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GOD:

Can we
find him

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LIGHT FROM MODERN SCIENCE AND PHILOSOPHY

By

REV. JOHN A. O'BRIEN, Ph.D., LL.D.

God: Can We Find Him?

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Rev. John A. O'Brien, Ph.D., LL.D.

The University of Notre Dame

"Today there is but one religious dogma in debate: What do you mean by God? And in this respect, today is like all our yesterdays."

PROFESSOR ALFRED WHITEHEAD,
Harvard University.

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Nihil Obstat:

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CHAPTER I

THE HEAVENS SHOW FORTH

The heavens show forth the glory of God, and the firmament declareth the work of His hands (Psalm xviii. 2)

Is there a God? How can I be sure? Where can I find Him? Do I have to make an act of faith to believe in God? Is it possible to prove the existence of a Supreme Ruler of the universe by logical reasoning? These are questions which are uppermost in the minds of many people today. They are of perennial interest. They have been with us since the race began and they will be with us until the end.

These are the questions of supreme importance which present themselves anew to each generation. Upon the success which the individual achieves in answering them correctly hinge consequences which jut beyond this life into eternity. "Today," observes Professor Whitehead of Harvard, "there is but one religious dogma in debate: What do you mean by God? And in this respect," he adds, "today is like all our yesterdays."

Immanuel Kant expressed the conviction that in all philosophy there are but three great problems, namely, the existence of God, the freedom of the will, and the immortality of the human soul. It is not difficult, however, to show that of these three, God's existence is the central problem and the other two are but corollaries of that. In fact they cannot be treated adequately or intelligently except in the light of the answer reached concerning the existence of a Supreme Intelligence.

The most important knowledge in the world, therefore, is the knowledge of God. Uncertainty about God renders people miserable and unhappy. It makes them less sure of themselves, of the purpose of life, and of human destiny. With wistful eyes and groping hands millions of people today are searching for something to steady them, for a firm hold on God.

In *The Adventures of the Black Girl in Her Search for God*, George Bernard Shaw pictures his central character in her African homeland accosting a white young man wearing a Greek tunic.

"Excuse me, baas," said the black girl. "You have knowing eyes. I am in search of God. Can you direct me?"

"Do not trouble about that," said the young man. "Take the world as it comes; for beyond it there is nothing. All roads end at the grave, which is the gate of nothingness; and in the shadow of nothingness everything is vanity. Take my advice and seek no further than the end of your nose. You will always know that there is something beyond that; and in that knowledge you will be hopeful and happy."

"My mind ranges further," said the black girl. "It is not right to shut one's eyes. I desire knowledge of God more than happiness or hope. God is my knowledge and my hope."¹

The black girl may be viewed as the symbol of all humanity, of the learned and of the unlearned, in their search for God Who alone gives meaning to life. She symbolizes, too, mankind's refusal to shut their eyes and to look no farther than their nose. The theme song of humanity's quest for meaning and purpose amidst the confusions of our day is sounded in the black girl's memorable cry, so simple and yet so pregnant with the cry of humanity in every age: "I desire knowledge of God more than happiness or hope. God is my knowledge and my hope."

God—The Meaning of the Universe

What do we mean by God? God is not a mere dream, not an hypothesis, nor the projection of our hopes and aspirations upon the frail canvas of illusion. He is the meaning of the universe and the hope of humanity. He gives a cosmic value to the ideals of truth, justice and righteousness, which point like slanting arrows of light to the Source from which they emanate. To know God, said Dante, is to learn how to make our lives eternal.

Long before Dante, St. John proclaimed the important truth almost lost in the contemporary fog: "this is eternal life: That they may know Thee, the only true God, and Jesus Christ Whom Thou hast sent."² Back before the dawn of the Christian era cried the prophet, Hosea: "Thou shalt know that I am the Lord."³ Like a cloud by day and a pillar of fire by night runs this mighty truth through the pages of the Old and of the New Testament.

It is our birthright, our priceless heritage. If the birthright be sold for a mess of pottage, and the heritage be lost in the confusion of our day, there is no power on earth that can rescue

¹ P. 14.

² John xvii. 3.

³ Hosea ii. 20.

man from his Babylonian captivity or relieve the nostalgia and loneliness of his exile.

God is the Supreme Ruler of the universe. He is the omniscient Mind Who thought out the myriad laws of nature and the omnipotent Power Who flung the uncounted planets, stars and galaxies out into the vastness of immeasurable space. He is the Architect not only of the stupendous universe but also of the heart and mind and soul of man. In Him, as St. Paul says, "we live and move and have our being."⁴ He created the universe, and He sustains it by His infinite power. He created man in His image and likeness, and endowed him with understanding and free-will. God is infinitely powerful and infinitely wise. There is not a sparrow which falls to the ground that escapes His all encompassing vision. He is a Being Whose center is everywhere and Whose circumference is nowhere. "The measure of Him," Sophar reminds Job, "is longer than the earth, and broader than the sea."⁵ "God's body," said Plato, "is truth, and light, His shadow." He is the Alpha and the Omega, the beginning and the end of all things. He is our heavenly Father, in Whom truth, justice, mercy, and love abound in their fullness.

An Appeal to Reason

What is the evidence of the existence of such a Supreme Being? In presenting this manifold evidence, we shall appeal not to the authority of the Bible or of the Church but to the court of human reason. If occasionally we shall quote a writer of the Scriptures or a prelate of the Church, we shall do so not as an inspired or infallible spokesman, but as a witness whose testimony we lay before the bar of human reason.

In our presentation we shall assume agreement upon the validity of but two primary principles, the ability of the human mind to know; and the law or principle of causality. These need not, and in fact cannot, be demonstrated because they are self-evident and shine by their own light.

Thus Kant's investigation of the trustworthiness of the human mind to know, as undertaken in his *Critique of Pure Reason*, was foredoomed to failure, regardless of the conclusion he would reach. If he arrived at the negative conclusion, as he did, that conclusion was of no consequence because the instrument by which he reached that conclusion was human reason itself. If he arrived at an affirmative answer, that too would

⁴ Acts, xvii. 28.

⁵ Job xi. 9.

have been meaningless, because the instrument used in reaching such a conclusion would be reason, which was ostensibly the object of investigation. This would be to assume the validity of reason and would constitute therefore a begging of the question. The simple fact is that we must start with the validity of these two primary principles, which underlie all philosophic and scientific investigation. To deny them is to close the door to all discussion and to plunge into the hopeless sea of universal skepticism.

We shall not ask the reader if he is Protestant, Jew, Catholic, or non-believer. We ask only that he examine the evidence with an open mind and that he observe the laws of logical reasoning. In this way he will allow the evidence to write the verdict on his own mind and heart. From this spirit of open-mindedness and good will, wherein the inquirer seeks honestly and earnestly to see the evidence and to feel the weight of its uncushioned impact upon his mind, he will derive the largest fruit. We hope, therefore, that our presentation will prove helpful to all earnest seekers for the truth, of whatever religious faith or philosophic creed they may be.

For more than a quarter of a century we have been engaged in the presentation of this subject to the upper class students in Universities, where technical philosophic language is customary. Here we shall endeavor to preserve the vigor of reasoning, but shall dispense with technical terms. Our aim will be to make every fact and every line of reasoning clear to all people of intelligence, whether they have a University background or not.

The evidence of the existence of a Supreme Being comes from many fields, from the world of inorganic matter, from the vegetal and animal worlds, and from the world of human life. While all of it is valid and cogent, experience has shown us that different kinds of evidence make appeals of varying degrees of impressiveness to different individuals. We shall draw the evidence, therefore, from many sources to carry conviction to every reader and to show, furthermore, how the whole field of nature, from a speck of dust and a blade of grass, to the farthest star, echoes the Source from which it comes and bears the unmistakable imprint of the hand of God upon it. As every shell along the seashore, when placed to the ear, gives an echo of the mighty deep from which it came, so every particle of matter in the universe from a grain of sand and an eagle flying high in the skies to the throbbing

heart of man, when hearkened to attentively, gives an echo of that infinite Power from whose creative womb it has come.

Evidence of Design

We shall start with the presentation of the evidence which we have found to make the widest appeal—the evidence of order and law in nature. That is commonly called the proof from design. In philosophy, it is known as the teleological argument, that is, the argument built around the evidence of ends or purposes in the organization of nature and in the operations of its laws.

Thus when Robinson Crusoe perceived a footprint on the island of Juan Fernandez, he rightly concluded that it had been made by a man. The clear imprint of the sole of the foot and the five toes was enough to convince him that it had been made, not by a bird or an elephant, or by the wind and the rain playing with the sand, but only by a man.

If a person walking long a seashore comes suddenly upon a watch, he will conclude that there must be a watchmaker. Why? Because as he looks at the mechanism of the watch, with its springs, its cogwheels, its hour hand and its minute hand, with its crystal and its face, with the movement of the minute hand so co-ordinated that it travels precisely twelve times faster than the hour hand, he knows that this could not have happened by accident or by blind chance. The adaptations of parts and the co-ordinations of movements reflect unmistakably the work of a thinking agent who arranged the whole to achieve a definite, pre-vised end. There is blinding evidence here of plan, purpose, order and design, which leaves him in no uncertainty.

Suppose you were to say to such a person: There is no evidence of a thinking agent behind that bit of mechanism. Those parts are simply an aggregation of bits of metal and glass, and were blown together by the winds of chance. Earth, sea, wind, sun, sky, air and the blind forces of nature explain the making of that watch. Would he not conclude that you were either joking or that you were a lunatic? Would he not say: Surely you cannot expect an intelligent person to believe so wild a fairy tale. Even a child of six would scorn such an explanation as an insult to his intelligence. There is woven into that watch an artistry of power and intelligence which convinces me that nothing on this planet could account for that watch except a human being who has mastered the craft of the watchmaker.

CHAPTER II

A WORLD CLOCK

Let us now glance at the marvelous universe in which our earth is as a tiny speck. The whole is arranged with wonderful order and design. Our earth rotates on its axis once in twenty-four hours, bringing to us night and day. The earth revolves around the sun once in the course of a year, bringing to us with unflinching regularity the four seasons of the year. This planet of ours, with its great cities teeming with millions of inhabitants, with its lofty skyscrapers, with its vast emporiums of trade and commerce, with its mountains, rivers and valleys, is shooting through space at the startling velocity of 68,400 miles per hour. Yet so smoothly does it move, that it disturbs not a babe in its cradle, nor brings a tremor to the wings of the bee nestling on the frail petals of an autumn rose.

This fact was brought home to the writer as he was traveling in an airplane from Rome to Budapest. Here was as fine a passenger plane as the engineering genius of man has been able to build. Sailing through the air at the rate of 150 miles an hour, with music from Vienna echoing softly from its radio, it would seem to represent the ultimate in skillful organization and in design. Yet how slow, clumsy and jolting was it in comparison with the airplane of the earth which sails through space 456 times faster and with such smoothness that its passengers are unaware that it is even moving!

The stars move in their appointed orbits with a regularity and a precision which shames the most accurate chronometer made by human hands. The most accurate watch or clock made by horologists will falter by some seconds each week in the accurate measurement of time, and will have to be corrected by the clock of the stars as caught by the United States Naval Observatory at Annapolis. Here then is order, plan, purpose and design which cries out not less imperiously than the watch found at the seashore for an intelligent and adequate cause.

Inescapable then is the simple conclusion: As the watch implies a watchmaker, so the universe implies a God. As the watch demands adequate cause in the form of an intelligent horologist, so the universe, vastly greater in size, complexity of organization, and adjustment of parts, demands an adequate cause in the form of a Being of vastly greater power and in-

telligence. This is the Being Whom we call by the venerable name of God.

St. Thomas Aquinas gives the classic statement of the argument, which we have just presented and illustrated, in the following words: "We observe that some things which are without understanding, such as natural bodies, operate for an end (as appears from the fact that always or more frequently they operate in the same way to arrive at what is best): whence it is clear that they attain this end not by chance but by intention. Now, these things which do not possess understanding, operate for a purpose only in so far as they are directed by a being endowed with intelligence: just as an arrow is directed by the archer. Therefore, there is an intelligent Being, by Whom all the things of nature are directed to their end. And this Being we call God."¹

"The Fool Hqth Said . . . "

If you wish to get a more vivid picture of the numerous galaxies of stars which dot our skies at night with pin points of light than is likely to be gained from textbooks, visit the Planetarium in Chicago or in New York. There you will see the technical skill of our architects and engineers harnessed to the skill of the astronomers in depicting for us the heavenly bodies which swing with order and precision in their appointed orbits through the immeasurable vastness of stellar space. The lights in the building are extinguished. Then on the ceiling, which is so shaped as to represent the dome of the heavens, thousands of pin points of light appear to show us the number, the place, and the distance of the stars that stud our northern sky. These are only inches or fractions of inches apart, but they represent millions of miles. The lights appear as pin points, but they represent heavenly bodies whose size would dwarf our earth. It is a marvelous work of scientific skill and engineering genius, which provokes the admiration of the stream of visitors.

What would you think of the person who, after viewing this depiction of the wonders of the sky, would say: This Planetarium does not imply any intelligent architect or designer. It is the work of chance. It is a pile of bricks, mortar, cement, steel, electric wires, fuses, wood, paint, thrown together by chance.

Would you not find it difficult to restrain your indignation

¹ *Summa Th. I, q. 2, a. 2.*

at so obvious an expression of utter nonsense? Would you not say: The arrangement of the seats, the fashioning of the ceiling, the contriving of the lights to represent the galaxy of stars in the heavens, are blinding evidence of plan and design of a high order. Only a fool could say that is the work of chance.

If you would be justified in saying that, as you would be indeed, would you not be justified in expressing an even more severe condemnation of the folly of the person who would assert that the vast universe, of which the Planetarium was a fragmentary picture, was itself the result of chance? Would you not feel more clearly than ever the truth of the words of the Psalmist: "The fool hath said in his heart: There is no God."²

The great astronomer, Kirchner, had a friend who experienced doubts about the existence of God. Knowing that a simple illustration would be more effective than a long argument, Kirchner made a globe and placed it in his study. When his friend called to see him, he noticed the new globe, and asked:

"Who made this globe?"

"Why," replied Kirchner, "it made itself."

His friend laughed heartily at the joke. Whereupon, Kirchner said:

"You laugh at that as absurd, and rightly so. But it would be a thousand times easier to believe that this little globe made itself than that the large one on which we live made itself."

Immensity of the Cosmos

A perception of the immensity of the universe, as disclosed by the findings of astronomers in the last few decades, will serve to increase our wonder and deepen our reverence before the infinite might and power of the Supreme Being who hurled the millions of worlds out into the midst of space. It will serve likewise to put richer content into the words *omnipotent* and *omniscient*, which were becoming anaemic in the nineteenth century. It will show that the ancient prophets and psalmists spoke wisely when they spoke of God as all powerful and all wise.

In the past we have been accustomed to think of our solar system as involving great distances and great masses. Thus the sun is 94 million miles from the earth. The planet Jupiter has a diameter of 88,640 miles, and could accommodate within itself 1,400 bodies the size of the earth. But now we learn that Jupiter and even our sun are but specks in comparison

² Psalm xiii. 1.

with other celestial bodies. The nearest star is Proxima Centauri, 25 billion miles away. Indeed, the distances are so great that they cannot well be understood in terms of miles.

Accordingly the astronomers have invented a new measure called a *light year*, to make the distance intelligible. Light travels at the rate of 186,000 miles per second. A light year is the distance traveled by light during that period—6 billion miles. Light from the moon reaches the earth in 1½ minutes and from the sun in 8 minutes. But light from the star, Betelgeux, takes over 100 years to reach the earth. It has a diameter of 273,000,000 miles or three times the distance of the sun from the earth. Betelgeux, however, is small in comparison with some of the giant stars in Nubecula Minor which have diameters of over 1,000,000,000 miles. There are many stars such as the Cepheids which are more than 60,000 times as luminous as our sun.

Moreover, the number of stars and solar systems floating about in the regions of interstellar space seems to be almost unlimited. The millions and billions of stars in the Milky Way are but a tiny fragment of the myriad worlds coursing through space. The most powerful photographic cameras are continually catching glimpses of new galaxies of stars beyond the outermost rim of the previously charted stellar universe. Professor Shapley of the Harvard Observatory has recently reported "island universes" of stars, far outside the main sidereal system. These globular clusters are over a million light years distant. In other words they are so far distant that light traveling at the rate of 186,000 miles per second would take more than a million years to reach our earth.

For all that astronomers have been able to discover, this may be but the nearest fringe, the vestibule of a universe that stretches out with its planets, suns, and stars into immeasurable and boundless space. Indeed, the question of the finitude or infinity of the physical universe vexes the minds of astronomers, and remains with them a moot question.³ Truly does the mind reel and stagger under the weight of such stupendous distances, such unimaginable sizes and such baffling complexity of galaxies of worlds seemingly without number.

Solar System—A Grain of Sand

"Such is the aspect," says Flammarion, "grand, splendid and sublime, of the universe which flies through space before

³ It is not a moot question, however, among metaphysicians, as we shall show later when presenting the argument from metaphysics.

the dazzled and stupefied gaze of the terrestrial astronomer, born today to die tomorrow on a globule lost in the infinite night." "The spirit of man," cries Richter, "acheth with this infinity." Similar was the sentiment expressed by Paschal: "The silence of these infinite spaces frightens me." The status of our earth in the stellar system is then that of a dwarf planet revolving about a dwarf star. It is but as a speck of dust floating in the reaches of illimitable space.

The eminent English astronomer, Sir James H. Jeans, helps us to get some idea of the staggering immensity of the universe and of the tinyness of our earth by the following comparison. "To fix our ideas we may suppose," he says, "although it is little more than a guess, that the most remote objects of all in our universe are at . . . 4,000,000 light years from us. We may now attempt to get these ideas into focus by constructing a model of the complete universe on the scale of a million million miles to the foot. The amount of reduction involved in such a scale is best visualized, perhaps, by thinking in terms of motions rather than of distances. Light, which can circle the earth seven times in a second, would move in our model with a speed rather below that at which a blade of grass grows in the spring.

"On this scale the whole universe will be represented by a sphere of the size of our earth, the star cloud of which our sun is a member will be an island of about the size of Yorkshire, while the big Andromeda nebula will be rather larger than the Isle of Wight, although with very ill-defined boundaries. The whole solar system in this model can be easily covered by a grain of sand, while our earth, now shrunk to less than a ten-millioneth of an inch in diameter, is hardly larger than a single molecule in this grain of sand. Such is the universe which the modern astronomer hands over to the cosmogonist for interpretation."⁴

"The Firmament Declareth . . ."

The findings of modern astro-physicists concerning the immensity and the grandeur of the universe serve therefore to emphasize the truth uttered by the Psalmist centuries before the dawn of the Christian era: "The heavens show forth the glory of God, and the firmament declareth the work of His hands."⁵ So, likewise, the writer of the Book of Wisdom,

⁴ Sir J. H. Jeans. *The New Outlook in Cosmogony*, in Annual Report of Smithsonian Institution, 1926. P. 155 f. ⁵ Psalm xviii. 2.

bidding us to contemplate the universe to see the works of God, declares: "All men are vain in whom there is not the knowledge of God, and who, by these good things that are seen, could not understand Him that is, neither by attending to the works, have acknowledged who was the workman."⁶

This is the truth sounded likewise by St. Paul, when he declared: "For the invisible things of Him from the creation of the world are clearly seen, being understood by the things that are made."⁷ Not less appealing is the utterance of this mighty truth in the memorable words of Job: "Ask now the beasts and they shall teach thee; and the birds of the air, and they shall tell thee. Speak to the earth and it shall answer thee; and the fishes of the sea shall tell. Who is ignorant that the hand of the Lord hath made all these things?"⁸

The mighty truth which these great seers and sages blazoned across the skies of the century finds its echo in the words of the scientist, Sir Isaac Newton, who first formulated the law of motion governing the heavenly bodies: "The origin of the material world must be ascribed to the intelligence and wisdom of a most potent Being, always existing and present everywhere, who controls according to His good pleasure, all parts of the universe much more effectually than our soul controls by its will the movements of the body united to it."⁹ So too writes one of the most eminent of contemporary scientists, Sir James H. Jeans: "We discover that the universe shows evidence of a designing or controlling power that has something in common with our own individual minds— . . . the tendency to think in the way which for want of a better word, we describe as mathematical."¹⁰ Thus does this mathematical astronomer think of God as the Divine Mathematician Whose thoughts are congealed in the series of mathematical and algebraic formulæ found in a grain of sand and in the dust of the stars.

⁶ Wisdom xiii. 1.

⁸ Job. xii. 7-9.

¹⁰ Quoted in *Now I See*, by Arnold Lunn, p. 149.

⁷ Rom. xi. 20.

⁹ Optics. B. III.

CHAPTER III

THE ATOM BEARS WITNESS

*Earth's crammed with heaven,
And every common bush afire with God,
But only he who sees takes off his shoes:
The rest sit 'round it and pluck blackberries.*

Let us come now from a consideration of the universe which staggers us with its immensity to a consideration of the tiny atom. For man may be said to be an isthmus between the world of the infinitely large and the world of the infinitesimally small. Great as are the marvels of the starry heavens, the wonders of the sub-microscopic world are not less remarkable. The amazing genius of Augustine perceived this back in the fifth century when he wrote: "*Deus est maximus in minimis.*"—The power of God shines forth most clearly in the smallest things.—Whole teeming worlds of life are said to lie in the non-filterable viruses—organisms so small that they cannot be seen, photographed or filtered. Yet medical science believes that some of the most important clues to the solving of many problems of life and death are locked up within their invisible dimensions, awaiting instruments that can penetrate their depths.

As I had been privileged to secure an insight into this new world from some of the leaders in subatomic physics in Europe and in America, including the two American Nobel Prize winners in physics, Professors Robert Andrews Millikan and Carl Compton, I thought it would be interesting to get the reactions of laymen and others untutored in this field to their startling discoveries.

"Do you think the particles of that pipe you are smoking are stationary or are in motion?" I asked of a cultured student of English literature, Joseph Whitney, who was seated in my room at Champion Hall, Oxford University.

Joe looked carefully at his meerschaum pipe and after rubbing his finger carefully over the stem and the bowl, said: "I think the particles of the pipe are entirely stationary, but the particles of smoke issuing from it are in motion."

"Well," I replied, "get ready for a shock. The particles composing that pipe are electrons and protons, and the electrons are constantly moving around the protons. That much

I will tell you. But now try to guess how many times per second those electrons are revolving around their protons."

"Perhaps, if they hurry," answered Joe, "they'll get around a dozen times or so."

"Now, Joe," I said, "brace yourself for the shock of your life. Those electrons in your pipe are shooting around their atomic orbits more than a thousand million million times per second."

"I don't believe it," blurted out Joe. "It sounds crazy to me. Sounds like Gertrude Stein talking physics. Or perhaps," he added with a touch of irony, "some of your physicists have been reading James Joyce's *Finnegan's Wake* or Lewis Carroll's *Alice in Wonderland*, and are trying to outdo them."

Well, Joseph Whitney, looking at his meerschaum pipe and feeling it with his finger, and finding it still and motionless may not believe it. And maybe millions of others may not believe it. But physicists ask us to believe it as an established fact of science. Such distinguished scientists as Millikan, Pupin, Eddington, Jeans and Compton tell us that a whole new subatomic world of marvelous mystery has been discovered. The atom has been broken up into proton and electrons. The whole concept of matter has been revolutionized. Instead of matter consisting of hard, inert pellets, as the man in the street still imagines, science has shown these infinitesimal constituents of matter to be in a state of tremendous activity.

The atom is viewed as a small solar system. Around its central nucleus of positive electricity called a proton, the electrons revolve as the planets revolve about the sun. The movements, however, apparently follow no fixed path or orbit. While the atom is so small as to be invisible to the naked eye, science has measured the speed of these electrons and tells us that they move in an orbit of less than one-millionth of an inch in diameter, faster than an airplane or a bullet from a revolver. Thus the average electron revolves around its central nucleus several thousand million million times every second, with a velocity of hundreds of miles a second. This amazing orbital speed which is greater than that of the planets or even of the stars, is achieved in spite of the infinitesimally small chamber in which it is imprisoned—namely less than one-millionth of an inch in diameter.

Man—As Science Sees Him

Indeed the whole conception of matter has been revolutionized by the discoveries of nuclear physics. Instead of a

stone wall, for instance, being a solid mass with no holes or gaps between the particles, it is now declared by physicists to be full of such openings and to bear a closer resemblance to what we might call a wire fence. So all matter, even the hardest metals, is permeated by gaping holes which occupy a vastly greater amount of the space than the particles of matter which are in a constant state of lightning-like velocity.

"How much do you weigh?" I asked Milt Piepul, one of our largest students here at Notre Dame, and a power full-back on the football team.

"Two hundred and twenty pounds," he answered.

"How tall are you?"

"Six feet, two inches."

"Now if you were all put compactly together, so that all the empty spaces in your body and in your head—I mean no disparagement," I added quickly as the students snickered—"were eliminated, how large would you be?"

"I don't believe there are any appreciable empty places in my body," replied Milt, "and I know there are none in my head. But if I were pressed tightly together, perhaps I might be squeezed down to five feet ten inches or so."

"Well, prepare yourself for a shock," I warned. "You would be about the size of a speck of dust, so tiny as to be invisible to the naked eye."

The students roared with laughter at such a seemingly incredible and even ridiculous statement.

Milt's reaction was identical with that of my young friend at Oxford.

"I don't believe it," said Milt. "I'm from Missouri," he added, "and you'll have to show me."

"Don't take my word for it," I said. "But read the statement of one of the most distinguished physicists in England, Arthur S. Eddington, of the University of Cambridge. Read the very first page of his epochal book, *The Nature of the Physical Universe*."

I handed him the open book.

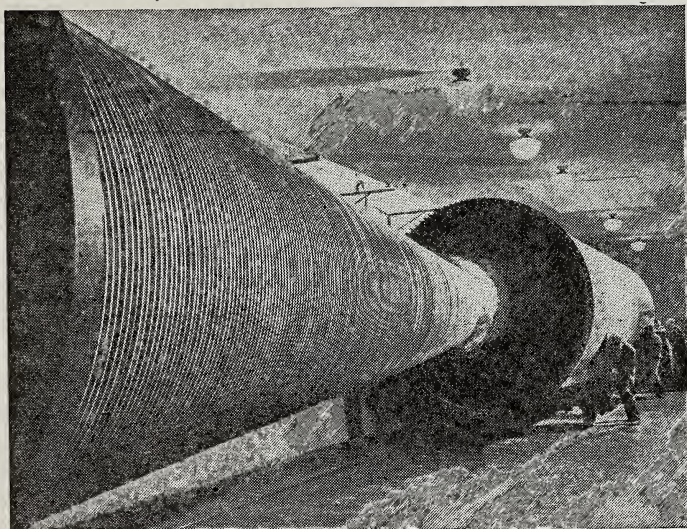
Science Speaks

Milt read:

"When we compare the universe as it is now supposed to be with the universe as we had originally preconceived it, the most arresting change is not the rearrangement of space and time by Einstein but the dissolution of all that we regard as most solid into tiny specks floating in void. That gives an

abrupt jar to those who think that things are more or less what they seem. The revelation by modern physics of the void within the atom is more disturbing than the revelation by astronomy of the immense void of interstellar space. 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.*"

Notre Dame Atom Smasher Seeks New Power for Man



This scientific apparatus, weighing twenty tons and capable of developing eight million volts, is used by physicists at the University of Notre Dame to discover the structure of the atomic nucleus and the source of the tremendous power locked up in it. If this atom smasher could release the energy stored up in matter and harness it to man's use, it would generate more power than Niagara Falls and revolutionize industry, commerce and modern life. It enables one to obtain a glimpse at the marvels and the mysteries which the Author of Nature has imprisoned within a speck of dust and a grain of sand.

Science asks us to believe as literal facts statements which no amount of reasoning could have induced the previous generation to accept. What a world of almost infinite potentialities are locked up in a small particle of matter, awaiting the

skillful hand to release them from their thralldom! Consider the energy stored up in a piece of coal smaller than a pea. Jeans states it as a scientific fact that if all the atomic energy locked up in so tiny a piece of coal could be released, it would be sufficient to take the *Mauretania*, a very large passenger vessel, across the Atlantic and back again! "If the energy in a single pound of coal," he says, "could be completely utilized, it would be sufficient to keep the whole British nation going for a fortnight, domestic fires, factories, trains, power stations, ships and all."¹

In the light of these discoveries of modern physics, a speck of dust and a grain of sand become teeming worlds of marvel and of mystery. In a speck of dust so small as to be beyond our naked vision are more particles than there are inhabitants upon our planet. They are moving in their atomic orbits, so silently as to be inaudible, with a velocity which bewilders our imagination. Science with its huge cyclotron, or atom crusher, is able occasionally to split an atom. Science has not been able as yet, however, to penetrate deep enough into the depths of the atom to ferret out the network of laws which stretch from the heart of an atom to the galaxy of the farthest stars. These laws hold the whole vast universe together and support the stars in their courses, much as milady's clothesline holds securely the whole family washing flapping in the summer breeze.

As far as science has been able to peer into the depth of an atom, it has found an amazing network of law. Indeed, the working out of the molecular arrangement in a grain of sand calls for a knowledge of a higher mathematics which few humans possess. The researches of Jeans into the ultimate constituents of elements lead him to think of a speck of dust as a long series of algebraic symbols. Will any human ever learn enough mathematics to decipher fully the algebraic formulae written on the heart of a speck of dust or on a grain of sand? Only time can tell. But if we do, it is reasonably certain that such discoveries will only open the door to a still vaster world of marvels and of mysteries, as all the scientific discoveries of the past have done.

"Put Off Thy Shoes"

Thus Dr. George L. Clark, Professor of X-ray Chemistry at the University of Illinois and a world authority in that

¹ Jeans. *The Universe Around Us*, p. 181.

field, threw upon the screen an X-ray picture of a particle of soot. I can still remember the expressions of wonderment and awe which came spontaneously from my students as they perceived the beauty and symmetry of the molecular arrangements therein disclosed. Like flakes of snow on a window pane tracing out geometric figures of remarkable symmetry and wonderful diversity, so these figures stood revealed like frozen pieces of glorious architecture. Indeed within a speck of soot which an individual will flip disdainfully from his white kid glove, there is a perfection of symmetry in the arrangement of the molecules and an embodiment of mathematical precision which would make the Taj Mahal of India or St. Peter's Cathedral in Rome seem like child's play in comparison.

That is why the scientist who has peered even a little way into the unfathomed and mysterious depths of a particle of matter, will stand with reverent eyes and uncovered head before a particle of dust or a grain of sand. Like Moses standing before the burning bush, he too hears the voice which says: "Put off thy shoes from thy feet, for the place whereon thou standest is holy ground."² To him there is no common clay. For every particle of matter is aglow with miracle and with mystery, singing a refrain in homage to that infinite Power from Whose creative hands it came.

In the past the appeal has been to the star-studded sky as evidence of a Supreme Being. That appeal grows stronger with each advance of astronomy which deepens our reverence and fills us with awe as we gaze upon the wonders of the firmament. Not less impressive or awe inspiring is the evidence of a Supreme Intelligence in the galaxies, solar systems, and island universes floating about in the mysterious depths of a speck of dust. In the whirling depths of a grain of sand there appear to be more particles than there are comets, planets, and stars in all the heavens. In the algebraic flecked sky of a speck of dust there may be more geometric symbols and mathematical formulae than can ever be written in all our books. Truly, indeed, the world of the infinitesimally small is not less wonderful than the world of the infinitely large. Nor does it speak less cogently nor less eloquently of a Supreme Ruler of the universe. "In all the vast and the minute," as the poet, Cowper, says, "we see the unambiguous footsteps of the God Who gives its luster to the insect's wings and wheels His throne upon the rolling worlds."

² Exodus iii. 5.

CHAPTER IV

THE TESTIMONY OF LIFE

"If I have made a single contribution to biology which I feel confident is permanent, it is the profession that living Nature is purposive."—Henry Fairfield Osborn.

Thus far we have been presenting the evidence of God's existence from the order and design in the world. Our illustrations have been taken thus far solely from the inorganic world. More impressive and wonderful still, however, is the evidence of plan in the world of life. Here we come to a higher category of being, a category where matter exemplifies the reign not only of physical law, but also of biological law. In other words, matter bursts through into a higher realm where it grows not by accretion, but by intussusception, that is, by taking lifeless external matter and changing it into its own living protoplasm. It lifts matter from the lifeless inorganic world into the living organic world. It solves the riddle which from time immemorial has baffled the mind of man. It has found the mysterious bridge which spans the chasm which has forever barred man's own efforts to carry lifeless matter over into the domain of life.

How did matter first find that bridge? How does it continue to find it, when it eludes the high-powered microscopes in the hands of our most penetrating scientists? "What incredible concatenation of circumstances," asks Bruce Bliven, "brought the first cell into being among the atoms of such substances as hydrogen and oxygen?"¹ No wonder it was that the scores of scientists, whom he interviewed, listed it as among the most baffling of all the mysteries of science.

In the plant world the process by which the chlorophyll in a blade of grass utilizes the sunlight to break up the carbon dioxide in the air, retaining the carbon for its own plasm, and giving back the free oxygen to the air is called photosynthesis. After learning the correct label for this process, most students hurry along, we fear, without ever pausing to consider the teleological significance of this action. Yet in that elementary action of all vegetal life, an action we meet at the very threshold of our study of biology, there is a teeming world of miracle and mystery.

¹ *The New Republic*, November 17, 1941, quoted in *The Reader's Digest*, December, 1941.

The term photosynthesis, formed by joining the two Greek words, *photos*, meaning light, and *synthesis*, meaning put together, merely indicates that the sun has had something to do with the putting together process. It throws no single ray of light, however, upon the essential problem: How does the chlorophyll use the sun's rays to perform the complex chemical operation, whereby an inorganic element is transmuted into living matter? What is the technique which the molecules of chlorophyll have worked out—a technique which the greatest scientists in the world are unable to discover or to duplicate? What is the principle which guides the molecules in the subtle technique of bridging the gulf between the world of inanimate matter and the world of life, which has thus far baffled the greatest chemists in the world with all their stores of knowledge accumulated from a thousand laboratories? If the action is merely one of chemical attraction, why does it not take place when light falls on the chlorophyll of a blade of grass torn from its roots?

Let us push this investigation a step further. For implications of profound significance are still to be traced out. I took a blade of grass to a distinguished bio-chemist at a great university, and I said:

"Analyze this for me and tell me all the elements of which this is composed."

He broke it up in his laboratory and after analyzing its contents, he replied:

"Carbon, nitrogen, hydrogen, oxygen, iron, chlorine, phosphorus, sodium, potassium and silicon."

"All right, now," I continued, "put these lifeless inorganic elements back together again in such a way that they will perform the process of photosynthesis, the rudimentary action of all vegetal life."

"Oh, that's impossible. Neither I nor all the chemists in the world, together with all our wonderful laboratory equipment, can do such a thing."

"Why can't you? Aren't you and your colleagues intelligent?"

"Yes. At least we think we are," he added with a smile.

"But aren't the elements, carbon, hydrogen, nitrogen and the other elements which compose a blade of grass unintelligent?"

"Yes."

"Why then can't you, with all your intelligence and with

the accumulated experience of all the chemists who ever lived, do what these unintelligent chemical elements do with despatch, with unflinching regularity, and with unerring accuracy?"

"Oh," he replied, "there's some principle which guides them in the performance of that complicated biochemical action."

"Some principle? What do you mean by that?"

"Oh, some Power, some Intelligence, call the principle what you will."

"The proper name for that Power is, I think, the Author of nature, the Ruler of the universe, the Supreme Intelligence Who has infused into all the particles of matter in the universe, whether they be inorganic or organic, the laws which guide them in their operations from the whirling of electrons and protons in a speck of dust and in a blade of grass to the movements of the stars in the galaxies floating at the rim of the universe.

"One Step Further"

"Professor," I continued, "I would like to push our investigation one step further.

"You admit that there is some principle or power or intelligence which guides the unintelligent elements in a blade of grass in the solving of the mystery of transmuting lifeless matter into living matter. From your study of nature are you led to believe that the principle works arbitrarily, or does it follow the path of a definite law?"

"From the investigations which scientists have conducted in all the fields of nature, we are persuaded that every operation in nature follows definite laws. Nothing happens by accident or by blind chance."

"But do not laws indicate the necessity of a lawmaker? Can you have a law without a legislator? If you stand at a busy intersection and you see cars scurrying rapidly along a highway and all coming to a stop when the traffic light flashes red, and then all starting again when the light flashes green, don't you conclude that there is a law which so ordains them to act?"

"Yes," replied the scientist. "A law implies a lawmaker. But here you are getting outside the field of science into that of the philosopher. A scientist sticks to matter and energy and the laws of their operations."

"True, indeed," I said. "But how many are the scientists who do not observe the limitations which you so correctly in-

dicare, and who rush in to pontificate in the fields of philosophy and theology, for which they are utterly untrained.”

An Inescapable Conclusion

Please note that all the data for our conclusion are drawn from science, namely, that such unintelligent elements as carbon, nitrogen and hydrogen in a blade of grass solve unerringly and with despatch the complicated biochemical operation of changing lifeless, inorganic matter into living protoplasm. This is an operation which transcends the ability of our most brilliant chemists to duplicate. Therefore, we are compelled by the laws of logic to say that there is manifested therein the working of a Power, an Intelligence, a Lawmaker which far transcends the genius of man. Whether we are just ordinary laymen, or scientists, or philosophers we are driven to that inescapable conclusion by the ruthless force of the laws of logic.

For this is simply to say, what every scientist and philosopher and, in fact, every intelligent person admits, that every effect must have an adequate and proportionate cause. Obviously it could not be carbon, nor hydrogen, nor the other chemical elements which are themselves utterly unintelligent. Therefore, the complicated operations they perform in solving a problem which transcends the genius of man to duplicate indicate the existence of an adequate Cause of surpassing Power and of transcending Intelligence—a mighty Lawmaker Who holds the whole vast universe, from a blade of grass to the farthest nebula, subject to the reign of His all-embracing network of law. Such a Supreme Ruler of the universe is essentially what we mean by God.

For the present, let us point out that the existence of a Being of vast power and intelligence is evidenced from the network of laws which control the functioning of the electrons and protons in a speck of dust, as well as from those which guide the particles of matter in a blade of grass in the biochemical operation of photosynthesis. Those who look, therefore, with understanding eyes upon a grain of sand or a blade of grass see mirrored therein flashes of the power and of the wisdom of the Most High. The subtle and mysterious laws which the electrons obey in solving problems which transcend our puny intelligence may be said to be the objectified thought of the Great Naturalist and the algebraic formulae of the Di-

vine Mathematician Whom mankind calls by the venerable name of God. As Wordsworth has well said:

“To me the meanest flower that blows can give
Thoughts that do often lie too deep for tears.”

Joyce Kilmer expresses the conclusion that is forced upon every thoughtful person who peers deeply into the wonders of nature in the memorable lines:

“Poems are made by fools like me,
But only God can make a tree.”

Tennyson likewise perceived that the whole universe rests upon the all-encompassing network of the laws of God. If we could look deeply enough into the mysterious and unfathomed network of law in any single object in all creation, we would see God and understand man, nature, and God. Tennyson gave admirable expression to this mighty truth when, in passing through a woods, he beheld a flower bursting out in the crevice of a wall, which he thus apostrophised:

“Flower in the crannied wall,
I pluck you out of the crannies,
I hold you here, root and all, in my hand,
Little flower—but if I could understand
What you are, root and all, and all in all,
I should know what God and man is.”

Scientist, poet, philosopher and theologian can make those words their own. The great scientist, Robert Andrews Millikan, expressed this same thought when he described his researches into the nature of the cosmic ray high up in the stratosphere of the sky as “the finger printing of God.”²

² *The Literary Digest*, January 24, 1931, p. 27.

CHAPTER V

A BEE TAKES THE WITNESS STAND

*"The pedigree of honey
Does not concern the bee;
A clover, any time, to him
Is aristocracy."*

—Emily Dickinson.

*"For so work the honey-bees,
Creatures that by a rule in nature teach
The act of order to a peopled kingdom.
They have a king and officers of sorts,
Where some, like magistrates, correct at home.
Others, like merchants, venture, trade abroad,
Others like soldiers, armed in their stings,
Make boot upon the summer's velvet buds,
Which pillage they with merry march bring home."*

Henry V, Act 1, Scene 2.

We might rest our case here, confident that the evidence thus far presented points clearly and unmistakably to a Supreme Being, in Whose intelligence and power we can find the only rational explanation for the marvelous order and design evident throughout the universe, from a blade of grass to the uttermost star. We would like, however, to drive this fact of God's existence so deeply into the minds of our readers, that God's presence in the universe will be as palpable as the chairs whereon they sit, and as luminous as the sun in a noon-day sky. Accordingly, we shall present the evidence of design in the field of animal instinct.

Anyone who has watched a bird build its nest, has witnessed an interesting display of plan, purpose and design, which is organized into the instinctive actions of animals. Take a robin which for the first time builds a nest in which to hatch her young. How does she know that a nest is necessary? Where did she learn the art of building one? What a skillful piece of work it is, to build out of such flimsy material as grass and straw a nest which will remain securely in its perch against the storms and winds which will menace it.

What prompts a hen to remain like a prisoner on her eggs for twenty-one days, scarcely leaving them for food or drink? Instinct, we answer glibly. But who fashioned it and twined it into the nervous system of the hen, so that it does the deed as naturally and as spontaneously as it gobbles up a grain of corn from the ground? This is a question seldom, if ever, raised by the scientist. It is inescapable, however, to anyone who seeks to penetrate beyond the method of acting to the principle directing that activity, and to push that inquiry beyond the network of physical causes to the First Cause.

Let us take the case of the bee. Insects which have a highly organized community life, such as bees, wasps, and ants need the most complex machinery of instinct if their polity is to survive. Individual members must render the most diverse types of services, working for the common welfare of the society rather than for the individual's own profit. Scarcely are all the parts of a young bee dried, and its wings in a state to be moved, than it begins the series of acts it will do all the rest of its life. It leaves the hive, goes out in search of flowers, goes through the complicated process of extracting nectar from them, and after traveling many miles finds its way alone back to its hive. Maraldi states that he has seen bees return to the hive, loaded with large balls of wax, the same day they were born. Their instinct told them their first task was to build their cells.

A Problem in Mathematics

Now let us consider the problem which the wax-worker bee must solve if her cell is to give a maximum of strength and capacity with a minimum of material. To calculate this form, mathematicians must propose to themselves the following problem: "To find the construction of a hexagonal prism terminated by a pyramid composed of three equal and similar rhombs, such that the solid may be made of the least quantity of materials." This was the manner in which the French naturalist, Reaumur, presented it to the noted mathematician, König. This problem resolves itself into another, namely, what should be the angles of the rhombs that cut the hexagonal prism, so as to form with it the figure of least possible surface. After prolonged work upon the problem, König calculated the angles at $109^{\circ} 26'$ and $70^{\circ} 34'$. The bees had

reached a different answer and had formed the angles at $109^{\circ} 28'$ and $70^{\circ} 32'$.

Which party was right—the bees or the mathematician? Further calculation showed that the trifling error was on the part of the mathematician, or rather in the table of logarithms which he used. The bees had bested the noted mathematician, solving the problem with perfect precision. The instance is a noted one. It throws into clear relief the immediate spontaneous manner in which instinct solves for them with marvelous precision a problem over which reason often halts and stumbles and fails to solve with accuracy.

The mathematical deftness of the working bee does not end with the solution of this complicated problem. It must penetrate farther. The bee must have the power of striking perfect circles from centers, the distance of which from each other must be accurately adjusted, and the center of the circle drawn on one side of the comb must be equi-distant from the centers of the three adjacent circles on the other side. This is a problem which man, even though equipped with compass and rule, would not find easy. Yet the bee goes to work and solves it with unerring despatch. How does it do it? Through instinct, we answer. We do not solve this problem, however, by covering it with the name, instinct, any more than we solve the problem of determining how a blade of grass converts lifeless inorganic matter into living matter, by covering the mysterious process with the word, photosynthesis. In both cases the labels cover not only the hidden processes but also our ignorance of what really occurs within those processes.

Many stop here and fail to raise the relevant questions: What is instinct? What Power or Intelligence created the instinct and placed it in the nervous system of the bee? Since the bee is not endowed with the faculty of reasoning, it obviously cannot have reasoned out for itself the mathematical and geometric answers to the problems indicated. Therefore, the problems must have been solved by an Intelligence equal to the difficulties involved, and that solution was woven into the nervous system of the bee to guide it in its life activity. Here again we are driven to the conclusion that the marvelous functioning of instinct within the animal kingdom, solving difficult and complex problems with ease and despatch, bespeaks the work of a Supreme Intelligence whose laws are as operative in the world of life as in the realm of inorganic matter.

An Ovum Speaks for the Record

*“O child! O new-born denizen
Of life’s great city! on thy head
The glory of the morn is shed,
Like a celestial benison!
Here at the portal dost thou stand,
And with thy little hand
Thou openest the mysterious gate
Into the future’s undiscovered land.”*

—Longfellow.

Impressive as is the evidence of order, design and law in the realm of inorganic matter, and in the domains of vegetal and of animal life, it is overwhelming in the world of human life. Here the argument from design sounds its most forceful and eloquent note. “The proper study of mankind,” rightly observed Pope, “is man.” For, as the Jungfrau and the Matterhorn tower majestically up above the plains and the lowly foothills, so the body and the mind of man tower up above all the other objects in the universe.

We shall consider two phases of man—his beginning as a single fecundated ovum, scarcely visible to the naked eye, and his maturity, as a full-orbed human personality. The operation which for many years has seemed to the writer to be the most marvelous and awe-inspiring achievement known to man, aside from the domain of conscious thought, is that by which a single cell builds itself into a full-blossomed human being. In comparison with this, the achievements of our engineers in building Boulder Dam and in erecting the 102-story Empire State Building, the accomplishments of our astro-physicists in peering into the mystery of the atom and in plumbing constellations millions of light years away, and the feats of our chemists in developing synthetic rubber and in forging ladies’ sheer hose from corn stalks, are but as children’s play.

Let us look for a moment at this microscopic speck of protoplasm and see what wonders it performs. A female cell, called an ovum, is secreted and starts down the Fallopian tubes. It is unable to advance a single step in its journey to maturity, however, unless it is united with a male cell, or spermatazoon. Once fecundated, however, it begins its majestic upward march. Here then are two distinct cells, each coming from a different parent. Each has no previous knowledge of the other’s existence. Yet each is unable to do any-

thing until one is merged with the other. Locked up within the chromosomes of each cell are the physical and psychological characteristics of the parent from which it comes, and of the forebears of that parent as well.

When these two cells unite to make one, you have a blending of these two cargoes of physical and psychical qualities. Buried deep down in the mysterious depth of the chromosomes are such psychical attributes as those which constitute the aptitude of a musician, an artist, a poet, a scientist. How are such psychological traits carried in suitcases of threads of chromatin, we ask in wonderment. But let us pass on to its achievements. That single fecundated cell then proceeds to play the roles of physicist, chemist, sculptor and architect—and to play them like an actor who has long rehearsed his lines. Out of the blood in the mother's womb it proceeds to fashion such divergent structures, of different physical and chemical elements, as bones, muscle, sinews, nerves, cartilage, skin, blood, hairs, and teeth. This truly is a bewildering performance—one which makes the achievement of the alchemist of old in changing the baser metals into the more precious ones appear simple in comparison.

Different Antennae—Why?

Let us concentrate, however, on one of its achievements—that of building nerve cells.

There in the darkness of the mother's womb, whither neither light nor color has ever penetrated, the fecundated ovum, developing into the embryo, takes the common material and transforms it into nerve cells which will respond later on only to light and color. How does it do this? How does it know that there exists light and color? It has had no experience of either. Then out of that same material it fabricates there in the silence of the womb other nerve cells which will respond later on only to stimuli of sound. Others it builds into nerve cells which are adapted only to stimuli of temperature. These respective types of nerve cells it places in their appropriate places in the developing embryo—in the end organs with corresponding centers in the brain. How does that fecundated ovum, without hands or tools of any kind, build finely spun nerve cells with different kinds of antennae, the details of whose architecture even the trained eye of the neurologist armed with a high-powered microscope is unable to trace? How does that speck of protoplasm build a heart and

gear it into an elaborate musculature that will keep it pumping blood through the body all the days of a life stretching perhaps close onto a century? How does it fabricate eyes, which make the finest camera seem rudimentary and awkward in comparison? How does it fashion ears which make our dictaphones seem like crude and unwieldy contraptions? How does it achieve that miracle of miracles, that mystery of mysteries, the crowning achievement in the biological world—the brain of man?

These are questions which have never been answered. In all probability they will never be answered this side of eternity. They are questions, however, which should be raised to indicate the breath-taking and awe-inspiring achievements of a speck of protoplasm. If all the chemists, physicists, physicians, sculptors and scientists in the world could do any one of the numerous feats which that unicellular organism performs, we would herald the dawn of a new day in science. The fact is that science's coarse thumb and finger cannot plumb the depths of the functioning of a single living cell, much less duplicate its miracles. Since that speck of protoplasm, a fertilized ovum, has neither hands, feet or tools to use, nor brain to guide it in its complex and mysterious operations, we are compelled to say that its actions bespeak the work of a Supreme Intelligence Whose network of laws guide the movements of its molecules from a tiny cell to the journey's end—a full-blossomed human being.

CHAPTER VI

THE HUMAN BODY AFFIRMS

*“What a piece of work is man! How noble in reason!
how infinite in faculty! in form and moving how express and
admirable! in action how like an angel! in apprehension how
like a god! the beauty of the world! the paragon of animals!”*

—Hamlet, Act II, Scene 2.

No treatment of the problem of purpose in nature would be at all complete, if it did not at least refer to that marvel of intricate organization, the human body, reaching its climactic expression in the cerebral cortex. If the structure and functioning of a unicellular organism, such as an amoeba, manifest a complexity that baffles the ingenuity of scientists to unravel, how much more bewildering is the complexity of the human organism with its billions of parts functioning as a unified whole? The most delicate and complex machine ever devised by human hands appears as a child's toy in comparison with the human body, self-repairing and self-reproducing.

It is refreshing to see so eminent a scientist as Professor Thompson state in so straightforward a manner the conclusion that would seem to flow implicitly from the marvelous design exemplified in the structure of the human organism. “Man,” he says, “is fearfully and wonderfully made. We never fail to be impressed with an intricate mechanical device, such as a linotype printing machine, a loom, a calculating machine; and we praise the maker. Why are we not more generous in our admiration of a living creature, which is more than any machine? Why are we not more inclined to do homage to the Prime Mover, Who made things make themselves?”

“We are confronted, then, with the intricacy of life. We have twenty-five trillions of red blood corpuscles and four billions of white blood corpuscles, and each is a living unit of great complexity. The microscopic capillaries, which Harvey inferred and Malpighi demonstrated, connecting the end of the arteries with the beginnings of the veins, are so numerous that if those of our body were placed end to end they would stretch across the Atlantic; and a drop of blood, if we could suppose it to retain its individuality, has a journey of about a mile a day. The nerve cells of our cerebral cortex, the seat of the higher intellectual processes, weigh no more than half

an ounce, yet there are nine thousand, two hundred millions of them, between five and six times the number of people living on the earth. And each cell is a complex intricate living unit often like a busy telephonic exchange, receiving calls and bringing one part of the body into communication with another.

"How glibly we say 'a single cell'; but a cell is a little world in itself. The living matter is in a colloidal state; that is to say, it shows a motley multitude of jostling particles and immiscible droplets suspended in a fluid, and divided somehow into eddies so that diverse chemical processes can go on at the same time side by side. In the cell-substance there are, in many cases, strands and rods and other definitely formed bodies, which are of at least three different kinds and bear many different names—as long as the things themselves are minute—such as mitochondria, chromidia, and Golgi's apparatus. In many animal cells there are two minute central corpuscles, or centrosomes, which play an important part as weavers at the loom when the cell is going to divide into two. In the center of the cell-substance, or cytoplasm—a whirlpool of eddies, with its diverse flotsam—there floats the nucleus, a little world in itself. Inside its membrane, through which materials are ever permeating out and in, there are the readily stainable chromosomes, usually definite in number for each species. Thus the number for man is probably forty-eight. But each of these rodlets, or chromosomes, is built up of microsomes, like beads on a string. Our heads begin to reel—body, organs, tissues, cells, nucleus, chromosomes, microsomes, and beyond that, though we cannot see, there are smaller units still."¹

Is there any possible escape from the conclusion that the amazing complexity of the human body with its 9,200,000,000 nerve cells delicately intertwined in the cerebral cortex weighing only half an ounce, manifests plan and purpose in its arrangement and demands, therefore, the attribute of intelligence in its Cause? Such is the conclusion that is dictated not only by the common sense of the generality of mankind, but also by the disciplined reasoning powers of a high order of intellect. Any effort to escape from such a conclusion would lead to the negation of the most basic laws of human reasoning and to a chaos in the universe that would be deep and hopeless.

An insight into the marvelous organization of the universe

¹ J. A. Thompson, *op. cit.*, pp. 120-122.

and the operation of its laws, such as we have sought to afford in the instances cited, reveals nature as a vast mirror, reflecting the power and intelligence of a Supreme Mind. Glimpses of the workings of that Mind, and of the divine plan may be had by the person who painstakingly endeavors to decipher the story written in mysterious hieroglyphics across the face of nature. If the story be read aright, nature herself supplies the answer to some of the deepest questionings of the human mind.

It was this truth which Carlyle perceived when he said: "We speak of the volume of Nature and truly a volume it is—whose author and writer is God. To read it—dost thou—does man so much as know the alphabet thereof? With its words, sentences and grand descriptive pages, poetical and philosophical, spread out through our solar systems, it is a volume written in celestial hieroglyphs, in the true sacred writing of which even the prophets are happy when they can read a line here or a line there." The lines which we have been able to decipher, however, tell a uniform story of plan, order, and design. Purposiveness written into the mosaic of nature is the universal Esperanto by which mind discerns the work of mind and loses the sense of its cosmic loneliness in the realization of the abiding omnipresence of Intelligence throughout the universe.

Mirrors Divine Lawmaker

The ceaseless research conducted by medical science into the structure and functioning of the human body, resulting in continued new discoveries of secrets previously hidden from our eyes, far from lessening the admiration of scientists, increases it with every new discovery. It is only when the work is that of a magician, that our admiration is dissipated on learning of the deception, tricks, and legerdemain by which the end was achieved. But no student familiar with the profoundly realistic methods of nature has ever accused her of being a charlatan.

It is to be acknowledged, however, that the fact that the technique employed by living matter to bridge the gulf separating it from inanimate matter has thus far surpassed the capacity of the human mind to discover or comprehend, tends to enlighten the impression of awe we experience for the power and intelligence which first tied these forces of nature together in so remarkable a union, and then endowed them

with such fecundity of offspring as disclosed in the hieroglyphics of the evolutionary story. Yet if the human mind should ultimately succeed in fathoming the depths of the present mystery of life, may it not truthfully be said that while perhaps some of the feeling of awe would disappear with the discovery, the intellectual admiration would only be deepened by the revelation of new marvels of delicate co-ordination of forces and synchronization of movements on the part of billions of infinitesimally small protons and electrons which course about in a cell of protoplasm as stars traverse the regions of almost infinite space? Then, too, this additional achievement of the human mind would mirror forth more strikingly than ever the intelligence of that ultimate cause which fashioned the nature of its complex organization and formed the laws for the processes of thought.

After having premised these interpretations of the implications of such a discovery, the writer hastens to agree with all careful students of the subject that life today remains as baffling a mystery as it ever was. All efforts to explain it in terms of mechanisms and physico-chemical forces fail abysmally to account for the principle directing its activities. Mechanisms and physico-chemical forces there doubtless are. But that "something else," that entelechy which eludes the scales, escapes from the test tube, and hides from the microscope remains about as mysterious as in the days when Aristotle, the ancient Stagirite, sought for it in vain amid the plants and flowers on the Grecian hillsides.

This, however, we can say with certainty that the mysterious process of life reflects the work of a Supreme Mind, a Divine Lawmaker, whose thought is mirrored in the laws which guide the movements of every proton and electron in every particle of matter, living or non-living, in the universe.

CHAPTER VII

THE MIND TESTIFIES

"The proper study of mankind is man."—Pope.

In our last illustration we considered man, first in his beginning as a unicellular organism and then as a fully developed organism. We saw how plan is written in every lineament of its structure, and purpose in every movement of the organism and of all its parts. Our attention has been riveted, however, upon merely the physical aspects. The intellectual is far more wonderful. When we reach the mind of man, we reach the pinnacle of all creation. It is the apex in the pyramid of values to be found in the universe. It is this which constitutes the dignity of man as a moral personality, and makes him a being of surpassing worth.

It is in the processes of thinking, especially in abstract thinking, wherein the mind reaches the concept of what Plato calls "universals," such as truth, justice, right, stripped of all material notes or attributes, that we find the supreme evidence of plan, purpose and design. While the material universe, as disclosed to us by modern astronomy, is indeed marvelous in its order and staggering in its immensity, still more marvelous is the mind of man which no scale can measure, because it transcends the properties of matter and reaches into the world of spirit. How wonderful, indeed, is the mind of man which measures the girth of Betelgeux and weighs stars a million light years from our planet! There is the supreme evidence of design, and the crowning argument of God's existence.

Man is a microcosm, a small universe, in which are found the properties of the material world, of the vegetal and of the animal kingdoms, and of the spiritual world. He is a walking argument of God's existence, a moving advertisement of God's power, an articulate herald of God's intelligence. As man is the crowning work of God, so we affirm man is the supreme argument and the blinding evidence of God's existence. Well might we alter the famous syllogism of Descartes, "I think. Therefore, I am," to read: "I think. Therefore, God exists." For only in God do we find a suitable Cause for the mysterious power of human reason. Among all the objects in the visible universe, the mind of man sounds the loudest and the most eloquent note, proclaiming the existence of a Supreme Being, an Omniscient Mind, and an Infinite God, Who is, in

the words of St. Paul, "the Alpha and the Omega, the beginning and the end of all things."

With this, we conclude our presentation of evidence of plan, order, and design in the universe, demonstrating the existence of a Supreme Designer and an Infinite Lawmaker. In concluding, we thus summarize the line of reasoning running all through this discussion: The universe as a whole and all its parts are arranged with marvelous order and design. Now this order must be effected either by matter itself or by a cause outside of matter. Order, however, is the suitable arrangement of parts into a harmonious whole and requires intelligence. But matter itself is unintelligent. Therefore, the existence of order and design in the world demands the existence of an Intelligent Cause to produce it. But such an Intelligent Cause, external to the universe, and yet directing by His power and His all-encompassing laws the movement of every particle of matter in the universe, is what we mean by God. Therefore, God exists.

The Origin of Life

*"Life, like a dome of many-colored glass,
Stains the white radiance of Eternity."*

—Shelley.

A proof of God's existence may be drawn from the universally accepted findings of two different sciences. First, the science of biology affirms, as one of its most basic generalizations, that life comes only from pre-existing life. Since the historic experiments of Pasteur, the old theory of spontaneous generation has been universally discredited. "Under no circumstances whatever," declares the eminent botanist, Reinke, "can chemical and mechanical forces produce a living being."¹ J. W. N. Sullivan, recognized by scientists as a competent reporter of their work, states: "So far as science has gone at present, a mechanical explanation of life has not been even approached."² Not less forceful are the words of Tyndall: "I affirm that no shred of trustworthy experimental testimony exists to prove that life in our day has ever appeared independently of antecedent life."³

Now the science of geology assures us that there was a time when the earth was a molten mass, so exceedingly hot,

¹ *Die Welt als Tat*, p. 315.

² *Science: A New Outline*, p. 196.

³ Quoted by F. J. Koch, *A Manual of Apologetics*, p. 19.

that no form of life could possibly have existed thereon. The fossil remains of life first appear in the strata which were deposited when more temperate conditions prevailed. In the igneous rocks the paleontologist can find no trace of living organisms. Science affirms likewise that life has been found on no other planet in the universe. Therefore life must have been produced or created by a Living Cause, external to this universe. But such a living, supramundane Being is substantially what we mean by God. Therefore, God exists.

Here then is a demonstration which should appeal to all those who want to have their philosophical conclusions based upon the findings of science. This conclusion follows with inescapable necessity from the universally accepted findings of biology and geology. Nor can its validity be impaired by asserting that in previous epochs life sprung spontaneously from inorganic matter. There is not a shred of scientific evidence to support that hypothesis, and it is thoroughly unscientific to forge hypotheses unsupported by a shred of evidence.

The whole tendency of scientific thought is to affirm the constancy, the invariability and the universality of nature's laws. Furthermore, even if we grant the hypothesis that life emerged in past eons from inorganic matter, even though that be unsupported by a shred of evidence, we would still be forced to raise the query: What caused it to emerge from lifeless matter? Since blind chance or fortuity is ruled out by all reputable scientists, we are back again at our previous conclusion that life could have been originally produced only by a Living Cause, which is merely another name for what we mean by God.

CHAPTER VIII

UNIVERSAL BELIEF OF MANKIND

*Father of all! in every age,
In every clime adored,
By saint, by savage, and by sage,
Jehovah, Jove, or Lord.*

—Pope.

Human reason is fundamentally a trustworthy faculty. It is the means by which we discriminate between truth and error. It is the basic tool by which we have ferreted out the laws of nature, discovered her sources of energy, and harnessed them to do our bidding. It is the fundamental means by which we have achieved our mastery of nature and reached our present state of civilization. To impugn the reliability of man's intellect would mean, therefore, the repudiation of the findings of modern science in which we take such glory and such pride. You might as well ask a modern to deny his own existence as to deny either the verified discoveries of modern science or the trustworthiness of the intellect by which those truths were ascertained.

Now it is a fact abundantly established by historians and anthropologists that mankind in all ages, in all countries and in all stages of civilization has believed in the existence of a Supreme Being. No matter whether the race or tribe was civilized or uncivilized, whether it was in communication with other races or whether it was isolated in the darkness of an African jungle, we find the clear and unmistakable evidence of the belief in a Ruler of the universe. True, individuals who doubted or denied the existence of such an Infinite Power can be found here and there. These are the exceptions, however, which prove the rule.

They are, moreover, so infinitesimally small in comparison with the overwhelming majority of mankind that they do not affect the moral unanimity of the judgment of the human race. Mankind in all ages has affirmed with moral unanimity the existence of a Supreme Being. Can such a deep, universal conviction of the race be an illusion? If "fifty thousand Frenchmen can't be wrong," can all the race be wrong? If we have been endowed with reason to ascertain the truth, can the functioning of that reason in all mankind have served but to lead them to a gigantic conspiracy against the truth?

Could it have served but to mislead them in answering the most important question which the human mind is called upon to answer? To answer in the affirmative is to impugn the trustworthiness of the intellect to know the truth. It is to plunge the race into universal skepticism. But the facts discovered in science, the truths of philosophy pounded out on the anvil of free discussion, and the general experience of mankind that our intellect is a light and not a darkness, preclude such a conclusion. Therefore, we are obliged to regard as valid the argument for God's existence that is drawn from the universal consent of mankind.

No Exceptions

Let us look at the scope and sweep of that belief. In the light of the investigations of the past half century into the religious belief of primitive peoples, we can now confidently assert that no race has been found without a belief in a Supreme Being. Travelers have from time to time reported certain tribes to be devoid of such a belief. Closer investigation, however, by experts familiar with their language, and capable of penetrating the veil with which such beliefs are sometimes concealed from strangers, have invariably disclosed belief in a Supreme Power or Deity.

This question, formerly a subject of warm dispute, has now been relegated, as the competent authority, F. B. Jevons, writes, "to the limbo of dead controversies."¹ The findings of research workers approaching the problem from widely different points of view, such as Professor Tylor, Max Müller, Ratzel, de Quatrefages, Tiele, Waitz, Gerland, Peschel, and the greatest of them all, Father Wilhelm Schmidt of Vienna, are in agreement that no race, no matter how primitive, has been found without religious beliefs and practices. While many superstitious elements, such as animism, fetishism, totemism and magic may be found in them, at the core of their religion will be found the belief in a Supreme Ruler of the universe.

As to the manner in which the different branches of the race first acquired the idea of God, we express no opinion. The long period of darkness, which preceded recorded history, and which has been penetrated only by a few pin points of light, suggests to us the wisdom of suspending judgment on the various theories proposed in answer to this question.²

¹ *Introduction to the History of Religion*, p. 7.

² Cf. W. Schmidt, *Origin and Growth of Religion* and G. H. Joyce, S.J., *Principles of Natural Theology*, p. 181.

Idea of God

It is to be noted that an idea of God may exist, and be worthy of that name, even though it be inadequate and faulty. Thus mankind has always believed in the existence of the sun. Yet what strange conceptions of its nature have existed among the peoples of the past? What odd notions about it are to be found today not only among uncivilized tribes but among highly civilized nations as well. Stop any ten people passing you on the street in an American city, and ask them how the sun gives heat and light to a planet 96,000,000 miles away. In all probability not a single one will come within speaking distance of the scientific explanation of the molecular action which enables the sun to send us its beneficent rays. How different is the popular conception from the views held by astrophysicists. How greatly do they differ even among themselves. Yet, would anyone be justified in saying that the peoples of the world do not have in consequence a real idea of the sun? Not at all. A real idea of that luminous body exists in the minds of all people, even though they may not understand everything about its nature and its operations. So it is with their conceptions of God.

It is not necessary that God be conceived of as omnipotent, omniscient or as Creator. It is sufficient that He be regarded as the Supreme Being, to Whom man owes homage and reverence. Much confusion and error may exist in regard to the attributes of the Deity, and in regard to the manner of paying honor and homage, without invalidating a conception as containing a true idea of the existence of a Supreme Being. Plato and Socrates believed in the eternity of matter, and held some erroneous notions about some of the attributes of the Deity. Yet no informed person would deny that they reached an exalted conception of God.

So, likewise, primitive peoples may possess a true idea of the Deity, even though they have no notion of the universality of His providence or of the infinitude of His knowledge and power. Nor is this conclusion in any way impaired by the many superstitions, beliefs, and even revolting practices which may be interwoven into their conception of the Deity and into their crude efforts to acknowledge His sovereign dominion over life and death. There have been, and there still are, certain savage tribes which have been arrested in their development and have been subjected to long periods of degeneration.

It seems inevitable that their religious practices would be

affected and colored by the deforming and degenerating conditions under which they lived—that myth and magic would spread like a fungus over their religious practices. “There are two currents,” observes A. Lang, “the religious and the mythical, flowing together through religion. The former current, religious, even among very low savages, is pure from the magical, ghost-propitiating habit. The latter current, mythological, is full of magic, mummery and scandalous legend. Sometimes the latter stream quite pollutes the former, sometimes they flow side by side, perfectly distinguishable, as in Aztec ethical piety, compared with the bloody Aztec ritualism.”³

The attention of travelers and of anthropologists has at times been so attracted by the gross superstitions and unusual rites which too frequently overlay the religion of primitives, that they have occasionally failed to penetrate to the central core—the belief in a Supreme Being Who was to be revered and propitiated. Closer and more scientific investigation has invariably disclosed such a central belief. The results of recent investigations are aptly summed up in Hasting’s *Encyclopedia of Religion and Ethics* as follows:⁴ “Increasing research into the mental habits of the least advanced races of mankind now living tends to demonstrate that side by side with the most foolish, tedious, and often repulsive myths, there is almost invariably a high if vague conception of a good Being Who is the Maker of all things, the undying Guardian of the moral life of man.”

Testimony of Civilized Races

Coming now to the civilized races of the ancient world, we find the evidence of their belief in a Supreme Being so impressive as to be beyond all dispute. It is woven into their art and civilization and is found inscribed upon their monuments and tombs. Indeed, in visiting the Museum in Cairo, Egypt, wherein were exhibited the numerous objects excavated from the tomb of Tutankhamen, carrying us back to the dawn of civilization along the Nile, the writer was especially impressed with the numerous objects pointing to a belief in a Supreme Being.

Among the Babylonians the supreme deity was Marduk. Among the Romans, Jupiter was supreme; while among the Greeks, Zeus held the highest place. In the early Chinese writings Shang Ti is represented as supreme. In the Iranian

³ *Making of Religion*, 2nd ed., p. 183.

⁴ Article on “Creation.”

religion, Ahuramazda is the name given to the Supreme Being, while in the Vedic religion, the same deity is known as Varuna. In Egypt, the chief deity differed with the district, each locality representing its own god as supreme.

The universality of the belief in a Supreme Being among the ancient civilizations is authentically mirrored in the writings of Herodotus and Plutarch among the historians, of Aristotle, Plato, Cicero and Seneca among the philosophers, and of Homer, Hesiod, Virgil and Ovid among the poets. "If you traverse the earth," observes Plutarch, "you may find cities without walls, or literature, or laws, or fixed habitations, or coin. But a city destitute of temples and gods—a city that employeth not prayers and oracles, that offereth not sacrifice to obtain blessings and avert evil, no one has ever seen, or ever shall see." ⁵

Similar is the testimony of Plato: "The earth, the sun and stars, and the universe itself; and the charming variety of the seasons, demonstrate the existence of a Divinity. Moreover, the barbarous nations unite with the Greeks in proclaiming this truth." Again he asserts: "No man has persisted from youth to old age in the opinion that there are no gods." ⁶

Aristotle, "the master of those who know," sums up the case thus succinctly: "According to the avowal of the whole human race, God is the Cause and Principle of things." ⁷

How weighty was this argument from universal belief to the ancient world is thus stated by Seneca: "We are accustomed to attach great importance to the universal belief of mankind. It is accepted by us as a convincing argument. That there are gods we infer from the sentiment engrafted in the human mind; nor has any nation ever been found, so far beyond the pale of law and civilization as to deny their existence." ⁸

The following inscription on one of the most ancient monuments of the Egyptians bears eloquent witness to their belief in God:

"Sovereign of life, health, and strength, Chief of the gods,
We worship Thy Spirit Who alone hast made us;
We whom Thou hast made, thank Thee, that Thou hast given
us birth;
We give to Thee praises for Thy mercy towards us." ⁹

⁵ *Contra Coloten.*, C. XXXI.

⁷ *Metaphysics*, II, 11, 820.

⁹ See Hoare's *Religion of the Ancient Egyptians*.

⁶ *De Legibus*, Lib. XI.

⁸ *Epis.*, CXVII.

Testimony of Moderns

We conclude our list of witnesses with the testimony of one of the foremost scientists of our day, Robert Andrews Millikan. Because of his wide acquaintance with scientists and scholars in many fields, he is in a position to testify concerning contemporary thought on this subject. "I have never known," he declares, "a thinking man who did not believe in God. . . . Everyone who reflects at all believes, in one way or another, in God. . . . To me it is unthinkable that a real atheist should exist at all. . . . It seems to me as obvious as breathing that every man who is sufficiently in his senses to recognize his own inability to comprehend the problem of existence, to understand whence he came and whither he is going, must in the very admission of that ignorance and finiteness recognize the existence of a something, a Power, and Being in Whom and because of Whom he himself 'lives and moves and has his being.' That power, that something, that existence, we call God."¹⁰

To sum up: We have shown that the belief in a Supreme Being has existed among all races and all lands and in all ages and that it exists in the same universal manner among the peoples of the world today. But a belief so universal that it cannot be attributed to one nation or to a set of circumstances must be rooted in the realities of the objective world. Otherwise the faculty of intellect, by which we discern truth from error would be deceiving us and working a gigantic hoax upon all mankind. But such a conclusion would impair the validity of all knowledge and would plunge us into universal skepticism from which there could be no escape. Therefore we are compelled to conclude that the belief of all mankind in a Supreme Being reflects the fundamental validity of the human mind to perceive truth and mirrors authentically the existence and the objective reality of God. Careful study of this line of reasoning will show that it is not a mere superficial attempt to determine truth by counting noses, but is based upon the fundamental validity of the human mind to know, and upon the recorded facts of human history. It is a valid and irrefutable proof of God's existence.

¹⁰ *World's Work*, April, 1926, pp. 665, 666.

CHAPTER IX

THE METAPHYSICAL ARGUMENT

"Let the chain of second causes be ever so long, the first link is always in God's hand."—George Lavington.

We come now to considerations of a metaphysical character which demonstrate the existence of an infinitely perfect Being. While many persons are apt to be somewhat frightened at the prospect of reasoning along metaphysical lines, and to regard themselves as incapable of following the logic of the argument, there can be no gainsaying that the arguments from metaphysics are among the most valid and indestructible of all the proofs of God's existence. They call, however, for rigorous thinking and sustained attention. They are not so popular as the arguments already presented. We would not use the metaphysical argument in discussing the subject with the untutored man in the street.

After much debating with ourselves, we have decided to present one of the metaphysical proofs. We have reached this decision for three reasons. Firstly, there may be some of our readers with philosophical training, to whom this line of reasoning will appeal with a finality and a conclusiveness, more categorical and absolute than in the other lines of evidence. Secondly, we think that the person who carefully follows the line of reasoning, even though he have no technical philosophic training, can appreciate its cogency.

Thirdly, we think that the presentation of the evidence of God's existence would be lacking in that full, rounded balance at which we aim, and would be sadly incomplete, if we did not give our readers at least a glimpse into that serene stratosphere of thought wherein Plato and Aristotle, St. Augustine and St. Thomas Aquinas, and the mightiest intellects of the race perceived the indestructible and inescapable evidence of the Absolute, the Eternal, and the Infinite Being Whom we call God.

There are four historic metaphysical arguments. They are: (1) the cosmological argument—God as the First Cause; (2) the argument from contingency—God as Necessary Being; (3) the argument from motion—God as the Prime Mover; (4) the henological argument—God as the One and the Perfect. When we say they are *metaphysical* proofs, we mean that they flow directly from the primary principles of reason so that it is impossible to reject them without calling into ques-

tion the validity of human reason itself. Moreover, our proof is drawn not from the working of physical law in the universe, nor from the nature of man as a moral agent, but simply from the nature of finite being as such. Any visible object in the universe is a finite being, and is capable of furnishing us with all the data for the reasoning which leads us at last to the one Necessary Being—God.

Argument from Contingency

We will present the argument from contingency. This is closely related to the cosmological argument, which is sometimes called the argument from efficient causation, and may indeed be more accurately described as the same proof viewed under a new aspect. Running through all the metaphysical arguments and through all the other arguments already presented, is the thread of causality. The principle that every effect must have an appropriate cause may be said to constitute the spinal column of all scientific reasoning and of all philosophic thinking as well. It is fundamental in all the lines of our reasoning concerning the existence of God.

Having taught this subject matter to university students for more than a quarter of a century, we are quite familiar with those aspects which present too abstract and lackluster a countenance to the student, and so we shall present illustrations which would not be necessary for professional philosophers. With a view of making the presentation as interesting and as effective as possible we shall throw it into the form of a discussion which we had with a university student of skeptical tendencies.

"Is it true, Herbert, that you have had some doubts about the existence of God?"

"Yes, too true. They have bitten into me, and they are unsettling me about many things. For, if I'm not sure about God, how can I be sure about the meaning of life or the end for which I should be striving?"

"You are quite logical, Herbert. Doubt about God is likely to paralyze your striving for altruism and nobility of life and make you grovelingly egocentric. Why die for an ideal, if there is no Power that sustains and underwrites that ideal, and will ultimately reward your self-sacrifice? Would I surprise you, however, if I were to tell you that everything in the universe proclaims the existence of God—not excepting your very act of doubting Him?"

"Do you mean that you can deduce the existence of God from the fact that I *doubt* His existence?"

"Yes, paradoxical as it may seem, that is precisely what I mean."

"Well, go ahead. But you'll surprise me all the more if you succeed in proving God's existence from such a strange starting point."

"Be Logical"

"All right. All I ask is that you be rigorously logical and that you admit whatever is logically implied in your premises."

"That's fair enough."

"In acknowledging that you doubt, you must admit all that is essential to doubt. By the essence of anything is meant that without which it could not exist. For example, the essence of water is H_2O . Whoever, therefore, admits the existence of water, *ipso facto*, or by that very act, admits the chemical compound, H_2O . To admit water and to deny H_2O is indeed an absurd procedure. Similarly, a circle is a figure in which every point of its circumference is equi-distant from its center. No one can admit the one and deny the other without involving himself in obvious absurdity. One cannot, therefore, admit the existence of anything and deny its essence without manifest contradiction. Is this clear so far, Herbert?"

"Crystal clear so far. Certainly no one could quarrel with anything you have said thus far. Go on."

"Splendid. Let me apply this now. If, as you admit, one cannot admit the existence of anything and deny its essence, then one cannot doubt the existence of God without admitting whatever is essential to this doubt. What then is essential to doubt? We may say at once that intelligence is essential to doubt or denial. One without intelligence can no more doubt or deny than he can believe or affirm. Whoever doubts the existence of God must, therefore, affirm the intelligence without which doubt or denial is impossible. Do you agree?"

"Where Does This Get Us?"

"Perfectly. What you say so far is beyond all question. But where does this get us?"

"I'll show you presently. For the same principle which you acknowledged in regard to doubt applies with equal rigor to intelligence. Having admitted intelligence, one must admit

whatever is essential to intelligence under penalty of denying what has been affirmed. We now ask what is essential to intelligence? The answer is not far to seek. The intelligible is essential to intelligence. By intelligence we understand the power or faculty by which we know. Quite obviously, to know necessarily implies something to be known. If one knows at all, he must know something. He cannot know nothing. Knowledge, therefore, implies two things, the intelligent subject which knows, and the intelligible object which is known. Suppress either of these and you suppress the possibility of knowing. Whoever, therefore, doubts the existence of God, must admit the intelligible. Don't you agree, Herbert?"

"Certainly. But I'm still waiting for you to prove that God really exists."

"One step at a time, Herbert, and we are coming to that by single steps which are so clear that you will never fail to see the why of each step we take. Now the intelligible must be something or being. It cannot be nothing because nothing is unintelligible. Therefore, something or being is affirmed in the very act of doubt. But the something or being thus affirmed must be either contingent or necessary being."

Contingent Being Means What?

"But what do you mean by contingent being?"

"By contingent being, Herbert, is meant that which derives its existence from another. It can neither exist nor be intelligible without that upon which it depends. No matter how far we may be disposed to extend a series of contingent beings, even if, by impossible hypothesis, it were unto infinity, no one of them singly and no series of them can either exist or be intelligible without the being upon which they depend and without which they cannot exist."

An Infinite Series?

"But," interjected Herbert, his face lighting up, as though he saw a way of escape from the iron chain being forged around him, "why can't you account for your series of contingent beings by stretching the series out to infinity?"

"Well, Herbert, that assumption has been made by those who thus sought to escape from the being upon whom the series depends. Now while I do not really believe that the series either is or can be infinite, I am willing, for the sake of

the argument, to grant your assumption. It will not long deflect us from the inevitable conclusion. For the point we are here making is that even though an infinite series of contingent beings were admitted, you have not decreased, but rather increased, the necessity of a being, on which they depend, or the necessary being."

"Would you please illustrate this?"

"Yes, Herbert, gladly. An idiot is not a reasonable being. If you multiplied the number of idiots to a million, or to an infinite series, would they ever suffice to constitute one reasonable being?"

"Of course not."

"Well, it would be as logical to suppose that an infinite series of idiots would constitute a reasonable being, as to suppose that an infinite series of contingent beings would constitute an uncontingent or necessary being."

"Capital. I'm beginning to see. The illustration helps mightily."

"Well, then, Herbert, here's another. Each link in a suspended chain is kept from falling only because it hangs on another. Now, if you stretch the chain to any length whatsoever, will that escape the need of some support to keep it from falling?"

"Obviously not. It would make it fall all the faster unless the support were proportionately strengthened."

Infinite Series—No Escape

"Right you are, Herbert. Yet it would be as logical to assume that by the mere expedient of multiplying the links in a suspended chain you could keep it from falling, as it would be to assume that by multiplying the series of contingent beings you could ever escape the necessity of coming ultimately to the uncontingent being upon whom the whole series, be it infinite or not, depends."

"Who said that reasoning along metaphysical lines was difficult to understand? Those illustrations make it so clear that even a child could understand the point you make."

"Thanks, Herbert. As this point is crucial, I shall clinch it once and for all with still another illustration. For if one clearly perceives that no manner of multiplying the number of contingent beings will ever yield a being of an altogether different nature, an uncontingent being, he will have no difficulty in grasping this entire metaphysical argument demonstrating

clearly and unmistakably the existence of a necessary uncaused Being, which is the metaphysical description of God."

"Well, I'm eager for the third illustration. What is it?"

"Suppose you have a clock with five wheels driven by a spring. It is evident that the movement of the wheels is dependent upon the spring, and is neither possible nor intelligible without that spring. Suppose now that you multiply the wheels by a million, or by any number you please, or raise the number to the n th power, the movement of the wheels would be neither possible nor intelligible unless the strength of the spring were increased correspondingly. If, therefore, it were possible to raise the number of wheels to infinity, it would require an infinite force to set them in motion. Must we not conclude then that an infinite series of contingent or dependent beings, if such were possible, would demand an infinite, necessary being without which they could neither exist nor be intelligible?"

"I don't see how anyone," said Herbert with enthusiasm, "can escape from that conclusion. I see now that the breast-works I threw up in the form of an assumption of an infinite series of contingent beings has completely crumbled under your reasoning, lit up by illustrations which allowed no vestige of obscurity to remain."

Necessary Being

"You'll make me blush, Herbert, if you're not more modest in your praise. I hasten to assure you that the line of reasoning is not original with me, but has been forged out by some of the most profound thinkers of the race.¹ Now, let me continue. From the existence of contingent being, or from any such series of contingent beings, we are compelled, as we have already seen, to demand the existence of a necessary being which is dependent upon no other, which has the reason of its being in itself, whose non-existence is therefore inconceivable, because that would be self-contradictory."

"Here then in brief," resumes Herbert, "are the links in the chain of our reasoning so far: One cannot doubt the existence of God without affirming intelligence. But intelligence necessarily implies the intelligible or being. Now being is either contingent or necessary. Contingent being, however, can neither exist nor be intelligible without necessary being. Therefore it follows with all the inexorable force of logical

¹ I am indebted to my colleague of former years, Rev. Dr. W. J. Bergin, C.S.V., for his scholarly aid in the formulation of this argument.

necessity that whoever doubts the existence of God must implicitly affirm necessary being. But tell me now just how you get from necessary being to God. I'm anxious to see how you will get to God."

"That's the next step. We get to God by tracing out the inescapable, logical implications of necessary being. I call them inescapable because no man can escape what is logically contained in his affirmations and negations without abdicating his reason. The first conclusion which forces itself upon us is that necessary being is eternal. What is not eternal had a beginning. What had a beginning must have had some cause which brought it into existence. It cannot be the cause of its own existence. What does not exist cannot be a cause. Therefore a being which is not eternal must owe its existence to some other being which is prior to it. But it is a simple contradiction in terms to say that a necessary being owes its existence to another being, for that would make it contingent, not necessary. Since, therefore, every being which is not eternal is contingent, we are compelled to conclude that the necessary being is eternal."

How Establish Infinite?

"Yes," said Herbert, "that conclusion follows logically enough. But isn't God also infinite? How do you establish that?"

"By a similar process of reasoning we are forced to conclude that the necessary being is infinite. It cannot be finite or limited. Whatever is limited must be limited either by itself or by another. But the necessary being can be limited in neither way. Therefore, it cannot be limited at all. It cannot be limited by itself. For to limit is to act. But action necessarily presupposes existence. What does not exist cannot act. Therefore, the existence of the necessary being is presupposed before any self-limiting action is possible or conceivable.

"Neither can the necessary being be limited by another. If, by impossible hypothesis, the necessary being should be limited by another, then unmistakably it would depend upon that other to make it what it is—a finite being. But a being which depends upon another is a contingent being, not a necessary being. Therefore, the necessary being cannot be limited by another. But beyond all shadow of doubt, a being which is limited neither by itself nor by another is not limited at

all, and is infinite. Therefore, the necessary being is infinite. The same conclusion may be reached by other equally valid lines of reasoning, but the argument already advanced is sufficient to establish the point on a thoroughly demonstrative basis."

How Establish Infinitely Perfect?

"Yes, I see," said Herbert. "You have demonstrated that the necessary being, which is the metaphysician's name for God, is eternal and infinite. But isn't God all perfect? How do you establish that?"

"If the necessary being is infinite, then it must be perfect. It cannot be imperfect, because imperfection necessarily implies limitation of being. But limitation is so incompatible with the idea of the infinite that they are mutually contradictory and exclusive. Consequently by its very nature the infinite is and must be perfect. Since, as we have already shown, the necessary being is infinite, it follows at once that the necessary being is perfect."

"The links in your chain of reasoning are closing in around me. You have established the existence of a Being, necessary, eternal, infinite and perfect. But one more link remains to be forged. How can you prove that there can be only one such infinitely perfect Being, or only one God?"

"If the necessary being is infinitely perfect, then it must follow that it is one. For only one being is or can be infinitely perfect. If it be supposed that two infinitely perfect beings exist, then there must be something by which they are distinguished one from the other. Otherwise, they would be identical and therefore one, not two. Now that by which they are distinguished must either be a perfection or an imperfection. It cannot be an imperfection because that would contradict that which is supposed—an infinitely perfect being.

"For the same reason the characteristic which distinguishes the one from the other cannot be a perfection. If one is distinguished from another by a perfection, then one must have a perfection which the other has not. It is manifestly impossible to suppose that the infinitely perfect is wanting in any perfection. Therefore, two infinitely perfect beings are impossible because such a concept is self-contradictory. The infinitely perfect being consequently can only be one. We arrive then, at last, at the existence of one necessary, eternal, infinite, perfect Being, which is what the metaphysician means by God."

"Well, for the life of me," said Herbert, "I do not see a

single step you have taken in all this logical Odyssey which did not follow from the premises. It gives me a new and deeper respect for the marvelous faculty of reason which is able to trace a path from the analysis of any finite or contingent object in the world, such as a man, a rose, or a grain of sand, to the infinite Being from Whose creative power the whole universe has come. It shows me that the marvels which scientists have achieved in the domain of matter have their counterpart in the wonderful structures of logical reasoning which philosophers have established in the realm of thought. They are not less worthy of our homage and respect."

Inexhaustible Being of God

"Thanks, Herbert. It has been a real pleasure. You deserve more credit for whatever has been achieved than you imagine. For an open mind and a willingness to recognize a point when one is made are two of the greatest sources of stimulation which can be given to any teacher. Then, too, remember that this great edifice of logical thought, erected over the span of centuries, embodies the cumulative work of a mighty host of the most penetrating thinkers of the race. We acknowledge that the description given by the metaphysician, like that given by the scientist, the mathematician, the naturalist, the poet, is inadequate to mirror in halting, finite words the inexhaustible being of God. The description is accurate, however, as far as it goes.

"Moreover, it gives us a clear and distinct idea of God because it enables us to distinguish God from every other being whatsoever. God, and God alone, can or does possess the attributes which have been enumerated. Furthermore, whatever other perfections can exist or be conceived must be ascribed to God, since He is an infinitely perfect being. Since, therefore, power, wisdom, mercy, justice, goodness, truth and beauty are perfections, they must all be found in God—the one, eternal, infinitely perfect Being in the universe."

CHAPTER X

CHRIST MANIFESTS GOD

"Thou art a true speaker, and teachest the way of God in truth."—*Matthew xxii. 16.*

So much then for the proofs of God's existence fashioned by human reason from the data of science and philosophy. That they are convincing, we think, no one who has followed this discussion with an open mind, can doubt. Throughout the entire discussion we have appealed to no external authority, such as the Bible or the Church, but have directed our appeal exclusively to the tribunal of human reason. We frankly admit, however, that the knowledge of God gained by the unaided intellect is meager and sketchy, and without the richness which is supplied by divine revelation. Where reason ends, revelation begins. It carries the mind to such heights of vision that reason grows dizzy. Consequently, it is the part of wisdom to supplement the knowledge of God with the penetrating insights and the richness of the revelation of God supplied by the Bible.

Indeed, the best picture we can ever acquire of God is that afforded us by the person of Jesus Christ, the untarnished mirror of the Most High. "No one has at any time seen God," declares St. John. "The only-begotten Son, Who is in the bosom of the Father, He has revealed Him."¹ Uniting in Himself the nature of man and the nature of God, Christ gives us a better and a truer picture of God than can be found in the writings of all the philosophers, theologians, prophets and mystics since time began. God stands revealed to us in the character of Him Who cleanses the lepers, heals the sick, restores sight to the blind, forgives the woman taken in adultery, washes the feet of His disciples, and sheds His Blood for the redemption of mankind.

See Him as He walks over the dusty roadsides of Judea and Galilee and says to His disciples: "Learn of Me, for I am meek and humble of heart." It was His ministry of mercy and love that inspired His disciple, St. John, to give the noblest definition of God ever uttered, when he said simply: "God is love." "If any one love Me," said Christ, "he will keep My word, and My Father will love him, and We will come to him and make Our abode with him."

¹ John i. 18.

God then is infinite Beauty, Truth, Goodness, Mercy, Love. It is this vision of God which has inspired the noblest enterprises of Christianity, built hospitals, orphanages, homes for the friendless, and has prompted man to find in the service of the poor and the lowly his title to nobility. When Christians have allowed this vision of a God of love to fade, and to be replaced by a God of vengeance, cruelty and wrath, they have stained the pages of history with some of the worst crimes in its long annals. It was this false picture which prompted John Calvin to burn his theological opponent, Michael Servetus, which caused the fanatics to kindle the fagots under Joan of Arc at Rouen, which stirred the Torquemada to torture the heretics in Spain.

Rufus Jones tells of a little child who was being put to bed by his mother. After she had given him her good-night kiss, she turned out the light and started for the door. Suddenly the little child realized the loneliness and the darkness which he would be enduring alone.

"Am I to be left all alone, and in the dark, too?" he asked anxiously.

"Yes, my dear," replied the mother, "but you know you have God with you all the time."

"Yes, I know God is here," said the child, "but I want some one who has a face."

Such too is the anxious, wistful cry of all humanity. "We know in the abstract," observes Rufus Jones, "that God is Mind and Spirit and that He is near us, but we want to have a more vivid sense of His reality and His presence in our world, and above all, we want to *see* Him and to discover Him as a real Person with an actual Life and Character. It is *that* that Christ does for us. It is in Him that the Face is seen and the personal character is revealed."²

A Pure Heart

To know God, mere intellectual groping is not enough. More helpful in seeing God than intellectual subtlety is a pure heart and a clean conscience. When Ignatius, Bishop of Antioch, was being led to martyrdom, a Roman soldier asked him leeringly: "Who is this Christian God of yours?" Gazing into his sensual, brutal face, Ignatius replied: "You shall know Him when you are worthy of Him."

The person who suffers persecution for justice' sake, who

² *Pathways to the Reality of God*, p. 125.

sacrifices for truth, who hungers for righteousness, who lives a godly life, penetrates to the deepest understanding of God. Virtue is more important than knowledge in enriching one's vision of God. Live a holy life and God will dwell in you and make Himself known to you. "God's thoughts," observes George Macdonald, "His will, His love, His judgments are all man's home. To think His thoughts, to choose His will, to love His loves, to judge His judgments, and thus to know that He is in us, is to be at home."

When God dwells in the soul of a person, a radiance shines in his face, a spiritual resonance in his voice, and peace fills his heart. Nothing in the universe can supply the radiance lost when God is banished from a human life. The experience of humanity the world over verifies the finding of St. Theresa: "Where God is, there is Heaven. Where God is not, there is Hell." Plato too caught a glimmering of this mighty truth when he declared: "To escape from evil we must be made, as far as possible, like God; and this resemblance consists in becoming just, holy, and wise."

God then is the answer to the cry of the human soul for happiness. In the partial possession of God in this life, we catch glimmerings of that supreme ecstasy which the soul will experience when it will be in intimate union with infinite Beauty, Truth, and Love, when the unveiled majesty of the eternal King will ravish the soul with beauty and still its restless yearning with a love that knows no ending. "Eye hath not seen," says the great Apostle of the Gentiles, "nor hath ear heard, nor hath it entered into the heart of man the joy that is prepared for those who love and serve Him." A foretaste of that ineffable bliss is experienced by all who walk in the paths of peace and righteousness, who keep always the joy of a good conscience, and who feel the immanence of God in their hearts by the radiance of a love that embraces all mankind.

Such a one can make his own the words which Henry VI addressed to Humphrey, Duke of Gloucester, after relieving him of his office of protector to the king, that he might find in God his sure defense:

*"God shall be my hope,
My stay, my guide, and lantern to my feet."*³

³ Shakespeare: *Henry VI*, Second Part, Act 2, Scene 3.

"Nothing Ever Happens"

While we have studied with some care a few objects to decipher thereon the handwriting of the Most High, the fact is that every object in the universe, from a speck of dust, a dandelion, a crawling ant, to the nebula so distant that it floats in the uncharted regions of cosmic space, proclaims the existence of a Supreme Being. Blades of grass are the handwriting of God and flowers are His capital letters. What would you think of the traveler who, standing on Inspiration Point above the Canyon of the Colorado River, gazes at all the beauties of nature spread out in profusion before him, yet sees no beauty. The gorgeous coloring of the mountain rock reflecting the sunsets of a thousand centuries, the vast expanse of grass and wild flowers that stretches like a verdant carpet through the valleys, the mighty ocean of pine and spruce tumbling over the mountain sides, the thousands of vari-colored birds making a symphony of music in the branches, the snow-covered peaks reaching up to kiss the virgin cheeks of the skies, produce no stirring of his imagination, no tug at his sense of awe, reverence and mystery.

Such a person cannot say with Browning: "A spark disturbs my clod." He should, however, utter the prayer of Stevenson: "Stab my spirit wide awake." For all the arguments of philosophers and theologians, written in all the volumes since printing began, seem wraithlike and anaemic in comparison with the blinding evidence which nature pours in upon the eye that is wide awake. Would you not say that such a man, though capable of physical vision, was mentally blind and spiritually dead?

Persons such as he, who look but do not see, are well depicted in the character of Otternschlag in Vicki Baum's *Grand Hotel*. Comedy, romance, tragedy are crammed into the scenes being enacted in the different rooms of that hotel. Just the night before, Kringelein living on borrowed time and out for a last fling, commits suicide. Baron von Gaigern, caught pilfering in the room of the magnate, Preysing, is murdered. In the midst of all the alarms vexing the brow of the hotel manager, Senf, he learns that his wife is having a baby.

As the casket containing the body of the murdered Baron is being carried out the door, a wedding party with their peals of gleeful laughter drive up to the entrance. Lewis Stone, playing the role of Otternschlag, blasé, tired of life, and blind to all the colorful and moving drama being enacted before his

very eyes, gazes upon the departing hearse and the disembarking bridal party with unseeing eyes, and flicking the ashes from his cigarette, remarks in a bored manner: "People come; people go. Nothing ever happens."

Such is he who gazes at all the marvelous beauties of nature, at all the blinding evidence of plan, order and design written in the handwriting of the Most High upon every particle of dust, upon every leaf of the tree, upon every flower and upon every star, and yet says: "I see no fingerprint of God, no evidence of a Supreme Designer." It was of a person of this blind and stupid type, of whom the Psalmist spoke: "The fool hath said in his heart: There is no God." The thousands of intervening years have produced, we think, no better characterization. For every one who has eyes to see can say with the Psalmist: "The heavens show forth the glory of God, and the firmament declareth the work of His hands."

QUESTIONS

Chapter I

1. Why is the question of God's existence of supreme importance?
2. What does Professor Whitehead say about it?
3. What did Immanuel Kant say are the three great problems in philosophy?
4. Describe the adventures of the Black Girl.
5. What do we mean by God?
6. Why was Kant's investigation of the trustworthiness of the human mind foredoomed to failure?
7. With what two primary principles do we begin our investigation?
8. Why is it well to begin our investigation in a spirit of open-mindedness and good will?
9. What is meant by the proof from design?
10. What conclusion are you obliged to draw from the existence of a watch? Why?

Chapter II

1. Describe the order existing in the solar system and on our earth.
2. How does our earth compare with an airplane in the smoothness of its flight through space?
3. How does the best clock made by human hands compare with the clock of the stars?
4. How does St. Thomas state the argument from order and design?
5. Compare our universe with a Planetarium, and state the conclusion that follows from such a comparison.
6. Narrate the incident about Kirchner and his friend.

7. Describe the immensity of the cosmos.
8. Why may our solar system be described as a grain of sand?
9. What truth do the findings of modern astronomers serve to emphasize?
10. State the conclusions of Sir Isaac Newton and of Sir James H. Jeans.

Chapter III

1. Where did St. Augustine perceive the greatest expression of the power of God? Why?
2. Narrate the conversation with Joseph Whitney.
3. Tell what you can about the atom, and state why it may be viewed as a small solar system.
4. Narrate the conversation with Milt Piepul.
5. What is the scientific conception of matter, including the body of man?
6. How much energy is stored up in a piece of coal smaller than a pea?
7. Describe the velocity with which the particles move in their atomic orbit.
8. Compare the architecture of the molecular arrangement with St. Peter's Cathedral in Rome.
9. Why should one stand with reverent eyes before a particle of dust?
10. Why is the evidence of design in the smallest particle of matter not less impressive than the evidence of design in a solar system?

Chapter IV

1. State some of the differences between living matter and non-living matter.
2. What is meant by photosynthesis, and what mystery does it present?

3. What are the constituents of a blade of grass?
4. Can scientists put them together so they will function as living matter? Why?
5. State the conversation with the professor of bio-chemistry in regard to a blade of grass.
6. Why do laws indicate the necessity of a lawmaker? Illustrate.
7. How do you establish the existence of God from the functioning of a blade of grass?
8. State the conclusion of Wordsworth.
9. What philosophic conclusion is contained in the lines of Kilmer?
10. Memorize the poem of Tennyson showing that the complete knowledge of a little flower would entail the knowledge of God and man.

Chapter V

1. What marvels of animal instinct can you mention?
2. What prompts a bird to build its nest? What do you mean by instinct?
3. Describe the organized community life of bees.
4. What problem in mathematics do the bees solve?
5. What conclusion do you draw from their feat in solving so complex a mathematical problem?
6. Compare the achievement of engineers in building the Empire State Building with the feat of an ovum in developing into a human being.
7. What part of the cell carries the psychological characteristics of the parents?
8. Describe some of the feats of the cell in building different structures.
9. What prompts the cell to build different types of nerve cells?
10. Why may the brain of man be said to be the crowning achievement in the biological world?

Chapter VI

1. Compare the human body with the most delicate and complex machine you have ever seen. Which is the more marvelous? Why?
2. Why are we not more inclined to do homage to the Prime Mover, Who made things make themselves?
3. Tell what you can of the complexity of the organization of the human body. If the microscopic capillaries within the human body were placed end to end, how far would they stretch?
4. How many nerve cells are there in the cerebral cortex, and what do they weigh?
5. Show how a cell is a little world in itself.
6. What conclusion follows from the delicate organization found within the cerebral cortex?
7. What did Carlyle say about the volume of nature?
8. When is our admiration for a work dissipated? Why?
9. If scientists were to discover the secret of life, would that discovery lessen the evidence of design and plan?
10. How do the processes of life mirror the work of a Divine Lawmaker?

Chapter VII

1. Why is the mind of man the pinnacle of all creation?
2. Wherein do we find the supreme evidence of plan and purpose? Why?
3. Why may man be said to be a microcosm?
4. How might we alter the famous syllogism of Descartes? Why?
5. Why can't we attribute the marvelous order found in nature to matter itself?
6. Summarize the line of reasoning running through this entire discussion.

7. What is a basic generalization of modern biology?
8. Was there a time when no life could have existed on the earth? Why?
9. What conclusion follows from these two basic laws of biology and of geology?
10. Is there any escape from the conclusion that the origin of life must be attributed to God?

Chapter VIII

1. Is human reason fundamentally a trustworthy faculty? Why?
2. Is the belief in a Supreme Being universal?
3. Can the functioning of reason in all mankind have served but to lead them to a gigantic conspiracy against the truth? Why?
4. State the testimony of Jevons and of other investigators.
5. Explain the comparison between different conceptions of the sun and different notions of God.
6. May primitive people possess a true idea of God even though their religion is marred by superstitions?
7. Sum up the results of recent investigations.
8. What is the testimony of civilized races?
9. What does Millikan say about belief in God?
10. Sum up this whole argument.

Chapter IX

1. Why is it worth-while to learn at least one metaphysical argument for God's existence?
2. What is meant by metaphysical proofs?
3. What principle may be said to constitute the spinal column of all scientific reasoning? Why?

4. What does a *contingent* being mean?
5. Why does an infinite series offer no escape from *necessary* being? Illustrate.
6. What is meant by a necessary being?
7. How do you prove that God is eternal?
8. How do you establish that God is infinite?
9. How can you prove that God is infinitely perfect?
10. Mention some of the perfections in the inexhaustible being of God.

Chapter X

1. Why is it wise to supplement the knowledge of God gained by the unaided intellect with the richness of Divine Revelation?
2. Why may Christ be said to be the untarnished mirror of the Most High? .
3. Why does the person of Christ give us a better picture of God than is to be found in the writings of philosophers and theologians?
4. Describe the character of Christ.
5. Tell the incident narrated by Rufus Jones, and explain its significance.
6. Why is a clean conscience more helpful in seeing God than mere intellectual subtlety?
7. How does the experience of humanity verify the findings of St. Theresa?
8. What blinding evidence does nature offer concerning the existence of God?
9. Narrate the incident from the play, *Grand Hotel*.
10. How does this incident apply to the person who looks at nature with unseeing eyes? How does the Psalmist characterize such a person?

