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# Belief in God and in Evolution

*The Harmony of Religion and Science*

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## *The Harmony of Science and Religion*

*A Genetic Study in Contemporary Religious Thought*

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BY REV. JOHN A. O'BRIEN, PH.D.

*Chaplain of the Catholic Students at the University of Illinois*

*"By identifying the new learning with heresy, you make orthodoxy synonymous with ignorance."—ERASMUS.*

WHAT is the explanation of the widespread hostility that has existed on the part of religious leaders toward evolution from the days of Darwin down to the present time? While the enmity has cooled down in recent years and is totally absent in some circles, it still persists in other quarters, especially in the South which staged the famous Scopes trial in its effort to prohibit by law the teaching of evolution in the public schools. Why did this particular teaching of science arouse resentment from which other teachings of natural science, such as the law of gravitation or the conservation of energy, were entirely free? The reason is probably threefold: 1. the false philosophical interpretations placed upon the scientific data of evolution; 2. the false scientific views, which the Bible as erroneously interpreted, was made to sponsor; 3. the different senses in which such terms as "law or principle of nature" and "theory" are frequently used by the scientist and by the theologian.

### Materialistic Interpretation of Evolution

There were not wanting scientists who essayed also the rôles of philosopher and theologian. Not content with reporting the facts of nature which they observed and collected, they proceeded to interpret the philosophical and religious implications of such data, almost invariably giving their conclusions in the name of science itself. While a scientist has the right to leave his own domain to enter the disparate field of philosophy if he chooses, he no longer speaks as the authentic voice of science which as such is silent on problems that transcend the properties of physical matter and which are therefore not susceptible of treatment by any of the instruments or methods of physical science.

Her realm is the material universe; her instruments the test tube, the microscope, and the metronome; her method that of observation and experimentation. When the scientist leaves the laboratory of the physical universe and proceeds to a consideration of the transcendental factors which lie behind and beyond it and speculates upon ultimate causes which will forever defy both his microscope and his telescope, mock at his myograph and laugh at his most sensitive scales, then he is in a world where his scientific technique no longer functions and is therefore of no avail. Into this different domain he cannot rightfully carry over the prestige he enjoyed in science, for here he is indeed a novice, confronted with problems which can never be attacked with the instruments with which alone he is experienced.

It seems to be a human instinct to travel and the wanderlust has not been confined to theologians. Scientists have given some classic exhibitions of themselves pontificating on questions of philosophy and

religion. Ernst Haeckel is a capital illustration. What Thomas Huxley did in popularizing Darwinian evolution for the English speaking world, Haeckel did for the German speaking countries. Not content with playing the rôle of a scientist he essayed in season and out the rôles of philosopher and theologian as well, but always insisted that his pronouncements in the two latter rôles were made in the name of pure science. Toward the end of his career, Professor Haeckel delivered three lectures at Berlin which have been published under the title *Last Words on Evolution* in which he solemnly informed his audience that the three most treasured concepts of the Christian religion, human immortality, freedom of the will, and the existence of a personal God must henceforth be relegated to the limbo of childish fables as they were now totally discredited by the new doctrine of evolution! Lest any reader think that the writer is exaggerating in the slightest degree the high-handed, dogmatic manner in which Haeckel pontifically communicated such ideas in the name of science, he will present Haeckel's own words: "The supplementary research of several more recent physiologists has shown from the ontogenetic side that the soul is not a special immaterial entity; but the sum-total of a number of connected functions of the brain. When the brain dies the soul comes to an end. . . . When we look at the matter impartially in the light of pure reason the belief in immortality is *wholly inconsistent with the facts of evolution and of physiology.*"<sup>1</sup>

Here is the classical example of the scientist hunting with his scalpel and microscope for an immaterial entity in a human embryo, and not finding it, declares

<sup>1</sup>Ernst Haeckel, *Last Words on Evolution*. Translated from the second edition by Joseph McCabe. Peter Eckler, Publisher, N. Y., 1905, pp. 144, 147.

forthwith that it does not exist. If the reader will photograph this picture in his mind he will have a picture of the type of scientist who has probably done as much as any other agency to retard the acceptance of evolution by tying around its neck the dead weight of totally unwarranted and irrelevant philosophical and religious conclusions. Haeckel has a perfect right to deny human immortality, freedom of the will, the existence of a personal God, and any other or all of the principles of the Christian religion, but he has no right to impose his negations on others in the name of science, or more particularly in the name of the scientific data of evolution.

If Haeckel had even a distant acquaintance with the first principles of that branch of philosophy known as metaphysics he would know that a physiologist hunting with a search light, scalpel, and microscope would not find an immaterial entity "on the ontogenetic side" or on any other side. Surely scientists must find this procedure of Haeckel as amusing as any quixotic performance of a divine in undertaking to lecture a naturalist on the phenomena of nature. No wonder it was that Robert Andrew Millikan in his recent lectures on *Evolution in Science and Religion* delivered at Yale University<sup>2</sup> termed Haeckel a "purer dogmatist" than William Jennings Bryan himself.

#### Free Will Excommunicated

It is interesting for all, and especially for present day scientists who are at a loss to understand why this particular teaching of science has aroused widespread hostility and resentment from which other teachings of science, such as, the law of gravitation

<sup>2</sup>R. A. Millikan, *Evolution in Science and Religion*. Yale University Press, New Haven, Conn., 1927, p. 60.

and the law of motion, were free, to note that the man who second only to Huxley was the chief interpreter of the meaning of evolution to the general public, in every instance sought to use evolution as a bludgeon to drive the most treasured concepts of the Christian religion from the minds and hearts of the people. Thus Haeckel invokes the high authority of evolution to excommunicate the idea of free will: "Another psychological dogma, the belief in man's free-will is equally *inconsistent with the truth of evolution*. Modern physiology shows clearly that the will is never really free in man or in the animal, but determined by the organization of the brain; this in turn is (given) its individual character by the laws of heredity and the influence of environment. It is only because the *apparent* freedom of the will has such a great practical significance in the province of religion, morality, sociology and law, that it still forms the subject of the most contradictory claims. Theoretically determinism, or the doctrine of the necessary character of our volitions, was established long ago."<sup>3</sup>

Will the scientist please note that Haeckel rejects the freedom of the will not in his own name but in the name and by the authority of the sacred "truth of evolution." Note, too, how he again invokes the physiologist to exorcise such an unphysiological noumenon as freedom of the will from the brain of man. His pronouncement, "Modern physiology *shows clearly* that the will is never really free in man," made with all the solemn assurance and dogmatic finality of an oracle uttering an immutable revelation from on high, is a classic illustration of the scientist who runs hopelessly amuck in the alien domain of philosophy where the subject matter by its very nature is unsusceptible

<sup>3</sup>Ernst Haeckel, *Last Words on Evolution*, p. 149.

of treatment by the only technique with which he is familiar. Yet for his pronouncement in philosophy he claims the same authority as for his conclusions when within the sphere of his own jurisdiction, namely, natural science.

### No Personal God

Not content with ruling out belief in human immortality and freedom of the will, Haeckel then proceeds to anathematize the idea of a personal God, doing so, of course, in the name of evolution. The conceptions of a "God who is set over against the world as an independent being, the personal creator, maintainer and ruler of all things, are quite incompatible with the advanced science of the nineteenth century, especially with its greatest triumphs, the law of substance and the law of Monistic evolution."<sup>4</sup>

Since one can no longer believe in a personal God because of the discovery of the Monistic evolution, one wonders what kind of a God, if any, evolution will permit him to believe in. Haeckel proceeds to reveal the kind of a God which evolution now renders mandatory upon every one to accept. What kind of a God is that? Here is Haeckel's description of the God of Monistic evolution: "Our Monistic God, the all-embracing essence of the world, the Nature-god of Spinoza and Goethe, is identical with the eternal, all-inspiring energy and is one in eternal and infinite substance, with space-filling matter."<sup>5</sup> This curious deity turns out to be none other than plain ordinary matter—rocks, stones, dust and clay!

In order that no one might be left in the dark as to his intention to banish all belief in the most treasured principles of the Christian religion from the minds of

<sup>4</sup>*Ibid.*, pp. 150, 151.

<sup>5</sup>*Ibid.*, p. 162.



the people, Haeckel again anathematizes them in the name of "pure science" declaring "a personal God, the personal immortality of the soul, and the liberty of the will . . . cease to pose as truths in the realm of pure science. As imaginative creations they retain a certain value in the world of poetry."<sup>6</sup> Thus does Haeckel relegate the most basic principles of the Christian religion to the limbo of outworn fables, myths, and superstitions, comparing them later on in the same paragraph with the fables of Hercules and the myths of the Odyssey and the Iliad.

These quotations from Haeckel have been presented somewhat extensively simply because they show more clearly than any words of the writer the materialistic and atheistic interpretations which were given of evolution by Haeckel and his brood of followers. They sought to use evolution as a club to bludgeon the Christian faith from the masses of the people. For sheer dogmatism it would be impossible to find in the ranks of religious leaders his superior, and hard enough to find his equal. He had about as much preparation to solve difficult problems of a philosophical or religious nature as Wilbur Glenn Voliva has to discourse upon the problems of science, including his favorite one, the shape of the earth.<sup>7</sup> They are two of a kind. This then was the materialistic and atheistic medium through which trickled the meaning of evolution to the masses of people in the German speaking countries, while the translation

<sup>6</sup>*Ibid.*, pp. 159, 160.

<sup>7</sup>Voliva, the leader of a religious denomination at Zion City, Illinois, issued the following statement to the press of the country: "So-called science is a lot of silly rot. The earth is flat. The firmament above our heads is a solid structure and the stars are points of light, that is all. The sun is a small body about forty miles in diameter and located only 3,000 miles from the earth." Voliva made this statement, be it noted, shortly after returning from a trip around the "edge" of a flat earth.

of his writings reached large numbers of English speaking people as well.

### Haeckel and Huxley

Huxley was the great popularizer of evolution to the English speaking world. While he avoided the dogmatism and the blatant crudities of Haeckel, there is no doubt but that his own agnosticism colored the interpretation which he gave of evolution and of its implications to the English speaking countries. When it is remembered then that the meaning of evolution was ushered into the world largely through the fanfare of Haeckel's strident materialism and the subtle agnosticism of Huxley, it becomes easier to understand the hostility which was aroused among religious leaders to this theory which apparently sought to erase God from the world and to substitute for Him such idols as "space-filling matter" and Natural Selection. Moreover, these two leaders represent the type of interpreters who followed in their wake largely down to the end of the nineteenth century. Undermining the incentives for nobility and unselfishness of conduct as well as the hope of eternal life which the Christian religion supplied, they pictured man as sharing the same ultimate destiny as the ape or the gorilla relegating the belief in a Divine Providence to the limbo of outmoded fables.

Writing to the London *Times* in 1876, Carlyle draws a vivid picture of the confusion following upon the spread of the materialistic interpretation of evolution. "Ah! it is a sad and terrible thing," he writes, "to see nigh a whole generation of men and women professing to be cultivated, looking around in purblind fashion and finding no God in this universe. I sup-

pose it is a reaction from the reign of cant and hollow pretense, professing to believe what in fact they do not, and this is what we have got; all things from frog spawn; the gospel of dirt the order of the day. The older I grow—and I now stand on the brink of eternity—the more comes back to me the sentence in the Catechism which I learned when a child, and the fuller and deeper its meaning becomes: "What is the great end of men? To glorify God and enjoy Him forever!" No gospel of dirt, teaching that men have descended from frogs through monkeys can ever set that aside."<sup>8</sup>

In the light of this genetic approach one secures a clearer insight into the circumstances which aroused such intense opposition among religious leaders to the theory of evolution. Vast multitudes of Christian people who felt they knew of a personal God and had direct personal relations with Him and who knew of the freedom of their own will, with an experiential certainty that transcended the inferences of the scientist, felt instinctively there must be something awry with a theory which demanded as a requisite for its acceptance the abandonment of these intimate personal convictions of the Christian faith. So much then for the first factor responsible for the arousal of violent opposition on the part of religious leaders toward the theory of evolution.

### Wrong Use of Bible

The second factor is the wrong use of the Bible. While back in the fourth century St. Augustine pointed out that the Bible reveals spiritual truth, not matters of physical nature which have no bearing on

<sup>8</sup>"Twenty-eighth Annual Archæological Report" of the Ontario Provincial Museum, pp. 61, 62.

man's spiritual development, this wise counsel was gradually lost sight of, and the custom developed of regarding the Bible as a textbook of the natural sciences as well. To decide mooted questions of science recourse was had to the Bible, examining incidental references to natural phenomena contained therein, to ascertain which side of the controversy such passages seemed to favor. It has been this failure to recognize the proper scope of the Bible, as a revelation of spiritual verities, while reflecting merely the views on natural science prevalent at the time, that has been the most prolific source of conflicts or rather of assumed conflicts between religion and science. It is scarcely too much to affirm that practically every famous controversy in history between science and religion has been traceable at least in part to this one cause.

The first famous controversy concerning the form of the earth was directly traceable to this cause. The Biblical writers reflecting quite naturally the geographical and astronomical views current among the people for whom they wrote, have many passages in their writings which mirror forth such views. These incidental references came to be regarded as part of the content of divine revelation and on the mistaken authority of such passages the early scientific concepts of the sphericity of the earth were opposed.

The second great controversy raged around the heliocentric theory. When Copernicus discovered in 1543 that the earth revolved around the sun, instead of the sun revolving around the earth as was commonly believed, his discovery was vigorously condemned by Luther and Calvin as contrary to the teaching of the Scriptures. Likewise when Galileo championed the view of Copernicus, adding fresh evi-

dence of his own to disprove the old geocentric system of Ptolemy, he found his doctrine condemned as anti-scriptural and heretical by the Congregation of the Index at Rome in 1615. In commenting on this action Gerard writing in the *Catholic Encyclopedia* aptly observes: "In thus acting it is undeniable that the ecclesiastical authorities committed a grave and deplorable error, and sanctioned an altogether false principle as to the proper use of Scripture. Galileo and Foscarini rightly urged that Holy Writ is intended to teach men to go to heaven, not how the heavens go."<sup>9</sup>

It is interesting to note in this connection that there were not wanting some churchmen who were beginning to recall the wise exegetical counsel enunciated centuries before by St. Augustine and to recognize as well the soundness of the contention of Galileo and Foscarini as to the proper purpose of the Scriptures. Writing to Foscarini, a Carmelite friar and staunch ally of Galileo, Cardinal Bellarmine sounded a note of caution that might well have been more generally heeded about using a passage of Scripture to condemn a finding of science: "I say that if a real proof be found that the sun is fixed and does not revolve around the earth, but the earth round the sun, then it will be necessary, very carefully, to proceed to the explanation of the passages of Scripture which appear to be contrary, and we should rather say that we have misunderstood these than pronounce that to be false which is demonstrated."

The third famous controversy raged about the age of the earth. When researches in geology began to discover rock formations and fossil remains which could be explained only on the postulate of the pas-

<sup>9</sup>*Cath. Ency.* Vol. VI., p. 344. The Encyclopedia Press, N. Y., 1909.

sage of millions of years, religious leaders again opposed on the grounds that the findings were contradicted by a Biblical revelation as to the age of the earth.

### The Antiquity of Man

The fourth famous controversy centered about the antiquity of man. The old literal interpretation of the Biblical chronology regarded man as a recent arrival on this earth, having made his entrance only about 6,000 years ago. Thus Dr. John Lightfoot, an eminent Hebrew scholar, one of the Westminster Divines, and at one time Vice-Chancellor of the University of Cambridge, figured on the basis of the literal interpretation of the Biblical chronology that man was created in the year 4004 B. C. at exactly nine o'clock in the forenoon. The fossil remains of prehistoric man, his tools and handicraft which paleontology has dug from deep strata of the rocks show overwhelmingly that man has been an inhabitant of the earth for a vastly greater period of time than had ever before been conceived. The inference is not that the Bible is in error, but simply that the chronology is fragmentary as scriptural scholars are now universally agreed.

The last great controversy is that which for the past seventy-five years has centered about evolution—the theme of our discussion. Besides the five great controversies mentioned there have been various minor ones, notably the one which raged during the eighteenth century over the burning of witches. During this controversy John Wesley maintained that if witchcraft were not true, then the whole Bible fell to the ground.

With the panorama of these historical controver-

sies before our eyes, with religion yielding ground in every instance where the issue was one involving a fact of natural science, it seems obvious that one should no longer attempt to make the Bible serve as a textbook of science, or as a quick and ready means of deciding the truth or error of a scientific theory or fact. All history teaches the unwisdom of doing so. It is high time to heed the warning of history and the advice of St. Augustine who said: "The gospels do not tell us that our Lord said, I will send you the Holy Ghost to teach you the course of the sun and the moon; we should endeavor to become Christians and not astronomers."<sup>10</sup>

Professor J. Arthur Thompson of the University of Aberdeen points out the danger of religion undertaking to place too rigorous limits to the field of natural science and to its possibilities of achievement. "The objection we wish to note here," he says, "is the undesirability of saying: 'Thus far and no further.' What seems an impregnable fortress—a Gibraltar that cannot be taken—may be flying the scientific flag a generation afterwards. Not many years ago biologists would have hardly turned their heads to listen to an investigator who asserted that he had been able to make sugar by the action of light on carbon dioxide and water. They were quite sure in the nineteenth century that the touch of life in the green leaf was a *sine qua non* in effecting this wonderful alchemy. Yet the artificial synthesis has been achieved, and who can tell what other steps in the same direction may follow. The whole history of the conflict between science and religion points to the unwisdom of religion defining Rubicons. No one can wish that the religious mind should accept without question every sci-

<sup>10</sup>Quoted in Zahn's *Bible, Science and Faith*, p. 33.

entific conclusion, for the statement of conclusions is a great art, and, beyond the realm of mathematics, demands a discipline in metaphysics. Such acquiescence would be evading the duty of philosophical criticism. But what history tells us to avoid is the error of King Canute."<sup>11</sup>

### Misunderstanding of Terms

The third factor contributing to the conflict of religious leaders and scientists as to whether evolution is a theory or an established law or principle of natural science, is to be found in the different meanings attached to these terms by the scientist on the one hand and by the religious leader on the other. It is vitally important to bear in mind the particular meaning which the scientist attaches to such terms as "laws or principles of nature" as explanations which best explain the known facts, but which by their very nature are tentative and are always liable to subsequent modification by the discovery of new evidence. The philosopher or theologian on the other hand generally attaches a far different significance to such terms. To the latter such terms have the sense of finality and of unmodifiability. They are regarded as expressions of ultimate relationships, of immutable metaphysical realities which are independent of the changing flux of physical phenomena. When such a principle or law is once solidly established it is regarded as an eternal verity which can no more be modified than a first principle of reason or an immutable law of metaphysics.

That which is but an explanation of a large number of facts, at present satisfactory, but tentative, and

<sup>11</sup>J. Arthur Thompson, *Science and Religion*, Chas. Scribner's Sons, New York, 1925, pp. 33, 34.



always liable to amendment or rejection through the discovery of new data is regarded by philosophers and theologians quite generally as a good working hypothesis or a satisfactory theory, but not a fixed law or principle of nature. That such is not an unusual usage, but outside of scientists reflects the common practice in the matter would seem to be evident from the meanings attached to such terms by the standard dictionaries. Thus, Webster,<sup>12</sup> reflecting the definition of the standard authorities, defines *theory* as "a hypothesis which has undergone verification, and which is applicable to a large number of related phenomena." Is not this substantially what the scientist means when he refers to the established law or principle of evolution? Does not the treatment of evolution by practically every scientist indicate that he regards it as just that: "a hypothesis which has undergone verification" and which explains "a large number of related phenomena?" Indeed it is a question if there is a single law or principle of any one of the natural sciences whatsoever which can claim for itself any other definition than that which the widely used dictionary just quoted gives for the word "theory."

Are there not, however, some laws in the more basic fields of natural science which are so solidly established as to be fixed and unalterable principles, beyond the reach of modifiability by the discovery of new data? Let us take what is probably the most fundamental of all the natural sciences, the science of physics. Perhaps the most eminent living authority on that subject in the world today is Professor Robert Andrews Millikan, awarded the Nobel Prize in 1923 for his epoch making discoveries in

<sup>12</sup>Webster's *New International Dictionary*, G. & C. Merriam Co., Springfield, Mass., 1920.

this field, and Research Professor at the California Institute of Technology. Delivering the Dwight Harrington Terry Foundation lecture at Yale University in 1927 on the Evolution of Twentieth Century Physics, Professor Millikan pointed out the amazing fact that within his own lifetime he has witnessed the complete overthrow or modification of practically every basic law of physics. Yet these are the laws which when he first began the study of physics, he was taught to regard as the enduring and unalterable scaffolding and frame-work of the physical universe. Though the heavens fell they would still be standing—unmoved and immovable.

Professor Millikan states that he began the study of physics in 1893, just three years before the end of the complete dominance of nineteenth century modes of thought. During that period he listened to lectures by the outstanding creators of nineteenth century physics—Kelvin, Helmholtz, Boltzman, Poincare, Rayleigh, Vant Hoff, Michelson, Ostwald, Lorentz. He recalls how in one of those lectures he “listened with rapt attention to the expression of a point of view which was undoubtedly held by most of them—indeed, by practically all physicists of that epoch; for it had been given expression more than once by the most distinguished men of the nineteenth century.

“The speaker had reviewed, first, the establishment and definite proof of the principles of mechanics during the seventeenth and eighteenth centuries in La Place’s great *Mecanique Celeste*; then he had turned to the wonderfully complete verification of the wave theory of light by Young and Fresnel, between 1800 and 1830, experiments which laid secure foundations for the later structure known as the

physics of the ether, one of the most beautiful products of nineteenth century thinking and experimenting; then he had traced the development in the middle of the century of the greatest and most fundamental generalization of all science, the principle of the conservation of energy; then he had spoken of the establishment in the first two decades of the second half of the century of the second law of thermodynamics, the principle of entropy or the degradation of energy, and finally of the development by Maxwell of the electromagnetic theory and its experimental verification by Hertz in 1886, only seven years earlier than the date of the lecture. This theory abolished in all particulars except wave length the distinction between light and radiant heat and long electromagnetic waves, all these phenomena being included under the general head of the physics of the ether.

“Then, summarizing this wonderfully complete, well-verified, and apparently all inclusive set of laws and principles into which it seemed that all physical phenomena must forever fit, the speaker concluded that it was probable that all the great discoveries in physics had already been made and that future progress was to be looked for, not in bringing to light qualitatively new phenomena, but rather in making more exact quantitative measurements upon old phenomena.”<sup>13</sup>

#### Laws of Science—Tentative

Professor Millikan then recalls that a little more than one year later he was present in Berlin on Christmas Eve, 1895, when Professor Roentgen pre-

<sup>13</sup>Robert A. Millikan, *Evolution in Science and Religion*. Yale University Press, New Haven, 1927, pp. 8, 9, 10.

sented to the German Physical Society his first X-ray photographs. He thus demonstrated that he had discovered some strange new rays which had the startling property of penetrating as opaque an object as the human body—properties of which previous physicists had not even dreamed. Commenting on this new finding Millikan says: “Here was a completely new phenomenon—a qualitatively new discovery and one having nothing to do with the principles of exact measurement. *As I listened and as the world listened, we all began to see that the nineteenth century physicists had taken themselves a little too seriously, that we had not come quite as near sounding the depths of the universe, even in the matter of fundamental physical principles, as we thought we had.*”

“This was the dramatic introduction, from the standpoint of one of the very young stage assistants in the play, to the new period of physics. Nobody at that time dreamed, however, what an amazing number of new phenomena would come to light within the next thirty years, or how revolutionary, or, better, how incomprehensible in terms of nineteenth century modes of thought, some of them would be. But, at any rate, Roentgen’s discovery began to prepare the mind for the startling changes that were to come.”<sup>14</sup>

Professor Millikan then outlines eight significant discoveries such as radioactivity, the transmutability of elements, electromagnetic waves, subatomic energy, and the principle of the transmission of radiant energy through space, which have thrown into the scrap heap such basic and important laws of physics as the permanent character of chemical elements,

<sup>14</sup>*Ibid.*, p. 10.

and that which was regarded as one of the most universal generalizations of all science, the law of the conservation of matter. The discoveries revealed a wonderful new world, a subatomic world of extraordinary simplicity and orderliness, of which nineteenth century physicists were completely unconscious and in which their laws of mass physics no longer possessed validity. Professor Millikan concludes his lecture with the following timely observation: "*We can still look with a sense of wonder and mystery and reverence upon the fundamental elements of the physical world as they have been partially revealed to us in this century. The childish mechanical conceptions of the nineteenth century are now grotesquely inadequate.*"

"We have at present no one consistent scheme of interpretation of physical phenomena, and we have become wise enough to see, and to admit, that we have none. We use the wave theory, for example, where it works; we use the quantum theory where it works; and we try to bridge the gap between the two apparently contradictory theories, in purely formal fashion, by what we call the correspondence principle. *It is true that we are slowly learning more of the rules in nature's game* so that our progress is not made by hit or miss experimenting, nor by random theorizing, but by following a more or less systematic, if not always a strictly logical, procedure; but the day has gone by when any physicist thinks that he understands the foundations of the physical universe as we thought we understood them in the nineteenth century. The foregoing discoveries of our generation have taught us a wholesome lesson of humility, wonder, and joy in the face of an as yet incomprehensible physical universe. *We have learned*

*not to take ourselves as seriously as the nineteenth century physicists took themselves. We have learned to work with new satisfaction, new hope, and new enthusiasm because there is still so much that we do not understand, and because, instead of having it all pigeon-holed as they thought they had, we have found in our lifetimes more new relations in physics than had come to light in all preceding ages put together, and because the stream of discovery as yet shows no signs of abatement.*"<sup>15</sup>

The writer has presented somewhat extensively the statement of Professor Millikan because it brings into clear relief the tentative, provisional character of all the generalizations of physics. If such be the character of the laws of the most basic of all the natural sciences, does it not follow *a fortiori* that the laws of the biological sciences which are less susceptible of the introduction of mathematics and are therefore less capable of rigorous and exact demonstration, are still more conjectural?

### The Perspective of History

Furthermore, it is a well known fact that a specialist deeply immersed in the minutiae of data in a small segment of the field of science, is so close to that particular part of the picture that he loses his perspective of the whole pageant. He becomes persuaded that a hypothesis that explains a large number of facts in his field has become a principle of science so solidly established as to be beyond the possibility of serious modification. But when the historian of science points out to him that the shores of science are literally strewn with the wrecks of discarded laws and principles of science, once more

<sup>15</sup>*Ibid.*, pp. 27, 28.

firmly established than his own, he is likely to take a broader and more objective view of the tentative character of all the generalizations of science. For, the whole progress of science seems to consist in the reduction of the multiplicity of discrete and bewildering phenomena to the unity of law, and then in the continuous sloughing off of one law after another in the light of a constantly expanding knowledge of the physical universe. While it may seem paradoxical, it is nevertheless true, that the rate of progress in any science may be fairly well determined by the number of laws which have been discarded in a limited period of time.

From the above discussion it becomes evident that a considerable portion of that phase of the controversy relating to whether evolution is a theory or a solidly established law or principle of nature, is traceable to the different senses in which these terms are used by the scientist and the theologian. When the scientist affirms as a result of data in his field, that evolution is a law or principle of nature as solidly established as the other laws of science, and even more firmly grounded than many of them, he is speaking within his own jurisdiction and neither the philosopher nor theologian can successfully controvert him in that assertion. Doubtless there are a considerable number of religious leaders who do seek to controvert him even in this sense, and to deny that evolution has as much basis in fact as the other laws or principles of science. Not only the impartial observer, however, who bases his verdict on the qualifications and authority of witnesses to testify concerning facts within their own domain, but the great overwhelming majority of persons who take the time and patience to examine for themselves

the converging lines of evidence from the many fields of science, especially from paleontology, comparative anatomy and embryology will scarcely find room for disagreement with the scientist in affirming that evolution is about as well established as most of the other laws or principles of natural science.

### **Different Kinds of Proof**

Since evolution seeks to give a picture very largely of occurrences in the remote prehistoric past, the evidence must always and necessarily remain fragmentary, circumstantial and indirect, though none the less valid and cogent in its cumulative force, and since the evidence for evolutionary changes at the present day is drawn from the data of biology which is susceptible in only the most limited degree of the introduction of mathematics, the proof will never be of the type of rigorous, exact demonstration which is possible in physics or chemistry, but it may be none the less convincing. Every science has a mode of demonstration which reflects the particular character of the subject matter with which it deals. Psychology does not establish its laws by the methods which obtain in astronomy nor does biology arrive at its conclusions by the methods of physics. Their laws are not called into question on this account, nor are they considered any less valid. If these facts were to be kept in mind there would probably be less unfair criticism of evolution and fewer demands that it demonstrate its validity by methods which are impossible to it.

From what has been said thus far, it is evident that the opposition between scientists and religious leaders concerning evolution which still obtains in



some quarters is traceable chiefly to the following causes: 1. the unwarranted philosophical interpretations which some scientists have drawn from evolution in the form of materialism and atheism; 2. the unwarranted use of the Bible by some religious leaders in making it serve as a textbook of science; 3. the different senses in which the terms "law or principle of nature" and "theory" have been used by the scientist and by the theologian.

To localize the causes of misunderstanding and to hold them to the light of impartial scrutiny from both sides is usually not only the first but the most effective step in eliminating the misunderstanding itself. In the light of the foregoing discussion it should be evident that *there is no real ground for warfare between the scientist and the theologian on the subject of evolution. It should be universally acknowledged as one of the grandest generalizations of all science during the last century.* It should be welcomed not only as raising the curtain upon the previously impenetrable prehistoric past but also as lighting up the present with new meaning and significance. Especially should it be hailed by the religious leader as giving a far grander and more sublime expression of the majesty and power of the Creator than had ever previously been conceived.

That there is no conflict between religion and science on the matter of evolution is the conviction not only of Christian philosophers and of biblical scholars, but of the outstanding leaders in science as well. In a Joint Statement upon the Relations of Science and Religion issued in 1923 and signed by such eminent scientists as Millikan, Pupin, Noyes and Birkoff in physics, Campbell in astronomy, and Osborn, Welch, Coulter and Conklin in biology, these

outstanding leaders conclude: "It is a sublime conception of God which is furnished by science, and one wholly consonant with the highest ideals of religion, when it represents Him as revealing Himself through inbreathing of life into its constituent matter, culminating in man with his spiritual nature and all his Godlike powers."

That is why there are practically no scientists of repute in the world today—Millikan said he knew of none—who regard the materialistic interpretation of life and the universe as offering any satisfaction to the thinking mind. That is why the theistic philosophy which assigns an adequate and proportionate cause for the design and purpose and plan in nature, and recognizes the presence of a great Intelligence behind the laws and the processes and the framework of the universe is held by the scientists of the world. Under this conception evolution is but the process or the method by which God brought the various forms of life into being.

For, by creating the first germinal forms of life and endowing them with potentialities which would evolve into successive higher forms in accordance with definite laws which He infused into them, God remains the Creator and Author of all living organisms just as truly and as really as if He had created them all at once in their different species and genera. Indeed, this concept of creation as a continuous unfolding and a ceaseless climbing to higher and higher forms of life, eternally marching upward, is of far greater grandeur and sublimity than the concept of creation which was completed in the instant it was begun and then remained static and unchanged throughout all time. Far then from lessening the creative power of God, or minimizing the need of His

presence in the universe, evolution exalts His power and renders the pageant of progressive botanical and zoölogical life upon this planet forever inexplicable without His guiding presence.

In causing the body of man to be evolved from lower forms of animal life and then, when the physical organism had attained an appropriate stage of neurological development and brain capacity, infusing into it a spiritual and immaterial principle called the human soul, God would be the Creator just as truly as if He had caused man to spring forth suddenly full-blossomed from the dust of the earth. Nor is there any reason to feel that the animal origin of the human body disparages the dignity of man. For in the hierarchy of values living creatures certainly rank far higher than the dust of the earth. Instead then of lessening the dignity of man's origin, evolution actually exalts it, by placing it far above the moistened dust or mud of the earth to living creatures endowed by God with sentiency and a form of intelligence. Thus when analyzed and viewed in the calm light of reason, this old sentimental objection to evolution is seen to have no basis in either fact or reason.

Moreover, evolution fits in admirably with the principle of the Divine utilization of secondary causes to attain a purposed end—a principle generally accepted by the greatest theistic thinkers. In simple language this means that God is not to be conceived as constantly interfering with the laws and processes of nature to attain the objectives purposed in the Divine plan, but that He endows nature and her laws with a potency and direction adequate to achieve her ends. In accordance with this principle, the concept of biological evolution on our earth and the evolution

of the entire universe into a harmonious whole under the reign of natural laws would admirably reflect the unity, power, and wisdom of the Divine Being. St. Thomas Aquinas gives a terse but lucid statement of this principle so far-reaching in its philosophical consequences. "The potency of a cause is greater, the more remote the effects to which it extends."<sup>16</sup> The great theistic philosopher, Suarez, expresses the same principle when he says: "God does not interfere directly with the natural order, where secondary causes suffice to produce the intended effect."<sup>17</sup>

In commenting upon this principle so clearly enunciated by St. Thomas Aquinas and Suarez, the great modern scientist and philosopher, Wasmann, declares: "In the light of this principle of the Christian interpretation of nature, the history of the animal and vegetable kingdoms on our planet is, as it were, a versicle in a volume of a million pages in which the natural development of the cosmos is described,"<sup>18</sup> and the finger of God is evident throughout.

Charles Darwin is generally regarded in the popular mind as the father of the theory of organic evolution, which he set forth in detail in his epochal book, *The Origin of Species*. Fourth-rate popularizers of science who do not have even a speaking acquaintance with Darwin's own writings, have often pictured this book as tending to erase God from the universe. Yet he concludes that very book with a sentence expressing the grandeur of the creative act of God as disclosed by the concept of evolution. Though the sentence is the last in the book and therefore could have been easily changed and though

<sup>16</sup>*Summa c. Gent.*, III. c. lxxvii.

<sup>17</sup>*De opere sex dierum*, II. C.X. n.13.

<sup>18</sup>*Catholic Encyclopedia*, art. "Evolution," Vol. V., p. 655.

the book went through many editions, Darwin always had each edition published with the following as its concluding sentence: "There is grandeur in this view of life, with its several powers having been originally breathed by the Creator into a few forms or into one; and that while this planet has gone cycling on according to fixed law of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been and are being evolved."<sup>19</sup>

### Evolution Does Not Dispense With God

It is evident then that evolution presents no grounds whatsoever for disquietude or doubt as to God's place in the universe. Far from taking God out of the universe it gives us a more sublime conception of God's creative act, and of His superintending providence in every blade of grass, in every leaf on the tree, in every flower that grows, in every nook and corner of the universe. Furthermore, it will be remembered that the Bible gives no revelation concerning the subject matter of science but reveals only spiritual and religious truths. Thus it does not encroach in any way upon the freedom and autonomy of the human intellect in its investigation of the structure, organization, and functioning of the material universe and of the laws which are embedded alike in the grain of sand and in the most distant star. Evolution may well serve as a ladder upon which the student of nature climbs to secure a deeper and more penetrating insight into the creative power of God that unfolds itself in every living creature from the lowest to the highest.

Charles Darwin tells us that before he began to study the secrets of nature and the mysteries that lie

<sup>19</sup>Charles Darwin, *The Origin of Species*, II., pp. 305, 306.

locked up in the petals of a rose, the words of Wordsworth applied to him as they apply to most people today:

“A primrose by the river’s brim  
A yellow primrose was to him  
And it was nothing more.”

After he began his investigation of the secrets of nature, he found it a veritable fairy land in which more poetry, romance and adventure were woven into the stamens and pistils and petals of the flowers than were to be found in any book written by human hands. He saw, as every student of nature to this day sees, the picture portrayed in lines of simple beauty by a writer of our own day, Augustus Wright Bornberger:

“There’s part of the sun in an apple,  
There’s part of the moon in a rose;  
There’s part of the flaming Pleiades  
In every leaf that grows.

“Out of the vast comes nearness;  
For the God whose love we sing  
Lends a little of His heaven  
To every living thing.”

The creative power of God constantly operative in the evolutionary process disclosed by scientific research, offers the only rational explanation of the universe. The acceptance of a self-existent, omnipotent and omniscient Being can alone serve as the foundation for any system of cosmogony which satisfies our intellectual need of causation. The nature of

this Being, while necessarily beyond the scope of our physical senses, can be known by us indirectly through the effects of which He is the cause.

A conclusion such as this was reached by the great scientist, Lamarck, the real father of the theory of organic evolution, who said: "Nature, not being intelligent, not even a being, but an order of things constituting a power subject to law cannot therefore be God. She is the wondrous product of His almighty will, and for us of all creatures she is the grandest and the most admirable. Thus the will of God is everywhere expressed by the laws of nature since these laws originate from Him."

Evolution renders more imperative than ever before the need of a Supreme Intelligence to explain the progressive march of life from the lowest to the highest forms.

*Instead of the crude anthropomorphic concept of a Deity working as a master mechanic constantly interfering with natural processes to make needed adjustments, evolution gives us a more sublime concept of a God that operates through the laws of nature which He has established and which hold universal sway throughout the entire universe from the tiny amœba to the most distant star. Instead of the old picture of a world created in a moment of time evolution discloses a far grander panorama of the creative power of God unfolding itself in the gradual development of the world and of all living creatures.*

As the tiny mountain rivulet as well as the majestic lake and river after many windings and turnings all trace their course at last down to the ocean's mighty shore, so all things and all living creatures great or small, all trace their origin and existence back to God, their Creator, for He has said: "I am

the beginning and the end, the Alpha and the Omega." This is the lesson taught by the grain of sand, the blade of grass, the leaf on the tree, and by the meanest flower that grows. It is the refrain sung for us with exquisite melody by the perfume of the violet, the white chastity of the lily, and the pensive beauty of the foliage in its autumnal coloring of crimson and gold sighing its requiem over the death of summer.

It is whispered to us in the ecstasy we feel when early in the morning we see rosy footed dawn standing tip-toed upon the horizon, shooting her golden arrows at the shadows of the night and reaching up to hide the stars in her bosom. Thus we see that nature is one grand cosmic book describing the power and the majesty of God and bearing on its title-page those memorable words of Genesis which express so beautiful and so sublime a truth: "In the beginning God created heaven and earth."



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