarfed by the world. But science robs man of such conceit, according to Freud. The cosmology that "is associated in our minds with the name of Copernicus" displaces man and shrinks him. Humanity cannot hold on to "its naive self-love," Freud writes, when it realizes that the earth is "not the center of the universe, but only a tiny speck in a world-system of a magnitude hardly conceivable."

Not only in the reflections of Marcus Aurelius, Montaigne, and Freud, but throughout the tradition of the great books, the concep-

tion of the world or universe is inseparable from the ideas of God and man. These three ideas always interpenetrate each other, though the resulting pattern of thought varies according to the direction in which thought moves from any one of the three to the other two.

Sometimes the whole universe lies on one side of the infinite distance between the Creator and His creation, and man has a special place of honor in the hierarchy of beings which constitutes the order of the created world. Though man is greater than the earth he treads or the skies he watches, the whole world is less than God, Who has made it out of nothing and Who, in the freedom of His act of creation, is unaffected by the world's coming to be or passing away. On this view, taken by Christian theologians, God is not part of the world, the world is not part of God, nor is there any whole which embraces both; and if "world" means the physical totality, then man belongs both to this world and to another—the realm of spiritual creatures which is also part of the created universe.

Sometimes "world" means the all-embracing universe, uncreated and coeternal with the divinity which dwells in it, a thing of soul as well as body, including mind as well as matter. Whether God is the prime mover of the universe; the transcendent One from which emanates in all degrees of being the multiplicity of intelligible and sensible things; the infinite substance which exceeds the sum of all the finite things that exist only as its modifications; or the Absolute Spirit which manifests itself historically in both physical and psychical nature—on any of these views cosmology merges with theology, as in the theories of Aristotle, Plotinus, Spinoza, and Hegel. For Spinoza and Hegel, as for the Stoics, to know the world is to know God. Its order or structure is more than divinely instituted. It is the indwelling divinity itself.

Such views of the world tend, for the most part, to look upon the individual man as a microcosm mirroring the macrocosm. The world's body and soul, its matter and mind, are there to be seen in miniature. Considering the philosophers who assert that "mind is the king of heaven and earth," Socrates suggests in the *Philebus* that "in reality they are magnifying themselves." Nevertheless, the doctrine of a world soul animating the body of the universe is repeatedly proposed in the dialogues of Plato as a way of understanding man; and that mad or at least cryptic Platonist, Captain Ahab, gazing on the gold doubloon he has nailed to the mast as a reward for sighting Moby Dick, observes in soliloquy that "this round gold is but the image of the rounder globe, which, like a magician's glass, to each and every man in turn but mirrors back his own mysterious self."

A third alternative remains. Sometimes, as with Lucretius and later philosophers of a materialist cast, the world is all there is, and all there is of it can be reduced to atoms and the void. It is thrown together by blind chance rather than designed by a presiding intelligence. The universe obeys no laws except the laws of its own matter in motion. "Nature has no tyrants over her," writes Lucretius, "But always acts of her own will; she has / No part of any godhead whatsoever." For their own happiness, Lucretius exiles his papier-mâché gods to the interspaces where they "lead lives supremely free of care." But man is not so fortunate.

In a world that is not made for him, and in which, godless, he must be entirely self-reliant, man is burdened with heavy cares. Since he is one of nature's progeny, he may not be wholly alien in this world of material forces; but neither is he, like a beloved son, assured of nature's hospitality. The dominant note here is that of man *against* the world; and in this unequal struggle science alone gives him the sense—or perhaps the illusion—that at least in his little corner of the world his mind may dominate. Yet from time to time defeat reminds him that the world remains unruly. Bridle its matter and harness its energies as he will, he holds no checkrein to prevent his being overthrown.

As THE CHAPTER ON NATURE indicates, the word "nature" in one of its meanings seems to be synonymous with "world." This fact, as well as the various ways in which "world" has been used in the foregoing discussion, re-

quires us to note a certain ambiguity. When we speak of the world, our meaning may range from the earth or globe which man inhabits to the solar system in which our planet revolves and beyond that to the whole physical universe, however far-flung. We also use "world" to signify an entire realm of things which is distinctively set apart from another order of existence, as when we speak of material and spiritual worlds, or when we refer to the world of thought or the world of sense. Such phrases as "world government" and "world peace" use "world" in a political sense which evokes the image of the whole order of human society upon this globe.

We shall restrict ourselves in this chapter to that sense of "world" in which it signifies the object of cosmological speculations and controversies. We are concerned with the idea of the universe or cosmos. As we have already observed, the universe may be quite differently conceived according to the way in which it is related to God, but it is almost always conceived as that totality in which man and his earth and solar system exist, and outside of which nothing can exist except God. According to the theologians, the angelic hierarchies are no exception, for they fall within the created universe. But philosophers like Plato and Plotinus, who identify the world with the physical universe, set apart from it the eternal ideas or the order of the pure intelligences.

The traditional issues concerning the world or universe, so understood, can be summarized by three basic questions: Are there many worlds or is there only one? What is the structure of the world? Does the world have a beginning and does it have an end?

The first of these questions seems to violate the meaning of "world" as *the* universe—the complete totality of things. How can there be more than one *all*? But that difficulty, as we shall see, may be avoided by the hypothesis of a plurality of worlds succeeding one another in infinite time. It may even be met by the supposition that the infinity of space permits the possibility of two or more coexistent but unrelated worlds. Considerations of the time and space of the world, amplified in the chapters on SPACE and TIME, have a bearing on this issue of one or many worlds.

The second question presupposes agreement that the world has a structure, for if it does not, no problem arises concerning what that structure is. Such agreement is present in the tradition, and is unaffected by the dispute over the role of chance or design in the world's production, and by the controversy concerning the world's creation. As Harvey points out, the Greek word "cosmos" connotes order and beauty. Its opposite is chaos.

Writers may disagree about an original chaos prior to the formation of the cosmos. Plato, for example, refers to a time when the elements "were all without reason and measure"—"before they were arranged so as to form a universe." Milton also writes of a time when "yet this world was not, and *Chaos* wilde reign'd where these Heav'ns now rowl." In the "dark illimitable Ocean with out bound"—before "Heav'ns and Earth rose out of *Chaos*"—"eldest Night and *Chaos*, Ancestors of Nature, held eternal *Anarchie*." In contrast, Aristotle maintains that "chaos or Night did not exist for an infinite time" prior to the world, and he argues against "the theologians who generate the world from Night."

But these differences of opinion leave the main point unaffected. The world is a cosmos, not a chaos. The universe has some order. Even those who doubt the perfection of its order, or who point out how it is marred by evil and irrationality, affirm an order or structure, according to which the universe hangs together and is in some degree intelligible to man. The disputed question of the world's structure, therefore, centers on what the structure is. What precisely is the principle or pattern of cosmic coherence? By what image or analogy shall man try to hold the world before his mind as if it were a single intelligible object?

This problem, as well as the issue concerning one or many worlds, cannot be completely discussed apart from the last of the three questions—the question of the world's beginning and end. For example, if world follows world in succession, each must have a beginning and an end. So, too, the world's structure takes

on a different aspect for those who affirm and those who deny its creation by a divine intelligence; and according to at least one view of the order in the universe, men are persuaded that it must be made or ruled by reason, and argue against its being the result of chance.

But the question of the world's beginning must not be confused with the issue of creation, or the problem of the world's relation to God. Aquinas may agree with Berkeley's criticism of "the ancient philosophers who maintained the being of a God," while holding "Matter to be uncreated and co-eternal with Him"; but he does not wholly agree with Hobbes that "to say the world was not created, but eternal, seeing that which is eternal has no cause, is to deny there is a God." For Aquinas, to deny creation is to deny God, but whether the created world ever began to be is a question for faith, not reason. Nor does the denial of creation necessarily imply the eternity of the world—at least not in the sense in which Lucretius imagines the world to have both a beginning and an end.

TWO GREAT EXPONENTS of atomism in the tradition of the great books—Lucretius and Newton—show us that agreement on some of the basic questions of cosmology does not preclude disagreement on others. Both conceive the world as built of indestructible atomic particles. They conceive its structure to be determined by the motions of its parts, both large and small, through the forces exerted by body upon body. Both, furthermore, favor the hypothesis of a plurality of worlds, but only Lucretius holds that this world had a chance beginning and will come to a similar end.

When Lucretius refers to the infinite universe, which, "unmeasurable in deep wide boundlessness . . . is limitless," he does not mean this world in which man now lives. He means the void in which our world as well as other worlds are formed out of the infinite number of atoms which, combining and separating, cause the birth and death of worlds. "The universe," he writes,

Is infinitely wide; its vastness holds
Innumerable seeds, beyond all count,
Beyond all possibility of number,
Flying along their everlasting ways.
So it must be unthinkable that our sky
And our round world are precious and unique
While all those other motes of matter flit
In idleness, achieve, accomplish nothing.

The existence of worlds other than this seems probable to him, not only because of the infinity of the universe in respect to its space and matter, but also because the atoms form each world "quite by chance, / Quite casually and quite intentionless." As chance produced this world, so it can produce others. Hence, Lucretius argues, "There are, elsewhere, other assemblages / Of matter, making other worlds . . .

Let's admit—
We really have to—there are other worlds,
More than one race of men, and many kinds
Of animal generations.

Furthermore,
Adding up all the sum, you'll never find
One single thing completely different
From all the rest, alone, apart, unique.

On this principle, he thinks "you must admit that earth, sun, moon, / Ocean, and all the rest, are not unique, / But beyond reckoning or estimate."

By calling the atoms eternal bodies and first-beginnings, Lucretius indicates that it is each particular world, not the universe of matter and the void, which has a beginning and an end. The atoms or first-beginnings were not arranged, he explains, by "a conscious pact, a treaty with each other . . .

More likely, being so many, in many ways
Harassed and driven through the universe
From an infinity of time, by trying
All kinds of motion, every combination,
They came at last into such disposition
As now establishes the sum of things.

Thus a world is born, and so even does it grow by the addition of bodies from without. But as a world is born and grows, it also decays and dies. "There is always diminution, ebb, retreat," Lucretius writes, "But for a while our gain exceeds our loss / Until we reach that highest point of ripeness. / From there we go, a little at a time, / Downhill; age breaks our oak, dissolves our strength," until finally, "In just this way the ramparts of the world . . . will

some day face assault, / Be stormed, collapse in ruin and in dust."

According to Newton, the atoms are indestructible but not eternal bodies. Upon their indestructibility or permanence depends the uniform and enduring texture of nature in all ages. "That Nature may be lasting," Newton says, "the changes of corporeal things are to be placed only in the various separations and new associations and motions of these permanent particles." But for Newton the indivisibility of the ultimate particles of matter does not preclude their being created. "It seems probable to me," he writes, "that God in the beginning formed matter in solid, massy, hard, impenetrable movable particles, of such size and figures, and with such other properties . . . as most conduced to the end for which he formed them."

Not through the chance colligation of atoms, but through their being "variously associated in the first creation by the counsel of an intelligent agent," is the world formed. "For it became him who created them to set them in order. And if he did so," Newton adds, "it's unphilosophical to seek for any other origin of the world, or to pretend that it might arise out of a chaos by the mere laws of nature; though being once formed, it may continue by those laws through many ages."

Newton differs from Lucretius in these particulars, but shares his view of the probability of many worlds. "Since space is divisible *in infinitum,* and matter is not necessarily in all places, it may also be allowed," Newton declares, "that God is able to create particles of matter of several sizes and figures, and in several proportions to space . . . and thereby to vary the laws of nature, and make worlds of several sorts in several parts of the universe. At least," he continues, "I see nothing of contradiction in all this."

OTHER WRITERS SEEM TO FIND a plurality of worlds repugnant to reason, if not flatly contradictory. Plato, for example, appears to think that the possibility of other worlds is inconsistent with the perfection of this one—certainly if this world is made in the image of the eternal ideas. Because "the original of the universe contains in itself all intelligible beings," Plato's Timaeus argues that there cannot be many worlds, but "one only, if the created copy is to accord with the original." It belongs to the world's perfection to be solitary, and for this reason, Timaeus explains, "the creator made not two worlds or an infinite number of them; but there is and ever will be one only-begotten and created heaven."

Aristotle reasons differently to the conclusion that "there cannot be more worlds than one." The conclusion follows in his view from the impossibility of an infinity of body or matter, and with it an infinity of space. "The universe is certainly a particular and a material thing," he writes. "If it is composed not of a part but of the whole of matter, then though the being of 'universe' and of 'this universe' are still distinct, yet there is no other universe, and no possibility of others being made, because all the matter is already included in this." He thinks it a tenable hypothesis that "the world as a whole includes *all* its appropriate matter"; hence, he concludes, "neither are there now, nor have there ever been, nor can there ever be formed, more heavens than one, but this heaven of ours is one and unique and complete."

On theological grounds, Augustine challenges those who suppose "either that this is not the only world, but that there are numberless worlds, or that indeed it is the only one, but that it dies, and is born again at fixed intervals, and this times without number." On theological grounds also, though with a different conception of God and the universe, Spinoza maintains that "besides God no substance can be or be conceived"; that "God is one, which is to say, in nature there is but one substance, and it is absolutely infinite"; that all finite things have their existence in the one infinite substance of God; and that God is "not only the cause of the commencement of their existence, but also of their continuance in existence." Because God's liberty consists, in Spinoza's conception, in acting according to the necessity of His own nature, not in freedom of will, he insists that "things could be produced by God in no other way and in no other order than that in which they have been

produced." This is not merely the only actual but the only possible world.

Aquinas agrees that there is only one actual world. "The very order of things created by God," he writes, "shows the unity of the world." Since "whatever things come from God have relations of order to each other and to God himself . . . it is necessary that all things should belong to one world. Therefore," Aquinas continues, "only those were able to assert the existence of many worlds who do not acknowledge any ordaining wisdom, but rather believed in chance; as did Democritus, who said that this world, besides an infinite number of other worlds, was made by a coming together of atoms."

Aquinas places God's liberty in freedom of choice, and so he contemplates the possibility of other worlds than this. This is the only world God actually created, but since, in creating, "God does not act from natural necessity," and since, in the act of creation, the divine will "is not naturally and from any necessity determined to these creatures," Aquinas concludes that "in no way is the present scheme of things produced by God with such necessity that other things could not come to be."

As the chapter on WILL indicates, Spinoza holds that God does not have the power of free choice. He therefore argues that the actual world, being the only possible one, cannot be bettered. All things, he writes, have been "produced by God in the highest degree of perfection, since they have necessarily followed from the existence of a most perfect nature." Aquinas, on the other hand, denies that this is the best of all possible worlds. "Given the things which actually exist," he says, "the universe cannot be better, for the order which God has established in things, and in which the good of the universe consists, most befits things . . . Yet God could make other things, or add something to the present creation; and then there would be another and a better universe."

OTHER SPECULATIONS CONCERNING the cosmos seem to divide into three sorts, according as they consider the matter and space, the size and shape, of the universe; or they try to discover the principle by which all things are ordered together in one world; or they examine whatever order is found, and judge its perfection, its goodness, and its beauty.

The first of these three types of cosmological theory belongs primarily to the physicist and the astronomer. From Aristotle to Einstein, observation, mathematical calculation, and imaginative hypotheses have propounded the alternatives of a finite or infinite universe or, as Einstein prefers to put it, of a "finite yet unbounded universe," as opposed to one which is either simply finite or both infinite and unbounded. Einstein also points out that spherical surface beings, such as the inhabitants of this planet, "have no means of determining whether they are living in a finite or in an infinite universe, because the 'piece of universe' to which they have access is in both cases practically plane, or Euclidean."

Archimedes in *The Sand-Reckoner* undertakes to show that the number of the grains of sand in a universe whose outer space extends to the distance of the fixed stars, is, however large, a finite rather than an infinite number. Lucretius and Newton, as we have seen, embrace the opposite hypothesis, while Aristotle defends the proposition that the universe is finite, bounded, and spherical in shape. Among the great astronomers, Copernicus and Kepler, no less than Ptolemy, conceive the world as bounded by an outer sphere. Copernicus opens his treatise by remarking that "the world is like a globe; whether because this form is the most perfect of all . . . or because it is the figure having the greatest volume . . . or because the separate parts of the world, *i.e.*, the sun, moon, and stars, are seen under such a form; or because all things seek to be delimited by such a form, as is apparent in the case of drops of water and other liquid bodies, when they become delimited through themselves."

A spherical or (if matter is not distributed uniformly) an elliptical or quasi-spherical universe, "will be necessarily finite," according to Einstein, but it will also "have no bounds." Among the conceivable "closed spaces without limits," Einstein points out that "the spherical space (and the elliptical) excels in its

simplicity, since all points on it are equivalent." But "whether the universe in which we live is infinite, or whether it is finite in the manner of the spherical universe," he thinks is a question that "our experience is far from being sufficient to enable us to answer." Recent astronomical observations of the velocity of the receding nebulas have suggested the hypothesis of an infinitely expanding universe.

These cosmological theories are more fully discussed in the chapter on SPACE. Another point of physical speculation concerning the uniformity of the world's matter—not the uniformity of its distribution, but the sameness or difference in kind of terrestrial matter and the matter of the heavenly bodies—is considered in the chapters on ASTRONOMY AND COSMOLOGY and MATTER. We turn, therefore, to the question of the world's structure, apart from its size, its shape, and the disposition of its matter.

THREE METAPHORS SEEM to express the great traditional images of the world's structure. The world is a living organism. *It is like an animal* with a soul, even a soul endowed with reason. The world is a multitude of diverse and unequal individual things, forming a hierarchy and associated, according to their natures and functions, for the common good of the whole. This view was first proposed by Plato. *It is like a society,* a society under divine law and government. The conception of the world as a divinely instituted and governed society seems to be a product of Jewish and Christian faith. Though that expression of it, which includes a hierarchical ordering of all things from the elemental bodies to the angels, belongs to Christian theologians and poets, there may be a pre-Christian version in the Stoic theory of the world as governed by a divine intelligence. *It is like a machine,* a system of interdependent moving parts, linked together from the least to the greatest in an unbroken chain of causation. This may be the earliest of the three theories, if the atomistic cosmology of Democritus, which Lucretius later expounds, can be interpreted as adopting the mechanical analogy. Full-fledged mechanism may, however, be thought to await 17th-century developments in the science of mechanics, when, for Descartes, Newton, and others, the laws of mechanics become the only laws of nature.

According to Plato, in the *Timaeus,* "God desired all things to be good and nothing bad," and he "found that no unintelligent creature taken as a whole was fairer than the intelligent taken as a whole; and that intelligence could not be present in anything which was devoid of soul. For which reason," Timaeus explains, "when he was framing the universe, he put intelligence in soul, and soul in body . . . Wherefore, using the language of probability, we may say that the world became a living creature truly endowed with soul and intelligence by the providence of God." Since his intention was that "the animal should be as far as possible a perfect whole and of perfect parts," he gave it self-sufficiency, a spherical body—which figure "comprehends within itself all other figures"—and circular movement. The universe did not require, therefore, sense organs or hands or feet.

"Such was the whole plan of the eternal God about the god that was to be, to whom for this reason he gave a body, smooth and even, having a surface in every direction equidistant from the center . . . And in the center," according to Timaeus, "he put the soul, which he diffused throughout the body, making it also to be the exterior environment of it; and he made the universe a circle moving in a circle . . . Having these purposes in view he created the world a blessed god."

The theory of a world soul and of an animated, organic universe appears not only in the *Timaeus,* but also in other Platonic dialogues. In the *Phaedrus,* for example, Socrates says that "the soul in her totality has the care of inanimate being everywhere"; and in the *Laws,* the Athenian Stranger, asking whether "it is the soul which controls heaven and earth, and the whole world," replies that "the best soul takes care of the world and guides it along the good path."

In somewhat different form, the theory of a world soul appears in Plotinus, according to whom the cosmic soul belongs only to the material universe and is, therefore, third and lowest in the scale of the "authentic

existents." It appears in Gilbert and Kepler, though in the latter largely as the expansion of a metaphor. It is considered by William James, whose comment on the "materialistic, or so-called 'scientific,' conceptions of the universe" is that "they leave the emotional and active interests cold," whereas he thinks "the perfect object of belief would be a God or 'Soul of the World,' represented both optimistically and moralistically . . . All science and all history would thus be accounted for in the deepest and simplest fashion."

Precisely because exponents of the doctrine attribute divinity to the world soul, Augustine and Aquinas object to it. "Impious and irreligious consequences follow," in Augustine's opinion, from the notion that "God is the soul of the world, and the world is as a body to Him." To those who compare the microcosm with the macrocosm by saying that "the soul is in the body as God is in the world," Aquinas replies that "the comparison holds in a certain respect, namely, because as God moves the world, so the soul moves the body. But it does not hold in every respect, for the soul did not create the body out of nothing as God created the world."

Furthermore, according to Aquinas, "God is not a part of it, but far above the whole universe, possessing within Himself the entire perfection of the universe in a more eminent way." God in relation to the world should not be conceived by analogy with soul and body, but by comparison to a king who "is said to be in the whole kingdom by his power, although he is not everywhere present." This analogy fits better with the conception of the universe as a society under divine government.

Although Aurelius reminds himself to "regard the universe as one living being, having one substance and one soul," he also takes the view that the world is a community of things ordered to one another. "The intelligence of the universe is social," he writes. "Accordingly it has made the inferior things for the sake of the superior, and it has fitted the superior to one another . . . It has subordinated, co-ordinated, and assigned to everything its proper portion." This view of the universe as a community is the one most fully developed in Christian thought. Augustine and Aquinas go much further than Aurelius in depicting the hierarchy of things and their ordination to one another under the eternal law. Both take as a basic text from Scripture the statement that God has "ordered all things in measure, and number, and weight." According to its dignity or worth, each thing occupies a place and plays its part in the general scheme of things.

"The parts of the universe are ordered to each other," Aquinas writes, "according as one acts on another, and according as one is the end and exemplar of the other." The government of the universe by the divine reason produces a perfection of order in the whole, which is the intrinsic common good of the universe, and directs each thing to the attainment of its end, in which consists its own perfection. "It belongs to the divine goodness," Aquinas says, "as it brought things into being, to lead them to their end. And this is to govern." But neither the perfection of each thing, nor the order of the universe itself, is the ultimate end of divine government. "Some good outside the whole universe," he says, "is the end of the government of the universe"—for the end of all things, as their beginning, lies in the goodness of God.

THE CONCEPTION OF THE WORLD as divinely governed, and cared for by divine providence, excludes chance as a factor in the formation of the world or in its structure. With Democritus and Epicurus in mind, Aquinas points out that "certain ancient philosophers denied the government of the world, saying that all things happened by chance." But the rejection of chance does not seem to be peculiar to Christian faith or theology.

Plato and Plotinus also deny that the order in the universe can be the result of chance. For Plato it is not merely that the world is animated by a rational soul, but also, as the Athenian Stranger suggests in the *Laws,* that it is a work of art rather than of nature or chance.

" 'Atoms' or 'elements'—it is in either case an absurdity, an impossibility," writes Plotinus, "to hand over the universe and its contents to material entities, and out of the disorderly swirl thus occasioned to call order

. . . into being." According to him, "there is nothing undesigned, nothing of chance, in all the process." Aristotle, too, speaks against the atomists who "ascribe this heavenly sphere and all the worlds to spontaneity" or chance. "When one man," he writes, referring to Anaxagoras, "said that reason was present—as in animals, so throughout nature—as the cause of order and of all arrangement, he seemed like a sober man in contrast with the random talk of his predecessors."

It might be supposed that those who view the world through the eyes of Newton or Descartes would be inclined to favor chance rather than reason or design. But this does not seem to be the case, at least not for Newton or Descartes. "This most beautiful system of the sun, planets, and comets," Newton declares, "could only proceed from the counsel and dominion of an intelligent and powerful Being."

Descartes asks us to consider what would happen if God were now to create a new world "somewhere in an imaginary space." Suppose that He agitated its matter in various ways "so that there resulted a chaos as confused as the poets ever feigned, and concluded His work by merely lending His concurrence to Nature in the usual way, leaving her to act in accordance with the laws which He had established." Something like this orderly universe would be the result. The laws of matter in motion, Descartes thinks, are "of such a nature that even if God had created other worlds, He could not have created any in which these laws would fail to be observed."

In the tradition of the great books, only the ancient atomists seem to take the position that the universe is a thing of chance. But this does not mean that, except for the atomists, agreement prevails concerning the manifestation of purpose or design in the world's structure. "Is the Kosmos an expression of intelligence, rational in its inward nature, or," James asks, "a brute external fact pure and simple?" James finds two answers to this question which he calls "the deepest of all philosophic problems"—one which regards the world "as a realm of final purposes, that . . . exists for the sake of something," and one which sees "the present only as so much mere mechanical sprouting from the past, occurring with no reference to the future."

As the chapter on MECHANICS indicates, Newton and Descartes are, in a sense, mechanists; yet they also affirm final causes—ends or purposes—in the plan of the universe. Newton speaks of God's "most wise and excellent contrivance of things, and final causes." It is true that Descartes, while referring to the universe as a work of divine art, says that God's purpose may not be visible to us in all its arrangements. Therefore "the species of cause termed final finds no useful employment in physical (or natural) things; for it does not appear to me," he explains, "that I can without temerity seek to investigate the (inscrutable) ends of God." But this states a rule of method in natural science, not the denial of a cosmic plan.

That denial is to be found, however, most plainly in Spinoza. "It is commonly supposed," he writes, "that all things in nature, like men, work to some end; and indeed it is thought to be certain that God Himself directs all things to some sure end, for it is said that God has made all things for man, and man that he may worship God." Against this view, which he regards as the most besetting of all human prejudices, Spinoza holds that "nature does nothing for the sake of an end, for that eternal and infinite Being whom we call God or Nature acts by the same necessity by which He exists." Since "He exists for no end, He acts for no end; and since He has no principle or end of existence, He has no principle or end of action. A final cause, as it is called," Spinoza continues, "is nothing, therefore, but human desire, in so far as this is considered as the principle or primary cause of anything."

Because man discovers things in nature which serve as means to his own ends, man is led to infer, Spinoza declares, that "some ruler or rulers of nature exist, endowed with human liberty, who have taken care of all things for him, and have made all things for his use . . . and hence he affirmed that the gods direct everything for his advantage, in order that he may be bound to them and hold them in the highest honor . . . Thus has this prejudice been turned into a superstition, and has driven deep roots into the mind—a prejudice which was

the reason why everyone has so eagerly tried to discover and explain the final causes of things." The attempt, however, to show that nature does nothing in vain (that is to say, nothing which is not profitable to man) seems, in Spinoza's opinion, "to end in showing that nature, the gods, and man are alike mad."

WHERE SPINOZA DENIES purpose or plan in the universe because everything exists or happens from the necessity of efficient, not final, causes (and ultimately from the necessity of nature or God himself), Lucretius argues against design or providence from the imperfection of the world. To those who "think that gods / Have organized all things for the sake of men," Lucretius says:

I might not know a thing about the atoms,
But this much I can say, from what I see
Of heaven's ways and many other features:
The nature of the world just could not be
A product of the gods' devising; no,
There are too many things the matter with it.

Spinoza would dismiss this argument. He thinks he can easily answer those who ask, "How is it that so many imperfections have arisen in nature—corruption, for instance, of things till they stink; deformity, exciting disgust; confusion, evil, crime, etc.?" He holds that "the perfection of things is to be judged by their nature and power alone; nor are they more or less perfect because they delight or offend the human senses, or because they are beneficial or prejudicial to human nature."

Others deal differently with the apparent imperfections in the world. Descartes, for example, makes the point that "the same thing which might possibly seem very imperfect . . . if regarded by itself, is found to be very perfect if regarded as part of the whole universe." Marcus Aurelius goes further. "Nothing is injurious to the part," he writes, "if it is for the advantage of the whole . . . By remembering, then, that I am part of such a whole, I shall be content with everything that happens."

In terms of another principle, Berkeley asks us to "consider that the very blemishes and defects of nature are not without their use, in that they make an agreeable sort of variety, and augment the beauty of the rest of creation, as shades in a picture serve to set off the brighter and more enlighted parts . . . As for the mixture of pain or uneasiness which is in the world, pursuant to the general laws of nature," he thinks that "this, in the state we are in at present, is indispensably necessary to our well-being."

In the opinion of those "philosophers who, after an exact scrutiny of all the phenomena of nature, conclude that the *whole,* considered as one system is, in every period of its existence, ordered with perfect benevolence," Hume sees only a specious, if also sublime, consolation for all human ills. But he does not think such convictions ever really work in practice. "These enlarged views may, for a moment," he says, "please the imagination of a speculative man, who is placed in ease and security; but neither can they dwell with constancy on his mind, even though undisturbed by the emotions of pain or passion; much less can they maintain their ground when attacked by such powerful antagonists."

But according to theologians like Augustine and Aquinas, evil does not and cannot exist in the world except as a privation or corruption of some good. "Evil neither belongs to the perfection of the universe, nor comes under the order of the universe," writes Aquinas, "except accidentally, that is, by reason of some good joined to it." But how does evil enter into a world created by a supremely good deity? What "God chiefly intends in created things," Aquinas answers, "is the good of the order of the universe. Now the order of the universe requires . . . that there should be some things that can, and sometimes do, fail. And thus God, by causing in things the good order of the universe, consequently and, as it were by accident, causes the corruptions of things." Furthermore, "the order of justice belongs to the order of the universe; and this requires that penalty should be dealt out to sinners. And so God is the author of the evil which is penalty, but not of the evil which is fault."

ON THIS POINT OF THE perfection of the universe, the great conversation passes from the order of the world to the problem of evil and to related issues.

In Voltaire's *Candide,* there is much talk about Doctor Pangloss' philosophy that this is the best of all possible worlds. Candide is not persuaded by Pangloss. He tells Cunégonde that "we are going to another universe," and adds, "in that one all is well. For it must be admitted that one might deplore a little what goes on in ours in the physical and moral realms"—earthquakes and tidal waves, rapture and torture.

When Freud, in commenting on what he calls "the religious Weltanschauung," says that "earthquakes, floods and fires do not differentiate between the good and devout man, and the sinner and unbeliever," he raises questions which are considered in the chapters on JUSTICE, PUNISHMENT, and GOOD AND EVIL. The perfection of the universe also leads to a discussion of the beauty of its order. The praises which are differently voiced by the astronomers, the theologians, and the poets extol not the visible beauties of nature, but the intelligible beauty of the cosmic structure—perceptible to a Kepler in his mathematical and musical formulation of the harmonies of the world.

In addition to questions of its goodness and beauty, the problem of the world's order is sometimes stated in terms of its rationality. For some writers, such as Hegel, rationality is affirmed as the very foundation of existence. "*What is rational is actual and what is actual is rational,*" he writes. "On this conviction the plain man like the philosopher takes his stand, and from it philosophy starts in its study of the universe of mind as well as the universe of nature." According to Russell, "we cannot prove that the universe as a whole forms a single harmonious system such as Hegel believes that it forms." To others, like James, "the whole war of the philosophies is over that point of faith. Some say that they can see their way already to the rationality; others that it is hopeless in any other but the mechanical way. To some the very fact that there is a world at all seems irrational."

Against the Hegelian notion of the world as a perfectly ordered whole (to which James applies the epithet "block universe"), James proposes the conception of a "concatenated universe." "The real world as it is given at this moment," James declares, "is the sum total of all its beings and events now. But can we think of such a sum? Can we realize for an instant what a cross-section of all existence at a definite point in time would be? While I talk and the flies buzz, a sea-gull catches a fish at the mouth of the Amazon, a tree falls in the Adirondack wilderness, a man sneezes in Germany, a horse dies in Tartary, and twins are born in France.

"What does that mean?" James asks. "Does the contemporaneity of these events with each other, and with a million more as disjointed as they, form a rational bond between them, and unite them into anything that means for us a world?" It would certainly not mean a universe or cosmos for those who, like Hegel, insist upon the pervasive unity of the universe as a whole which completely and rationally relates all its parts. But for James, who conceives the universe in a pluralistic rather than in a monistic fashion, the "collateral contemporaneity" of all things, "and nothing else, is the *real* order of the world."

ALL OF THESE ISSUES carry the discussion back to what is perhaps the decisive question—the question of the world's origin. According as men believe it to be the purposeful work of a beneficent intelligence or the product of blind chance or of equally blind necessity, their other judgments about the world tend in the general directions of optimism or pessimism. Yet this is only true for the most part.

The problem of the world's origin involves some technical issues which do not seem to have such consequences for man's appraisal of the universe. One is the question whether a created world has a beginning in time or is coeternal with its creator. As is indicated in the chapters on ETERNITY and TIME, whichever way the disputed question concerning the eternity of the world is answered, its creation may be affirmed or denied. Those who think the world is created declare that the power needed to maintain the world in being is identical with the creative power needed to initiate it. "The divine conversation," as Berkeley points out, is conceived as "a continual creation."

The most difficult point in issue concerns the meaning of creation itself. According to Christian doctrine, the essence of creation consists in making something out of nothing. On this principle Aquinas, for example, contrasts creation with generation or procreation and with artistic production. In biological generation, the offspring is produced out of the substance of its progenitors. In artistic production, some preexistent material is transformed by the craftsman. But according to the theologian, creation is not change, "for change means that the same thing should be different now from what it was previously."

In becoming or alteration, some being is presupposed. "Creation is more perfect and more excellent than generation and alteration," Aquinas says, "because the term *whereto* is the whole substance of the thing; whereas what is understood as the term *wherefrom* is absolutely non-being," which, as he remarks, is the same as *nothing*. Since the distance between total nonbeing and being is infinite, only an infinite power can create, or make something out of nothing.

Lucretius flatly denies this possibility when he asserts as a first principle that "*Nothing comes from nothing.*" Not even the gods can violate this principle. "*Nothing at all,*" he declares, "*is ever born from nothing / By the god's will.*" To Locke, on the other hand, the inconceivability of creation constitutes no argument against it. Writers like Lucretius "must give up their great maxim, *Ex nihilo nihil fit* . . . It is not reasonable to deny the power of an infinite Being because we cannot comprehend its operations. We do not deny other effects upon this ground," Locke continues, "because we cannot possibly conceive the manner of their production . . . It is an overvaluing of ourselves, to reduce all to the narrow measure of our capacities, and to conclude all things impossible to be done, whose manner of doing exceeds our comprehension."

But may not the world be related to a supreme cause or principle in some way which does not involve *exnihilation?* The great books present various alternatives. Aristotle's prime mover is the unmoved and eternal cause of the world's eternal motion, not of its coming into being or its conservation in being. Plato's demiurge is a divinity which, according to the myth of the world's origin in the *Timaeus,* fashions the universe after the model of the eternal ideas, artistically producing their sensible replicas in the matter or space which is called "the receptacle."

The emanation of the sensible as well as the intelligible world from the transcendent All-One in the cosmogony of Plotinus, or the production of finite things from the infinite substance of God in Spinoza's theory, seem to be more like generation or procreation than like creation in the meaning of the opening chapter of Genesis.

Such theories, according to theologians like Augustine and Aquinas, or philosophers like Berkeley and Locke, deny what is meant by creation in the Judeo-Christian tradition. To Berkeley they are all equally forms of atheism. Yet it should be remarked that to Spinoza a theory like that of Plato's is also impious; for it places "something outside of God which is independent of Him, to which He looks while He is at work as to a model, or at which He aims as if at a certain mark. This is indeed nothing else than to subject God to fate, the most absurd thing which can be affirmed of Him whom we have shown to be the first and only free cause of the essence of all things as well as of their existence."

THE VARIOUS THEORIES of the world's origin usually extend also to the problem of the world's end. Aristotle, for example, who denies a beginning to the motions of the heavens and all other cycles of natural change, affirms them to go on in everlasting perpetuity. But it is not merely those who think the world has no beginning or source who attribute endless endurance to it. If the world did not have endless duration, it would not be for Plato the moving image of eternity. And though they conceive the world as somehow a divine emanation or production, Plotinus and Spinoza, no less than Aristotle, hold it to be everlasting if not eternal. "We hold that the ordered universe, in its material mass," Plotinus writes, "has existed for ever and will for ever endure."

The proposition that nothing is ever re-

duced to nothing is, for Lucretius, as true as the principle that nothing ever comes from nothing. He applies these principles, however, only to the eternal atoms, uncreated and indestructible, not to the world after world which arises and perishes as the atoms come together and disperse. Just as any compound body which atoms form can be dissolved into its simple bodies, so whole worlds are subject to similar dissolution, and will suffer it in the course of long ages. Yet though world succeeds world in the ceaseless activity of the eternal atoms, Lucretius contemplates a universe without beginning or end.

Since annihilation (or reduction to nothingness) is the opposite of exnihilation (or creation out of nothing), it might be expected that the doctrine which rests on the faith that "in the beginning God created heaven and earth," would also foresee an end to all things—a return of the whole created universe to the nothingness from which it came. Sacred Scripture does contain the prophecy of a final cataclysm. "The earth shall reel to and fro like a drunkard, and shall be removed like a cottage," says Isaiah. Reciting the parable of the tares in the field, Matthew explains that as "the tares are gathered and burned in the fire, so shall it be in the end of this world." In the Gospel according to Luke, Christ foretells His second coming:

> And there shall be signs in the sun, and in the moon, and in the stars; and upon the earth distress of nations, with perplexity; the sea and the waves roaring;
>
> Men's hearts failing them for fear, and for looking after those things which are coming on the earth: for the powers of heaven shall be shaken;
>
> And then shall they see the Son of man coming in a cloud with great power and great glory . . .
>
> Heaven and earth shall pass away; but my word shall not pass away.

But there is one other text which exercises a controlling influence on the theologian's interpretation of Scripture. In the second Epistle of Peter, we find:

> . . . the day of the Lord will come as a thief in the night; in the which the heavens shall pass away with a great noise, and the elements shall melt with fervent heat, the earth also and the works that are therein shall be burned up . . .
>
> Nevertheless we, according to his promise, look for new heavens and a new earth, wherein dwelleth righteousness.

The final conflagration will be the end of the world as we know it, but it will bring about the re-formation, not the annihilation, of the material universe. As God has the power to create, so, according to Aquinas, He has the power to annihilate, but "since the power and goodness of God are rather manifested by the conservation of things in being . . . we must conclude by denying absolutely that anything at all will be annihilated." In the concluding treatises of the *Summa Theologica*—dealing with the end of the world, the Last Judgment, and the resurrection of the body—the final cataclysm is described as the cleansing of the world by fire to bring into being a new earth and a new heaven.

In our time, men talk of the end of the world as an event which might by chance occur if a chain reaction set up by atomic fission got out of control and exploded the whole material universe. The physicist's theory of entropy also forecasts the eventual dissipation of energy to the point at which the universe will be a frozen mass of inert matter. These are secular alternatives to the religious prophecy of the world's end. But what Jesus said of the Last Judgment—that its time is a secret hidden from men—may be applicable to any termination of the world, certainly if it lies in the hands of God, and not merely at the disposal of man or nature.