IDEAS FROM NATURE

PROF. WILLIAM ELDER

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IDEAS FROM NATURE

TALKS WITH STUDENTS

BY

WILLIAM ELDER, A. M., Sc. D.
Professor of Chemistry, Colby University

PHILADELPHIA
American Baptist Publication Society
1420 Chestnut Street

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To

Henry E. Robins, D. D.

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I

DESIGN

The world,
The beauty and the wonder and the power,
. . . and God made it all!
—*Browning*

He that planted the ear, shall he not hear?
He that formed the eye, shall he not see?

I

Physical science affirms that the sensible universe is made up of matter and energy alone. The saying is unquestionably true of the sensible universe; eye and ear and the other bodily avenues through which knowledge flows in upon us, confirm the existence of these alone—matter, the material of which all bodies consist; energy, the mysterious cause of changes in matter, called the phenomena of nature.

But physical science does not affirm that the universe contains nothing beyond these. It studies that which appears in nature with the senses as its instruments, and reports truthfully the grand results of its search; but it gives no reason for concluding that other realities may not exist beyond its proper field of investigation. In fact, there is implied in this use of the

Discovering Realities

senses the existence of another reality, a something behind the senses which employs and directs them; a thinking power within us without which there could be no knowledge of matter or energy or aught else, the self-conscious mind which not only receives impressions through the senses, but actively seeks knowledge by their use, which observes, reflects, classifies, reasons. Clearly it is possible that the mind, on which such high qualities have been bestowed, may be able to find in nature evidences of things other than the phenomena produced by the ceaseless action of energy on matter.

To assure ourselves that very different kinds of knowledge may be gained from the same source, let us seek the aid of a homely illustration. When we read from the printed page, the eye makes known to us only two existences, the white paper and the familiar black marks upon it. As a matter of fact, however, we are scarcely conscious of these. That something behind the eye, using the eye merely as an instrument, finds in those familiar black

marks signs that have a meaning entirely beyond themselves. As we connect these intelligently, by a power quite other than that of the senses, we find ourselves in possession of something radically different from any quality of the paper or the ink which were employed to convey it, something as real as either of them, but having an altogether different form of existence; we have an idea.

And yet we might profitably study either the paper or the type, those realities sensible to hand or eye. A record of the discoveries and inventions which have resulted in furnishing a cheap material suitable for receiving the written or printed letter, would reveal many things closely connected with human progress. Still more curious and valuable knowledge would be gained if we set ourselves to study the printed characters, their forms, history, meaning, tracing them back to their rude genesis, back through writing, hieroglyph, cuneiform, to the man, Accad be he, or Sumirian, who in a moment of inspiration first used marks to represent thought.

Fascinating as such research would be, we rate the value of its results low when compared with that of the ideas which the characters on the paper convey to our minds. Think how precious these may be; a "*Novum Organum*," a "*Principia*," the long record of scientific discoveries from Aristotle to our own time—filling the universe with light, guiding the progress of the world—a poem by Homer or Shakespeare, a philosophy by Plato or Bacon, or more worthy than all these the clear, imperative call to duty by inspired prophet or Teacher qualified to tell us, what most of all we need to know, how to live well this life which we can live but once.

Such things, time's most precious legacies, come to us through the humble instrumentality of the printed page—little daubs of printer's ink on a cheap white paper. In like manner, as we study the properties of matter and the manifestations of energy or force, we find ourselves gaining ideas whose reality we can no more doubt than we can question the existence of earth and sun, light and heat. It may be that among

the ideas taught through the materials and operations of nature there are truths of still greater value than knowledge of the grandeur of the universe, even truths that can aid us in the formation of belief, in the building of character, in the conduct of life. If so, we want them.

Material things are present and near. By their presence they may shut out from consideration other things at least as worthy as they, while their nearness may so exaggerate them as to pervert our estimate of the varied concerns of life, which must be taken as a whole and in true perspective to afford us a just estimate of their relative values. More than this, it may be the higher function of these material and visible things that surround us daily to teach lessons of realities beyond the reach of sense.

It will be a great gain for us if what we have learned of the things that are seen can be made to witness to us of things unseen, of truths perhaps as much beyond the facts of science as the meaning of the golden rule outvalues what may be known

of the curious marks that represent the words conveying the meaning of that precept to us.

With this end in view, let us take up some of the most familiar topics of the classroom and inspect them once more.

Order in Nature

When we have witnessed an experiment in chemistry and learned what we may of the changes produced in the substances used by the forces that acted upon them, we are certain that the same experiment, that is, one made with the same materials, in the same way, and under the same conditions, will always yield exactly the same results. We find that alkalies and acids have always their appropriate action; and so strong is our conviction of this regularity that any apparent deviation from it is set down to our own error. Here then, we find in nature something besides the matter and energy with which physical science deals, an idea which matter and force are the means of conveying to us, an idea so evident that its validity cannot be questioned.

The idea is that of order in nature, and so universally is this recognized that it is embodied in one of our most familiar terms, the "laws of nature," by which we mean the observed regularity of natural phenomena and express our confidence in the continuance of that regularity. It is the boast of modern science that it has caused the acceptance of this idea,[1] that it has produced everywhere the belief that nature is governed according to laws that are uniform in their operation. Our conviction of the truth of this belief is so strong that it cannot be overcome. Although, from its very nature, it is incapable of demonstration, we submit ourselves to its guidance in every concern of life.[2] No sane man would expect other than a fatal result if he

[1] It must admitted that this thought was familiar to the writers of the Bible long before the birth of the modern sciences.

[2] The moral significance of this reliableness of nature is thus expressed by the author of the "Unseen Universe": "We have perfect trust that God, whom we believe to have given us intelligence, will work in such a way as not to put us to permanent intellectual confusion" (p. 91).

were to set at naught the law of gravitation by stepping off the edge of a lofty tower, or disregard the laws of health by drinking a deadly poison. Clearly there is an established order in nature, banishing from it all possibility of chance or accident.

Now we know that laws do not cause anything, do not govern anything. The expression "governed by law" is inexact and erroneous in all cases, and when applied to nature may give rise to hurtful error. The law is a mere statement, powerless in itself, of the manner in which the power behind the law governs. The laws of nature reveal the existence of a power behind nature, whose methods they are, a power capable of establishing and maintaining those laws, and the harmonious working of the laws proclaims the unity of their Author.

But we must notice that this order of nature is not at all of a mechanical kind. Men sometimes talk of natural laws as though they were real existences in themselves, fulfilling themselves with machine-like regularity and the resistless certainty

of blind fate. Science does not warrant such a view. We have learned that every event must be ascribed to an adequate cause, that similar causes produce similar effects, that the succession of cause and effect proceeds in unbroken continuity.

But the study of nature utters a warning here. We may apply the idea of continuity blindly; we may extend it too far and be led into serious error; even the law may be used unlawfully. To illustrate: We take a bar of metal and place it over a source of heat. Its temperature rises, faster or slower according to the amount of heat received, and we talk of cause and effect; the volume of the solid increases also, and this we note to be in proportion to the rise of temperature. So we may formulate a rule and fairly determine what volume a given mass of this metal will have at different temperatures. But our rule is only applicable within narrow limits, for if we continue our experiment we reach a point where a new thing happens, quite at variance with preceding results. Added heat no longer causes rise

of temperature in the mass of metal, but it begins to flow down as a liquid and has assumed a new state of existence subject to new conditions before increased heat again begins to raise its temperature.

Every student of nature knows that he is constantly meeting with the unexpected, with interruptions of continuity, as he advances in his knowledge of its operations. Water, taken at a certain temperature, expands whether it is heated or cooled. Variations of temperature alone will cause it to exist as a solid, a liquid, or a vapor. The most minute acquaintance with its properties in the solid state affords no indication of its qualities as a liquid; and when it assumes the state of vapor we must begin its study anew. Acted on by heat or electricity, water is suddenly changed into the two elementary gases, oxygen and hydrogen, each possessing strongly marked characteristics, but neither giving any hint of the properties of the familiar liquid formed by their chemical union. We do not interpret the unexpected events as caprice or violation of

law, for we cannot doubt that the same thing will happen again under the same conditions. The truth is that we are only beginning to catch a glimpse of the real grandeur of creation, even of that part of it open to human investigation. Our scientific knowledge, though so extensive and valuable in the aggregate, is small when compared to the unknown which still eludes us. Our philosophic understanding of nature is yet in its infancy. So Newton said long ago; so Lord Kelvin repeats today.

All this points to the conclusion that nature is manifold beyond our most exalted anticipations. What we have experienced of its operations is sufficient to give us confidence in its orderly government, to convince us of the truth of the great doctrine of continuity; but it is also sufficient to warn us that this doctrine must be applied with caution and humility. The power working in nature is evidently not of the order of blind force, to be interpreted by rules of mechanic regularity, but of the higher order of will and intel-

ligence. This order of the world, which no one dares question in act even if he would in thought, finds its only rational explanation in a Divine Ordainer.

Contrivance

We do not proceed far in the study of nature before we meet with another idea, that of skillful contrivance. We recognize it in the properties with which substances have been endowed, as in the properties of oxygen, so resistless when its chemical activities are aroused, so gentle at ordinary temperatures, reducing a whole city to ashes, yet bathing the most delicate tissues harmlessly; in the properties of carbon, so well fitted to serve as fuel, yet inert and harmless under ordinary conditions.

This fact that consummate skill is shown in the structure of the commonest substances which we use daily is most forcibly impressed upon us when we strive to form some conception of what that structure is, and to find out how the properties of each substance are related to its inner constitution. As yet we have no hint of what that relation may be.

Caustic soda and hydrochloric acid are bodies possessing well-known properties, caustic, corrosive, poisonous. Yet when solutions of these are mixed in due proportion all these properties are lost, the substances themselves disappear, and in their places are found water and common salt, not acid nor poisonous, but necessary for foods. Interpreted by the most daring inferences of chemical theory the acid and alkali are both comparatively simple in composition, and the change which goes on when these were converted into salt and water was the mere exchange of certain elements.

We may perhaps form some satisfactory conception of the manner in which this change was produced; but when we ask the reason for the surprising change of properties which resulted from the simple transference of material parts we find ourselves in the presence of a mystery, and are obliged to be content with a simple statement of final results. Let us not allow a certain vulgar familiarity with the names of things and the outside of things

to rob us of the valuable lesson which this mystery has to teach us. That lesson is reverence for the surpassing skill exhibited in the inner structure of material things which we call common and ordinary. Intimate acquaintance with nature does not tend to lessen admiration; on the contrary, reverence grows as knowledge grows. When an explanation is found for something before unknown, it brings with it a revelation of more mystery beyond, and all explanations point forward to one ultimate mystery which is the source of being.

The evidence of contrivance in nature is more clear in the mutual adaptations of two or more agencies so that they work together to produce one result. This idea of adaptation is in advance of that of contrivance, however intricate. The human mind finds much to stimulate its growth in a study of the powers and properties of individual substances and in the modes of operation of various forms of energy. But in the presence of these we are driven to ask, "What end do they serve?" When the mutual

Adaptation

relations of things are discovered the significance of individual functions is appreciated, and we the better understand to what extent skill is shown in their contrivance.

Thus it is only necesssary to heat carbon and oxygen together to cause them to combine with great vigor, evolving a generous supply of heat. Think of the carbon, the product of long past ages, stored up in the earth in the form of mineral coal, and of the oxygen free in the atmosphere. In them man has furnished to his hand a mine of energy which he may call forth at his will to minister to the comfort of everyday life, or to speed the work of the world. Think how every growing plant that lifts its leaves to the sun is winning back this expended energy for our service once more, and it seems ungrateful to begrudge the name Providence to such consummately skillful and beneficent contrivance as this.

Again, adaptation is most distinctly shown in the properties with which certain substances have been endowed to an eminent degree, fitting them to fill a place of

first importance in the economy of nature. Water is a good instance of this, on account of its wide distribution and varied uses, and our comparative familiarity with it. It is also an illustration of the capital fact that it is in the case of the substances of which we know most that this evidence is strongest.

In the study of water there is much to challenge attention and excite admiration. We are familiar with it as a liquid, but at a temperature not very low it becomes a solid, and at all temperatures of the earth it escapes into the air as an invisible gas or vapor. The solid snow and ice wrap the earth as in a warm mantle to protect it during the rigors of winter; but the vapor of water in the air has a yet more important office. Water is supplied in unstinted amount, in ocean, seas, lakes, rivers, yet considering its varied uses in nature, we are forced to conclude that there is not a drop too much; about three-fourths of the earth's surface is covered with water that the remainder may be fitted to become the dwelling-place of man.

Consider the work of water as a regulator and distributer of heat. It is fitted for this office because it possesses certain properties in an exceptionally high degree, constituting it the climate-maker of the world.

In the first place, water can absorb more heat than any other known substance, solid or liquid. By this means it cools the air of summer, and as cold weather comes on gives out the heat it had absorbed, to moderate the severity of winter. An island in the ocean has, as every one knows, an equable climate for this reason; what we may call the waste heat of summer is stored away and held over for winter. A French scientist lately made an estimate of the amount of heat absorbed by the lake of Geneva during summer and given out as it cools at the approach of winter; it is as much as would be produced by the burning of three hundred million tons of coal. How much then, must the ocean take up and give out during similar changes, and how beneficent must be its effect on climate!

The Climate-Maker of the World

But no matter how great a capacity for heat water may possess, it must at last become chilled by long-continued cold. Then at a temperature not very low, just stimulating to healthy life, it solidifies, or as we say, freezes. Here a most curious thing happens. Each cubic foot of water in freezing gives out enough heat to raise the temperature of an equal amount of water, or more than three thousand cubic feet of air, seventy-nine degrees. This is in accordance with a general law that a substance in solidifying gives out heat, but in the case of water the amount thus given out is exceptionally great. So long as water is freezing, this evolution of heat continues, the temperature of the air is moderated, and, what is even of greater moment, the rapidity of the change to excessive cold is greatly checked. When spring comes, the ice and snow in melting must take back all the heat they had given out; melting goes on slowly; and the danger of flood is lessened.

It may be said that these processes affect only extreme northern and southern

countries, and can have but remote influence on the excessive heat of the tropics; but for moderating this heat a still more liberal provision has been made. Water evaporates readily, more and more rapidly as its temperature rises, so that from tropical waters a constant stream of invisible water vapor is poured into the air from every square foot of surface. When a pound of water thus changes into vapor, it absorbs an immense amount of heat; according to an estimate made by Tyndall, enough to raise five pounds of iron to the melting point. All this disappears as heat; and by close thinking we may form some idea of the prodigious drain thus kept up on the heat of the tropics, which form as it were the furnace of the globe. All this heat is again restored to the atmosphere when the water vapor condenses. The winds carry a great part of it to colder latitudes, where it is gradually condensed and falls as rain, giving up at the same time its store of heat. This heat not only warms the atmosphere, but checks condensation and prevents the deluging torrents that

would fall if all the moisture of the air were to be precipitated at once.[1]

These are not the only provisions made for reducing extremes of temperature and lessening the rapidity of change from hot to cold, and from cold to hot. Sea water is always heavier when cold than when warm, because it contracts down to its freezing point. The cold water of the polar region sinks to the bottom and creeps slowly to tropics, where it rises, becomes heated, and then flows off in surface currents toward colder regions, laden with heat which it gives out on its way. The dullest mind can scarcely contemplate such consummate skill in contrivance as all this exhibits without being stirred to admiration. Does it not warrant something beyond admiration?

Let us imagine that a native of a warm climate, who has never felt the need of artificial heat in a dwelling, is suddenly trans-

[1] If one mile of air saturated with water at 35° be cooled to 0° it will deposit one hundred and forty-thousand tons of water.—*Roscoe*, "*Treatise on Chemistry*," *Vol. I., p. 541.*

ferred to one of our northern cities in winter. He is shown through a great building warmed by a steam-heating apparatus in perfect order. How he will wonder at the contrast between the arctic temperature outside and the genial summer within. If he is an intelligent man how he will delight to inspect the great furnaces and boilers, the pipes and automatic contrivances by which the desired temperature is maintained in every room. The more he becomes bewildered with the intricacy of the apparatus the more he will admire the skill of its maker. He would but lightly esteem the poor wit of the facetious agnostic who should tell him that he "doesn't know that it has any maker."

The heating apparatus of our globe is infinitely more wonderful than this; it serves many more uses than this. By its automatic contrivances, which never get out of order, heat and cold are made to check the severity of their own changes. Does it not seem in the highest degree probable, to use no stronger term, that it too had a maker, and that it has something

to teach us about him? Does not the practical reason, the most reliable judge within us, unperverted by quibbles, unblinded by manufactured doubts, affirm unhesitatingly that it must have had an Almighty Maker?

In all things whose origin we can trace, skillful contrivance, contrivance that profits, is at once accepted as proof of intelligent design. Especially does it become impossible to accept mere coincidence as an explanation of the observed relations when the contrivance is intricate and the adaptations many. In nature we find contrivance everywhere skillful beyond human device; life depends on such nice adaptations and contrivances innumerable. No valid objection can be urged against continuing here the sure process of reason, here where most we need its guidance. Third among the ideas gained from a careful study of nature we place intelligent design, and, of necessity, an intelligent Designer.

Design

It will be worth while to take one of the almost innumerable uses of water and try

not merely to give it a correct general statement, but to bring it actually before the mind.

Rain is absolutely necessary to the life of the globe. If it is withheld, industries languish and die, the fertile field is gradually transformed into a desert. Rain nourishes plant and animal; rain supplies the springs that overflow to form streams and rivers. For it water must be purified and brought from the ocean.

A brook has dried up because its source has been tampered with and no rain has fallen. Let us suppose that a company of men have undertaken to furnish to it the needed water supply during the dry season. Along the shore to right and left stretch the great distilleries necessary to change the salt water into fresh. From every point available trains are running night and day, carrying the purified water up to be poured out on the hills from which the brook formerly gathered its waters. What would be the grand result of all this expenditure of millions, this flaming of furnaces and puffings of engines, this hurry

and worry and toil of men? An eager shareholder in this promising enterprise, standing by the shore where once a generous stream shot out into the sea, might perhaps discover a tiny driblet of water down among the gravel under the dry stones. This would be the most that man could accomplish; a humiliating result for man, who does such great and wonderful things that he sometimes doubts whether there really exists any need for other god than himself, or whether the power behind nature has ever risen to conscious intelligence higher than the human mind.

Now imagine one of the laborers who had been actively employed in this most stupendous experiment, namely, "running a brook," sitting down to rest himself beside the Mississippi River. He would have before him a stream that gathers its waters from about a million and a quarter of square miles, and sweeps past him over sixty million cubic feet of water every minute. He could scarcely fail to ask himself, in the light of his late laborious experiences, "How is all that water supplied?"

The answer is very simple; water is readily changed into vapor, and this vapor is readily condensed to water again. The ordinary variations of the earth's temperature are quite sufficient to produce these changes, and we have noticed their beneficent effect upon climate. But the heat taken away from hot countries is not merely transferred to colder parts.

While this is being done an even greater good is accomplished in the distribution of moisture. Silently and rapidly entering the water the sun's rays transform it from a liquid over seven hundred times heavier than air into a vapor much lighter than air, so that it rises and floats, and is carried on the wings of the wind to colder regions. This vapor cooled becomes liquid again in cloud and rain, to be poured out on the surface of the earth, but especially on hills and elevated regions. So are fed, not only the Father of Waters and its mighty rivals, but every brook that throbs like a pulse of life among the hills, brings freshness to the fields, and sweeps away impurities to the salt sea. It is difficult

to understand how any man can get a real conception of these things and not feel compelled to admit that there must be somewhere in the universe, not only power greater than his, but benevolent intelligence higher than his, an intelligence that wills, purposes, performs. These are attributes of personality.

Not only does water possess in an eminent degree certain properties which other substances exhibit in less degree, but in one marked case it is an exception to a general law of nature. Through four degrees above its freezing point it expands as it cools, instead of contracting as other liquids do. The importance and significance of this exception is dwelt on by our best writers on physical science, even in works intended to be used merely as text-books.

Professor Cooke, of Harvard, calls it "a special adaptation in the plan of nature."[1]

Testimony

Sir Henry Roscoe, in his great work on chemistry, says: "Although the amount of contrac-

[1] "Chemical Physics," p. 520.

tion on heating water from 0° to 4° is but small, yet it exerts a most important influence upon the economy of nature. If it were not for this apparently unimportant property, our climate would be perfectly Arctic, and Europe would in all probability be as uninhabitable as Melville Island. . . This cooling (of water exposed to a freezing atmosphere) goes on till the temperature of the top layer of water sinks to 0°, after which a crust of ice is formed; and if the mass of water be sufficiently large, the temperature of the water at the bottom is never reduced below 4°. In nature, precisely the same phenomenon occurs in the freezing of lakes and rivers; the surface water is gradually cooled by cold winds, and thus becoming heavier, sinks, whilst lighter and warmer water rises to supply its place. This goes on till the temperature of the whole mass is reduced to 4°, after which the surface water never sinks, however much it may be cooled, as it is always lighter than the deeper water at 4°. Hence ice is formed only at the top, the mass of water retaining the tem-

perature of 4°. Had water become heavier as it cooled down to the freezing point . . . our lakes and rivers would be converted into solid masses of ice, which the summer's warmth would be quite insufficient thoroughly to melt; and hence the climate of our now temperate zone might approach in severity that of the Arctic regions!"[1]

The fact that sea water follows the general law, contracting as it approaches its freezing point, which is below 0°, very strongly emphasizes the significance of the exception in the case of fresh water.

Thus physical science supplies us with evidences of design in nature, which strengthen as our knowledge of nature becomes wider and deeper. Biological science also furnishes evidence of a peculiarly forcible kind and pointing to the same conclusion. Wise and benevolent design implies the existence of a wise and benevolent Designer. This argument from design is an old one; we find it in the

[1] "Treatise on Chemistry," Vol. I., pp. 224, 225. Repeated in new ed., p. 271.

writings of the Hebrew prophet, in the "*Memorabilia*" of the Greek sage. It is stated with great ability in the "Natural Theology" of Paley and in the "Bridgewater Treatises."

Our knowledge of nature has greatly increased since Paley's time, but this increase has only changed the form of the design argument, not lessened its force nor modified its essence. This, though hastily questioned by some, has been fully granted by leading men of science. The human eye or ear is still a marvel of design, no matter how long it was in fashioning, or what means were used to bring it to its present form. The skillful adaptation of means to an end is the very feature by which we recognize intelligent design. If the means employed turn out to be more wonderful than anything man could conceive, the lesson of purpose is not thereby discredited, but approved and extended.

Let us hear what some of the foremost scholars of our own day, standing in the van of science and taking an active part in the battle of belief, say of the validity of

this argument. I select two, the first referring to the evidences furnished by physical science; the second, to those from biology.

Professor Cooke, of Harvard, when discussing these same properties of matter to which we have just referred, says: "I cannot conceive of stronger evidence of design than this; and if these facts do not prove the existence of an intelligent Creator, then all nature is a deception and our own faculties a lie." [1]

Sir William Thomson (now Lord Kelvin), in an inaugural address before the British Association, says: "I feel profoundly convinced that the argument of design has been greatly too much lost sight of in our recent zoological speculations. Reaction against the frivolities of teleology, such as are to be found, not rarely, in the notes of the learned commentators on Paley's 'Natural Theology,' has, I believe, had a temporary effect in turning attention from the solid and irrefragable argument so well put forward in that excellent old

[1] "Religion and Chemistry," p. 155.

book. But overwhelmingly strong proofs of intelligent and benevolent design lie all around us, and if ever perplexities, whether metaphysical or scientific, turn us away from these for a time, they come back upon us with irresistible force, teaching us that all living beings depend on one ever-acting Creator and Ruler."

This is clear and outspoken. It was addressed to the most august body of scientists in the realm, men familiar with all the objections that have been urged against the old argument.

It is often instructive to observe how men of genius, of very different training and endowment, regard the same great question. Even John Stuart Mill, educated as nearly as possible in a religious vacuum, felt constrained to say: "It must be allowed that in the present state of our knowledge the adaptations in nature afford a large balance of probability in favor of creation by intelligence." [1]

Prof. Huxley with equal frankness acknowledges the cogency of the argument

[1] "Essay on Religion."

from design. He says: "The teleological and the mechanical views of nature are not necessarily mutually exclusive. On the contrary, the more purely a mechanist the speculator is, the more firmly does he assume a primordial molecular arrangement of which all the phenomena of the universe are the consequences, and the more completely is he thereby at the mercy of the teleologist, who can always defy him to disprove that this primordial molecular arrangement was *intended* to evolve the phenomena of the universe." [1]

Dr. Martineau makes a place for the argument from design in his philosophic "Study of Religion," with the following comment: "Advanced thought, also, like dress and manners, is not without its fashions and its fops; and many a scientific sciolist, who would bear himself *comme il faut* toward such questionable deceivers as 'Final Causes,' now thinks it necessary to have his fling at Paley and the 'Bridgewater Treatises.' He has it on best authority that Darwin has exposed their

[1] "Life of Darwin," Vol. I., p. 555.

imposture, and he must show that he is not going to fall into their trap. It is probable that, of those who speak in this tone, nine out of ten have never read the books with which they deal so flippantly; and it is certain that the tenth is incompetent to grasp the essentials of an argument, while letting its separable accidents fall away. . . I see no reason to doubt that Paley would have welcomed the new theory of organic life upon the globe, as a magnificent expansion of his idea."

Before we leave this subject, the argument from design for the existence of a Creator, let us look at it in another light.

In order to understand to any adequate degree the perfection of adaptation, we must study, as thoroughly as we may, a single case. So instead of seeking for new materials I have drawn illustrations from the things most familiar. Others are at hand and biology furnishes many more. The life history of the plant, the fertilization of the flower, the habits of insects, the adaptation of the organs of animals to the requirements of life on land, in air

and sea, the minute correspondence of organ and function to environment, all suggest as the most reasonable explanation of nature the intentional action of an intelligent being. It is difficult indeed for the unbiased mind to consider these things and not conclude that they are as they are because some one has made them so, and because he intended them so to be.

But to realize how certainly this adaptation can only be the result of intelligent design, it is well to set in array before our eyes the great number and variety of parts and the many ways in which their individual functions, seemingly separate, are made to work together harmoniously to the accomplishment of a single end.

Consider for a moment what is implied in normal human life, our ordinary daily life.

Conditions for Life

Life as we have it is possible only in a very narrow area of the solar system as known to us. We are taught that a few miles beneath us the heat is sufficient to melt iron; not far above our heads is a cold sufficient to freeze mercury. Human life

and the things necessary for its maintenance have been gathered together in this very small section of the known universe.

We think of the orderly succession of periods of light and darkness, of the changing sky and varying seasons, all adapted to the physical and mental endowments of man, of atmosphere and soil, plant and animal, and we are sent back for causes to all that astronomy has taught of the delicate adjustment of suns and systems, so that seedtime and harvest, and cold and heat, and summer and winter, and day and night should not cease; to all that geology has made known of the progressive changes through which the world has been brought to its present condition.

We think of the body and its environment, of the eye delicately adjusted for light, of light bringing its message from near or far in such form that the eye, and the eye alone, can interpret it, of the ear formed so fairily for sounds and harmonies made for it.

We think of the parts of the body, of

their separate functions, their mutual relations, of the streaming currents of the blood, of bone and muscle and tendon, of nerve and brain, each a unit in its individual structure, each a part contributing to give the whole completeness.

We may not stop here. We see that the body as a whole is not made for itself as an end, but is fitted to be the instrument of mind.

We think of that mind holding the mystery of our own personality, holding the potencies that determine the issues of time and eternity, self-conscious, curious to inquire into the meaning of things, impelled to look beyond the seen and find the cause of things, eager to grasp reality, yet in tutelage now amid these earthly phenomena.

We think of our advanced social condition worked out by man truly, but only possible because of ordinances established in the constitution of existence, with which man had no more to do than with the origin of gravitation.

Yet all these have been brought together

and co-ordinated in that thin belt of space which surrounds our planet. If this co-ordination is an accident, the result of fortuitous causes, then that accident is the most astounding miracle of chance man was ever called upon to believe. Such harmony culminating in intelligence cannot be the result of blind force.

If any one, in view of such considerations as these, is haunted by the so-called difficulties of belief in a Creator, I would ask him if he has ever seriously considered how much more formidable are the difficulties of unbelief.

In brief then the argument from design is this: The study of nature shows us, in the interaction of its materials and forces, in the life of plant and animal and man, contrivances so numerous, so elaborate, so refined in detail, yet all working toward a common end, that reason is compelled to the conclusion that the world is the work of an intelligent Creator. If we reject this explanation we have no other, because to reject this is to stultify the reason that has been given us as our guide.

II

OBJECTIONS

Can you doubt whether these things, wrought with such forethought, are the works of chance, or of intelligence?

—*Socrates*

II

Every great truth that bears upon the highest interests of man has found opposers; and we need not wonder that there are those who question the validity of the argument from design. Truth costs nothing; not so belief. Truth is given away; belief rests on conviction and must be acquired, often only after a long struggle against inclination, prejudice, fashion, and the spirit of the age.

It is not the least valuable part of the discipline of life that each of us must find out for himself what is worthy of belief amid hostile views, must contend for his creed, if he would have a good one, as the warrior of old fought for the spurs of knighthood, and with more than one vigil-at-arms.

It is sometimes said that we see in things what we want to see. Let us appropriate the small fraction of truth this

saying contains, and make sure that what we want to see is the truth of things.

I do not think the search for truth is so difficult an enterprise as it is often represented, if there is first a loyal purpose. Of opposing teachings offered us, many may be recognized at sight as worthless, and thrown away; others, by comparison, shown to be inferior, may be laid aside. Doctrines "with some truth in them" are not suitable; gilded brass is not the kind of material for character building; we want the pure gold of truth at any cost, and we may find it. Some teachings are good, that is, true; others are bad, they tend downward, they relax the moral muscle, they dull the nice sense of loyalty to the right, they are false. Doubt as you will with that scientific doubt that leads to a careful examination of the foundations of belief, but do not let any one cram you with the manufactured difficulties and objections of amateur skepticism, else you may find, by and by, that you do not know how to be honest with yourself.

Let us consider now some of the most

formidable objections that arise in our own minds or are urged by others against the argument from design.

The first is that the evidence is but partial. We can discover contrivance in some things, but not in all. In some cases the appointments of nature operate unfavorably, so far as we can judge.

The Evidence Partial

The answer to this is that we are unable to grasp the whole scheme and meaning of human existence in all its parts. If we can discover helpful contrivance in some things, especially those of which we know most, and which are most intimately concerned in our own well-being, as we do in the structure of our own bodies and the liberal provision made for our happiness in earth, air, water, food, we have *positive evidence* of benevolent design which no amount of negative evidence can invalidate.

In reference to the seemingly more weighty form of the objection that, looking from our own standpoint, we are obliged to regard some of the results of the working of natural law as hostile, there is a still

more weighty answer. Man is not intended to be a mere nursling waited on by the obedient processes of nature. So, he would always continue a baby; he was intended to become, in reality as well as in name, a man. Difficulties, obstacles, trials, are appointed him in order to make a man of him—if possible. There is nothing in which the evidence of design is more satisfactory than in the discipline of hardship appointed us in life, and which alone can transform the raw recruit into a good soldier.

The argument does not affirm that the works of nature are typically perfect. A wise man of the olden time has given us as a result of his observation, "I have seen an end of all perfection." We find admirable contrivance, catch a glimpse of a perfect plan; but in everything that relates to man, perhaps in everything for man's sake, there is a falling short of the perfect in execution. Man is out of harmony with his environment; he is a destroyer, a polluter, a discord. For him the whole creation groaneth and travaileth in pain. After

so many centuries of research the best explanation we have of this astonishing and humiliating fact is the simple story told in the third chapter of Genesis. The course of history, as well as our individual experience, has so uniformly sustained the fact of a "fall" that opponents of the grand old book have been unable to find any better argument against it than ridicule. In view of all this, we need not wonder if man sometimes finds the appointments of nature against him, and himself compelled, if he would recover his true standing, to undergo a discipline that is painful.

No teaching affords an explanation of the mystery of evil, but we should not miss the point of that ancient parable which refers its earthly beginning to a being, possessed of a certain intelligence and a certain freedom, who willed contrary to the appointed conditions of his being, so linking suffering with sin. The patriarch of Uz was given a course of object-lessons from nature to convince him that God knows best; for us, to assure us that God

loves best, there is the Cross; yet neither answer solves this darkest of earth's enigmas, though both emphasize the terrible reality of evil. However, the mystery is not wholly dark. "Made perfect through suffering" is anything but an unmeaning term to those who have learned how the soul refines and develops its noblest powers; and, much as we must regret the existence of moral evil, we know that character grows strong in proportion as we resist temptation. The purpose of trial in the evolution of manhood is not difficult to understand.[1]

Use of Mechanism

A second objection is more philosophical: Why should an infinite Creator make use of contrivance? If he wishes certain varieties of climate, why not ordain them, instead of endowing one or more substances exceptionally, and using them to construct a

[1] It is also a matter of fact that if Christianity is truthful in representing this world as a school of moral probation, we cannot conceive a system better adapted to this end than is the world, or a better schoolmaster than Christianity.—*Romanes*, "*Thoughts on Religion*," *p. 151.*

vast circulating system in sea and air to bring about the same result? Why not endow a simple membrane with the faculty of sight, instead of forming the eye with its admirable but complicated and delicate structure?

To this I offer the following answer. Man is designed to become a worker; for his education a long period of growth, and surroundings that incite to and reward activity have been afforded. The substances furnished in nature are his raw material; he can acquire skill to use them. The forces of nature are his slaves; he can find out how to slip their necks beneath his yoke. The laws of nature furnish the sure foundation on which he may build; contrivances in nature supply models for his imitation. Man's Creator is a worker as well, and in the constitution he has given to nature has put honor upon his laws by using them, thus surrounding man with lessons to stimulate his powers of invention and discovery, and to witness to the character and purpose of his Maker.

Coincidence Simulating Design

A third objection is, that the adaptations found in nature and interpreted as evidences of wise design may be simply coincidences, the result of accident, not purpose.

This can never be very formidable; it is of the order of objections men raise when they wish to escape a conclusion they suspect to be true. Such curious harmony of events without purpose does occur occasionally in the experience of every one, and may sometimes be invested by the superstitious with undue importance; but they are too rare, too trivial, too transient, too ambiguous, to be classed along with such significant facts as the anomalous expansion of water, the fitness of the bird's wing for flying, the man's hand for grasping, and others in almost endless array.

Evolution

Fourth: it may be thought that the doctrine of evolution, which occupies such a prominent position in biological speculation, furnishes an objection to the argument from design by rendering it unnecessary.

This theory is an attempt to explain the complexity of living things now on the earth by descent, with variation, from one or at least only a few primitive forms. It relies on known facts. (*a*) That the offspring resembles the parent—*heredity;* (*b*) that this resemblance is not rigid—*variation;* (*c*) that new characteristics acquired by variation may be preserved by inheritance; (*d*) that if this process could continue in a definite line for a sufficient length of time, differences might at last be produced in animals descended from the same ancestors such as those which now distinguish different species.

Clearly enough there is evolution in nature. The most superficial observer can scarcely fail to notice, "First the blade, then the ear, then the full corn in the ear." Whoever will set himself to find out how the seed cast into the earth springs up, will find more evolution; and yet more if he follow the transformations through which the germ becomes the animal. To extend the process and make it account for the origin of all the differences

that distinguish the various species of plants and animals was an idea likely to occur to some speculative mind; and it did occur long ago. But the difficult part of the work remained, to explain the explanation, to assign a sufficient natural cause to evolution. The eager discussions of the day show us that this has not yet been done to the satisfaction of all naturalists.

Mr. Darwin's name is associated with an explanation which, if it does not assign a sufficient cause, is believed by many to point out a true cause. He noted the success that attends the breeder's efforts to produce new varieties of animals possessing valuable qualities, speed, strength, beauty,—a process which may be called *artificial selection*,—and he reasoned that similar changes might be produced by natural agencies and result in specific differences. This is *natural selection;* the breeder's office is performed by that thing we all hate and fear so much, yet which, curiously enough, seems to be the uniform attendant of all earthly progress, want.

Life's family soon becomes so large that there is not enough food to go around, and there results from this awkward state of affairs that struggle for existence with which we are all so sadly familiar. In this the fortunate possessor of a helpful variation, or a ready adaptability to new conditions, is victor. There is thus brought about, by this survival of the fittest in the struggle for existence, what we now see, a great variety of plants and animals nicely adjusted to the conditions of the world in which they live, their *environment.*

Whether or not the different factors already proposed, natural selection, sexual selection, the reaction of organism and environment, strain produced by effort, any or all of them, afford a sufficient mechanical explanation of the mechanics of evolution is a scientific question, to be answered by scientific investigation. If such explanation has not yet been found it is reasonable to believe that it will be; but when found it will reveal merely mechanical processes,—including physical and

chemical,—furnishing more adaptations to enforce the argument from design.

Granting that there has been evolution in nature, we notice that it emphasizes certain considerations which argue strongly for belief in a Creator.

Conclusions from Evolution

1. As to the origin of life. Evolution substitutes a natural process, modification of a living organism, for special creative acts in the origin of species—using the term origin very much as we do when we speak of the origin of a city. Of the origin of the first living being it can tell us nothing; it is obliged to assume it. Evolution is not a substitute for creation; if things were evolved, that does not imply that they evolved themselves, much less that they evolved themselves out of nothing.

2. The cause of the adaptation of the living being to its surroundings. Life is possible only under certain definite conditions, to which the organism must be nicely adjusted. Evolution is obliged to assume these adaptations as existing.

3. The occurrence of favorable variations. Granting that natural selection accounts for the preservation of such variations as are useful to the being in its struggle for existence, it can give us no aid in understanding how these helpful variations are produced. It must assume a tendency to fitness operating in nature.

4. The continuous progress of evolution along definite lines, as in the formation of the skeleton, the teeth, or the eye of the higher animals. The insufficiency of evolution without the guidance of intelligence is very evident here.

5. The progressive harmonious variation of the different parts of animals which naturalists describe as necessary to the production of new species. Mr. Darwin speaks of the whole organism as being "so tied together during its growth and development, that when slight variations in any one part occur, and are accumulated through natural selection, other parts become modified." Accidental variation cannot account for harmonious variation.

All these limitations of the theory have

been pointed out by its leading expounders. It gives us a magnificent extension of our view of the order of the world, but it cannot even attempt to account for the origin and maintenance of that order. It modifies our conception of the manner in which the adaptations seen in nature were produced, but only renders it more reasonable to regard them as the result of intelligent purpose.

The evolutionary process may even be carried back and applied to the original material of nature. We have only to assume that during the cooling of the nebula from which our solar system was formed, different associations of matter took place; those best fitted to the conditions remained; the unfit dissolved to give place to the fit. Thus our world and all that it contains, living and not living, was developed by natural processes, acting under one great law, from a material relatively simple and formless.

Evolution is a grand hypothesis, in accord with much that we know, and holds the field as the most probable conception,

in the present state of our knowledge, of the method of the Creator. But it is merely a method, it is neither a cause nor a force, and itself requires to be accounted for.

Granting the existence of matter and energy, no imaginable interaction of the two would produce any tendency to fitness, unless conditioned by an intelligence recognizing what is fit. An infinite number of attempts under the guidance of fortuity would only lead to chaos worse confounded, not to the astonishing complexity and harmony of adaptations which nature everywhere reveals. There would be no tendency through immeasurable ages to the conditions that fit water for its uses or the eye or the ear to its functions, unless behind the operations of nature acted One who worketh all things after the counsel of his will.[1]

"Mere Analogy"

But here the skeptical philosopher may startle us with a fifth objection that is at least intended to be fatal. The argument from skillful contrivance to intelligent

[1] "Relics of Primeval Life," Dawson, p. 323.

design is legitimate, he may tell us, only so long as it confines itself to human workmanship; we may not extend it beyond.

This entirely misstates the argument, which is not a mere reasoning from human works to divine, by analogy.[1] What is claimed is this, that wherever we behold useful results evidently produced by skillfully contrived and nicely adapted means which our intelligence can appreciate, there we must recognize the design of an intelligent being. It is the imperative demand of reason; to refuse it would be to turn the light that is in us to darkness.

Another last objection, really breathing slaughter, comes not from a philosopher, but from a popular exponent of modern infidelity. It is this: If a watch must have had a maker

Causation

[1] The design argument is not drawn from mere resemblance in nature to the work of human intelligence, but from the special character of this resemblance. . . The argument, therefore, is not one of mere analogy. As mere analogy it has its weight, but it is more than analogy. It surpasses analogy exactly as induction surpasses it. It is an inductive argument.—*J. S. Mill*, "*Essays on Religion, Theism*," *pp. 169, 170.*

because it exhibits skill and the adaptation of many parts all working together to one end, and man, who made the watch, and exhibits in his nature these same qualities to a much greater degree, must have had a Maker, then, for a still stronger reason the Maker of man, so much more wonderful than man, must also have a maker; and the argument from design is reduced to an absurdity. Absurdity enough there is, not in the argument from design, but in the reckless confusion of thought and misstatements contained in the objection.

Of the existence of anything that now is, two—and only two—explanations are possible. It may have existed always, that is, may be eternally existent, which means self-existent; or it may have come into existence, in which case it must have been brought into existence, for the very sufficient reason that from nothing nothing can arise. The things whose history is limited within the time-duration of our globe are events, things which have begun to be, and of these we speak when we say "every event must have a sufficient

cause." But it is dire bungling to say that everything that exists must have had a cause, for the first cause, the cause of all, must have been uncaused. It is merely a modification of this conception, not another explanation, to speak of cause behind cause in infinite series, man's effort to divide eternity into time-stages, so that he may reach what intelligence demands, the first Cause, the supreme reality.

Evidently, if we could fix upon a point in the past where it might be truly said that nothing existed, then nothing could now exist, for out of nothing nothing can arise. The present existence of anything necessitates the eternal existence of something. But we do reach a point at which we are compelled to say, "Beyond this nothing existed save the Eternal."

Thus our own existence and the existence of the world about us proves that something must have existed always, the Cause of all, uncaused. Science, as well as religion, answering the cry of the human heart, authorize us to clothe that cause with the attributes of personality.

That question of the child, "Who made God?" I hope no parent or teacher—surely no Christian parent or teacher—finds difficult of answer. If the heathen Plato, guided by the light within, could teach that we should not attribute time relations to the Infinite One, that we should not say that God was, or will be, but that God is, his existence an eternal present, certainly with the sublime doctrine of the I AM before us, satisfying heart and brain, we should not fail to give this conception to the unfolding mind, and let it feel at once its own minuteness and its own security, as we do more, in the presence of the Eternal Father. Because we know so little of the Supreme, makes what we do know all the more precious.

The belief in a Supreme Being is so securely imbedded in the human mind that it may fairly be called universal. I do not know that there never has been, or is not now, a race destitute of this belief; but all will admit that such a race must be most degraded. True, we meet rarely with men who have freed themselves, or

think they have freed themselves, from all such "superstition"; but their efforts to convince themselves that there is not manifested in the universe an intelligence superior to their own must be desperate and oft renewed. The story told of Napoleon's reply to the atheistic philosophers who were trying to emancipate him from the necessity of believing in God may be true or not, but it is suggestive. He is said to have pointed them to the stars, which were shining brightly above, and asked, "Gentlemen, who made these?" The story may be an invention; the question remains.

Next among these ideas from nature I place care. The Power that works in nature watches over all his works with a never-failing care. Two illustrations from chemistry show how this is taught. The object of the chemist is to find out what things are made of. Most substances existing in nature or produced by art are found to be compounded of two or more simpler substances intimately united. These simplest

Care

constituents of matter we call elements, that is, they are elements to us. Of these we know about seventy; all the known materials of our world are made up by combinations of these. Two of them united form water, two others our common table salt. The nature of this union among elements is most mysterious; we have as yet no explanation of it, for the substance they form by their union may be quite different from either of them. Common salt is made up of sodium, a soft, silver-white metal, that will take fire if you pour a few drops of water on it, and chlorine, a heavy yellowish green gas, which inhaled will cause instant death; yet the two united form this white, brittle solid so necessary to healthful life. These compound substances may be resolved into their elements, and the elements recombined to form the original compounds, by methods perfected through long years of patient research. Evidently the power that constituted nature wrought along lines where man may follow, slowly it is true, our limited intelligence recogniz-

ing intelligence to which we can set no limits.

As a thoughtful parent, packing the boy's trunk for his first long stay from home, might half conceal in some corner a written message which found would speak to his heart of loving solicitude; so our world, often seemingly indifferent to how we fare, has within it, only half hidden, messages for him who will read, showing an unmistakable care for his material comfort and intellectual advancement and spiritual growth.

It is not yet a hundred years since one of these messages, the solution of a great problem in chemistry, was first distinctly read and clearly enunciated. Then the discovery set the learned world in commotion; now it is but a commonplace of our text-books. It is that each substance has an *invariable composition*—the elements that form a compound are united in an exact proportion by weight, and this proportion never varies. Common salt, for example, always consists of twenty-three parts by weight of sodium and thirty-five

and five-tenths parts of chlorine, and no other proportions of these elements can be made to produce that substance.

It fell to the lot of John Dalton, the son of a poor weaver, who from boyhood had worked his own way, to give the full statement of this grand fact of nature and assign a satisfactory explanation, the famous atomic theory of Dalton. We may form an estimate of the value of Dalton's work when we remember that he is assigned a place among the immortals of science beside Newton.

Every advance of chemistry supplies new impetus to the progress of the world. It is instructive to consider how much the practical application of the discoveries of this science has contributed to individual well-being and national prosperity. It aids man in his work on the farm, in the mine, in the factory; it is ever present in the home; it watches over the preparation of food for the well and medicine for the sick. Roscoe says that the standing of a people among manufacturing nations may be estimated by the amount they use of one

of its products. An attempt to do without its aid would drop the most prosperous nations into beggary. As a means of education its methods of patient research and rigorous verification give it still greater value.

But we have higher needs than these. Can the discovery of the laws of chemical combination, that have proved so helpful as the basis of a science, aid us in answering any of those questions that express the loftier aspirations of the soul? Unquestionably it does. These laws point out to us that in the exact and unvarying composition of all substances we have ever present before us the evidences of unfailing care. A fragment of quartz picked up in a ramble may seem an unmeaning thing, but analysis will show that it is made up of two elements combined with an accuracy which our most delicate methods can only approach. And wherever one finds it, forming great masses of rock, ground to fragments and strewing the desert, trodden into the mire of the streets, or sparkling in the crystal, it will

yield the same elements in the same unvarying ratio. And the like is true of every other compound.

The mind turns spontaneously to the question of Isaiah: "Who hath measured the waters in the hollow of his hand, and meted out heaven with the span, and comprehended the dust of the earth in a measure, and weighed the mountains in scales, and the hills in a balance?" To-day question and answer are re-echoed, not alone by poet and seer, but by the worker in the laboratory, where men put nature to the torture by fire, pry into its secrets with the microscope, weigh its testimony in the balance, examine its answers in the dry light of science, and with the precision of the mathematical formula.

Additional testimony to the same truth comes from another source. Not only has each substance a fixed composition, but it has a definite internal structure—a plan on which it is built. This is shown externally in those regular geometrical forms called *crystals*, which minerals tend to assume

Plans in the Dust

when allowed to solidify undisturbed. We find them in nature; but the testimony of things is most forcible when it comes as an answer to our own questions. Take a pinch of table salt, dissolve it in a teaspoonful of water, spread the clear liquid on a glass plate, and watch it through a lens. The water dries up and the solid is deposited on the glass plate. This was to be expected, but not so the manner in which it is done. The solid is not left as an incrustation on the glass, but the invisible materials are drawn away from intervening spaces, and built together into regular forms—tiny cubes with beautifully sculptured faces.

The significance of all this is not easily overrated. The power behind nature is here seen at work, operating according to a clearly defined plan toward a definite end. But there is more than power and intelligence shown in this; there is the added revelation of care, care that extends to the invisible particles of matter and handles them more deftly than the skilled builder can handle his materials. So other sub-

stances yield results, like but varied, for the builder of the universe is not limited in mechanics.

Any one who has watched this process closely, has seen the symmetrical bodies take shape under the microscope, gathering into isolated crystals, branching out at definite angles, shooting up in bundles of divergent fibres like the lines of an advancing host, will remember the awe inspired by the sight. It seems as though one could almost hear the order given that called each well-drilled particle to its place in the ranks. "Consider the lilies how they grow" was the lesson of the world's supreme Teacher to the worrying and the disheartened. For the inquiring and halting of our day, science utters the same implied assurance; for the power that watches over the minutest particles of matter cannot be unmindful of the need of the human soul.

This assurance of the care of the Creator is a very precious thought to us, and it is the more significant to find it taught in nature, the workmanship of the Creator,

because nature often appears heedless. Its forces are so resistless that they seem as ready to crush us as to nourish us. It is so boundless that our own individual existence appears too insignificant to be regarded.

We not unfrequently meet with arguments framed in this way—it is a favorite with the professional vender of difficulties and objections: The universe is too wide, he says, with its space without limit, worlds and suns numberless and vast, to allow us to believe that the great Creator has devoted so much attention as the Christian scheme declares, to this little planet of ours which, looked at from a moderate (astronomical) distance, would appear but as a mote in the sunbeam.

An ingenious writer, familiar with the resources of rhetoric, may pile up from such materials a very threatening mountain of doubt. Dr. Draper has done this in that wickedly inaccurate book "A History of the Conflict between Religion and Science." It would be pertinent to ask such reasoners just how large a world or a creature must be before its Creator could

see it or deem it worthy of attention, more pertinent to point out that he who guides the course of events in nature and human history has shown a decided preference for the use of agents weak and small. An island is built up in the ocean by the labors of that tiny workman, the coral polyp; a continent is composed of grains of sand and clay; nay, according to our best science, the world itself is formed from atoms. History bristles with similar illustrations, showing what feeble agencies have been employed to mold the character of a nation, shape the destiny of the world. The direct and unequivocal testimony of the science we have been following is this: There is not a mountain, however huge, or a particle, however small, that does not bear witness by the uniform composition and structure of its materials to an overruling care that neither fails nor forgets.

Matter Created

The unvarying composition of all kinds of matter shows that they are constituted of exact, weighable quantities. Thus any sample of common salt yields its ele-

ments, sodium and chlorine, in the ratio of twenty-three parts by weight of sodium to thirty-five and five-tenth parts of chlorine. These are called the combining weights of those elements and recur whenever either of them combines with any other element. Numbers representing the combining weights of the other elements are found in a similar way. These significant facts have led to a belief that matter is composed of *atoms*, minute indivisible parts having a fixed weight, the combining weight above referred to, and consequently always the same for the same element, but different for different elements. According to this explanation, the numbers twenty-three and thirty-five and five-tenths represent the weights of the atoms, or least parts, of sodium and chlorine, in terms of the lightest atom known, hydrogen. One atom of sodium and one of chlorine united by chemical affinity form a molecule or least part, of the substance common salt.

From these weighable quantities or atoms that compose all bodies, another idea has been derived by two philosophers of the

first eminence, Sir J. W. Herschel and Professor Clerk-Maxwell. It is that matter declares itself to be a created thing. The term atom, or that of molecule, is used in the discussion on account of its definiteness, not because the argument relies on the atomic theory; for it rests on the uniformity of the combining weights as shown by analysis and is unaffected by theory.

Before quoting the words of these authorities, let us consider the question to which they apply. One of our greatest intellectual difficulties is to form any satisfactory notion concerning the origin of things. How did nature come into existence? True, it is quite as impossible for the finite mind to comprehend present existence, with all it implies, as to grasp the idea of origins. But of our own present existence we have the direct evidence of thought, and the experience of external things gained through the senses convinces us of the existence of realities outside us; while the beginning transcends both thought and experience. Reason and sense compel us to believe in the existence of an

external world, but afford no hint or analogy to aid us in understanding how it came into existence.

Starting with the certainty of present existence, we find it necessary to believe in the eternal existence of something. Are matter and energy thus eternal? or are they dependent entities, creatures of a first Cause? It is true that there is a very simple solution offered in the words, "In the beginning God created." God is the eternal existence; besides him and his creation nothing exists. But this solution, although it is admitted to afford the only sure and sufficient basis for both science and philosophy, is not acceptable to all.

A belief in the eternal existence of matter is sometimes adopted as an escape from the theory of creation. Leaving out of the question all other considerations, it would evidently be most satisfactory if matter itself could testify concerning its own origin, as the gold coin testifies of the mint in which it was struck. This is what it is claimed to do by Herschel and Maxwell, examining it in the light of the most

advanced scientific research. Their argument is briefly this: The atoms of each element exist in countless multitudes, but are all alike; this effectually disposes of the idea of an eternally existing, that is a self-existing, matter, because it shows that the atoms have all the essential qualities of manufactured articles, like similar parts of many watches, all made in the same machine. To make sure that we do not miss the great significance of this, let us borrow light from an illustration.

A friend shows you a rounded pebble of limestone which he tells you he picked up on the seashore, and he maintains that it was brought to its present form by the action of the waves. You are inclined to believe him and agree with him, not only because of his assertion and apparent sincerity, but because you have noticed that the tendency of such action is to give a rounded form. On closer examination you find that the pebble is an exact sphere. Doubt arises; here is an exactness that is seemingly incompatible with the action of forces not guided by purpose. Then your

friend shows you a second pebble of the same material and appearance as the first. You are now almost certain that his explanation of the manner in which they were formed is erroneous. Proceeding in the inquiry you find that the two pebbles have exactly the same size, shape, and weight. Now you are fully convinced that your friend is wrong; the exact shape and the perfect equality of weight suggests design as the only rational explanation.

But he has scores of them, all like the first, and other spheres of granite, others of quartz; all of the same kind are alike, but each kind differs from all the other kinds. You look at them and you *know* that they are manufactured articles; each kind testifies that it is as it is because some workman, and a very skillful workman, designed that it should be so and made it so.

The Uniform Myriads

Now apply this reasoning about the pebbles to the atoms of the elements or, what is the same thing, to the combining weights of these elements. We prepare

hydrogen in the laboratory to-day by pouring an acid on a metal; it has certain properties by which we recognize it, a certain proportion by weight in which it unites with other elements, its atomic weight. We procure it from coal which has lain for ages in the earth's crust; we extract it from a meteorite that has come from no one knows where in the regions of space. Its properties are the same, its atoms are the same, no matter where procured, or in what quantities. This unvarying sameness of the atoms is as truly the manufacturer's stamp as is the uniform impression on the coin.

For fear of misapprehension let us turn around and look at the subject from the opposite side. Suppose some one asks: "Why may not these atoms be all alike and yet self-existent?" On this supposition each atom is a separate, independent existence, self-caused. That even two should arise just alike is in the highest degree improbable. That the millions which have been examined should have all been alike is impossible, unless they all had a connection in origin sufficient to secure

this uniformity. Such connection in origin simply means that one being made them all.

Now I think we are prepared to comprehend the significance of the opinions given by the two philosophers I have named.

Sir J. W. Herschel says: "Chemical analysis most certainly points to an origin, and effectually destroys the idea of an eternal self-existent matter, by giving to each of its atoms the essential character at once of a manufactured article, and a subordinate agent." [1]

The following are the words of Professor Clerk-Maxwell: "Each molecule throughout the universe bears impressed on it the stamp of a metric system as distinctly as does the *mètre* of the Archives at Paris, or the double royal cubit of the Temple of Karnac.

"No theory of evolution can be formed to account for the similarity of molecules, for evolution necessarily implies continuous change, and the molecule is incapable of growth or decay, generation or destruction.

"None of the processes of nature, since

[1] "Dissertation on the Study of Natural Philosophy."

the time when nature began, have produced the slightest difference in the properties of any molecule. We are therefore unable to ascribe either the existence of the molecules or the identity of their properties to the operation of any of the causes which are called *natural.*

"On the other hand, the exact equality of each molecule to all others of the same kind gives it, as Sir John Herschel has well said, the essential characteristics of a manufactured article, and precludes the idea of its being eternal and self-existent.

"They continue this day as they were created, perfect in number and measure and weight, and from the ineffaceable character impressed on them we may learn that those aspirations after accuracy in measurement, truth in statement, and justice in action, which we reckon among our noblest attributes as men, are ours because they are essential constituents of the image of Him who in the beginning created, not only the heaven and the earth, but the materials of which heaven and earth consist."[1]

[1] "Nature," Vol. IV., p. 270.

III

ENERGY

In contemplation of created things,
By steps we may ascend to God.

—*Milton*

III

These discussions were begun with a sentence from a text-book of chemistry, "The sensible universe is made up of matter and energy"; matter, the material of which all bodies consist; energy, that which produces changes in matter. The forces of nature, light, heat, electricity, chemical affinity, are described in science as different forms of energy. It is found that these may be converted one into another, through many changes, without loss. This is expressed in the scientific doctrine of the conservation of energy, the word conservation, firmly imbedded in scientific language, implying the belief that, as with matter so with energy, there is a Power in nature that preserves.

A very hasty glance at some of the properties of the substances best known to us showed that science, though dealing with material things, does not justify ma-

terialism, but that the order manifested in nature leads us up to a Divine Intelligence as its cause. The exact composition and individual structure of each kind of matter proclaim immanent care; the invariableness of the atom shows it to be the work of a Creator. An inquiry into the nature of energy leads to the conclusion that it also is a dependent existence.

We observe that not all the exhibitions of energy we see are due to what we call natural causes. Some of them are produced by man. The rush of the train; the motion of factory wheels; the immeasurable activities which civilization employs, are of this kind. The motion of a ball thrown by the hand is traced to the motion of the muscles of the arm of the thrower acting in obedience to his will. In like manner, all the varied motions just referred to are directly traceable to the same origin, the human will acting according to a preconceived plan. Thus all exhibitions of energy which we are able to trace to their source, lead us to the same source, the will of an intelligent being.

Let us listen to what the men who have studied the subject most profoundly, both from the side of science and philosophy, have to say about the inference fairly deducible from this.

Scientists find Will

Herbert Spencer: "The force by which we ourselves produce changes, and which serves to symbolize the cause of changes in general, is the final disclosure of all analysis. . . All other modes of consciousness are derived from our own consciousness of exerting force."

Sir John Herschel: "It is but reasonable to regard the force of gravitation as the direct or indirect result of a Consciousness or a Will existing somewhere."

Dr. Carpenter: "Force must be taken as the direct expression of Will."

Sir William Grove: "In all phenomena the more closely they are investigated the more are we convinced that, humanly speaking, neither matter nor force can be created nor annihilated. . . Causation is the will, creation is the act, of God."

The Duke of Argyle: "Science, in the

modern doctrine of the conservation of energy and the convertibility of forces, is already getting hold of the idea that all kinds of force are but forms and manifestations of some one central force issuing from some one fountain-head of power. . . This one force, into which all others return again, is itself but a mode of action of the Divine Will."

These considerations are sufficient to assure us that nature, interpreted according to the most advanced science by the men best qualified to interpret it, proclaims a personal God as its maker and ruler. It does not make known merely a great Architect of the universe, but a Creator; it is at one with religion in referring both matter and energy to their origin in Eternal Mind.

Is God Unknowable?

But can the finite mind know the Infinite? Who was it that asked, "Canst thou by searching find out God?" The great ingenuity with which doubt has been cast on man's ability to know that there is some reality behind the phenom-

ena of mind and matter, has given us, through various changes, the cleverest of all devices yet hit upon for dismissing the thought of God. This is agnosticism, presumed by its adherents to have some special attractions for the student of science. The name agnosticism is of recent origin, but the doctrine dates back at least as far as Hume. Huxley and Spencer are its greatest modern exponents. The agnostic does not affirm either the existence or the non-existence of God; he holds that to assert the one is as unphilosophic as to assert the other.

Herbert Spencer began his "First Principles" with an introduction containing his statement of the argument: "The objects and actions surrounding us, no less than the phenomena of our own consciousness, compel us to ask a cause; in our search for a cause we discover no resting-place until we arrive at the hypothesis of a first Cause; and we have no alternative but to regard this first Cause as infinite and absolute."

He then uses and extends Mansel's ar-

gument, the sum of which is, that the human mind cannot comprehend the infinite and the absolute, that every form of thought under which we attempt to conceive of either leads to conclusions that are unthinkable.

Much of this is no doubt true. As long ago as the time of Job it was clearly understood that man cannot find out the Almighty to perfection. Whenever man undertakes to do this, his search will lead him into contradictions of thought; but this does not prove, as the agnostic argues, that God is both unknown and unknowable. Mr. Spencer is a man of great speculative ability, possessing a very extensive, if not profound, acquaintance with science. It is hard to understand how any one can read his works without admiring the power he has shown in the gigantic outline he has sketched, and the work he has done upon it. He deals largely in dogmatic statement, and his judicial method is liable at first to produce on the reader the impression that he claims absolute inerrancy. This of course will not be conceded to any

man, and while we grant freely the great value of much he has done, we need not apologize for testing his speculative views before adopting them. Just now let us consider this one question: "Is it certain that man cannot know anything of God?"

First, the incomprehensible is not necessarily the unknowable. There are many things we cannot comprehend, space, for example, and Spencer includes space and time in the unknowable. Now if any of us were to awake at midnight and find the building all about us wrapped in flames, our movements would at once show that we possessed some definite and valuable knowledge of time; and if we were compelled to leap from a window to save our lives, we would greatly prefer a first-story window to a fifth-story one, because of something which we know for a certainty about space. In like manner a thing may be unthinkable to us and yet quite true. The passage from the last physical effect produced by the activity of a sense organ to the thought which follows this activity is unthinkable. Nothing more truly de-

fies man's power of conception than the passage from the disturbance of the physical apparatus of hearing by the waves of the air to that elevation of soul which we experience when we listen to grand music or sublime oratory.

It must be borne in mind that Spencer does not deny the existence of God; he claims not to weaken but to strengthen that belief, for he says "only in a doctrine which recognizes the unknown Cause as co-extensive with all orders of phenomena can there be a consistent religion or a consistent philosophy." What he wishes to convince us of is that the Cause is not only unknown but unknowable. In this he has undertaken an impossible task; the stars in their courses fight against him.

The Agnostic's Difficulties

Second, the agnostic's practice is not in accordance with his preaching. He conditions the unconditioned. He declares that he knows nothing about God, and seeks to convince others that they can know nothing, yet he proclaims that God

is unknowable. It is no play upon words to say that to know this he must know much about God. In truth, the agnostic is the man who knows altogether too much about God. He knows more than is true; more than he can give any adequate reason for. He knows, or professes to know, that the Infinite Creator whom he confesses cannot make himself known to man in any degree; that man, even with divine aid, cannot know anything about his Maker. And all he has to offer in evidence is the well-worn truism, "The finite cannot comprehend the Infinite." As a matter of fact, we are able to know something of any intelligent being whose work we have an opportunity to examine, though we are utterly unable to comprehend being in any mode.

Granted only the foothold of faith which the agnostic admits,—an infinite, independent First Cause,—it follows that the system of nature, the sum of effects, is his work; and this work studied with honesty and humility is found to be intelligible, and does enable us, not to comprehend God,

but to apprehend many things about him. It gives us the strongest reasons for believing that God is, and that he is not only powerful but also wise and benevolent.

There are not wanting, even now, signs that the charm of the new device is broken. The men who can be attracted by a God of whom nothing can be known are mainly those who do not wish to retain the thought of God. A creed with nothing in it is scarcely worth professing; most of its willing adherents gravitate away from it toward blank negation. The few who were deceived into believing that evolution had dethroned God, and hastily, though sadly, renounced their faith in him, come at last to see, as George Romanes did so lately, that in the fiercest glare of scientific truth Christianity is a wholly reasonable belief, and return to it with joy.

Those acquainted with the biological advances of the past quarter of a century are familiar with the name of George Romanes. A graduate of Cambridge, he soon distinguished himself as an original investigator and brilliant writer. He had been

educated in evangelical views, which he loved and defended. In 1873 he won the Burney Prize with an essay on "Christian Prayer and General Laws," and was regarded as a champion of the Christian faith. Then came the fierce contest between popular theology and a rising science, which seemed to many, and to Romanes among the number, about to establish the reign of materialism. In 1878 he published a book entitled "A Candid Examination of Theism," in which he rejected belief in a personal God and Christian revelation, not flippantly, but sincerely and with sorrow. In their place he accepted the agnostic philosophy. Later in life he began to apply his skepticism to the examination of his doubts about religion, and found that they gave way under the test, found that it is "reasonable to be a Christian believer." At his death he left a manuscript containing the notes for a work he had intended to write. These notes are now published under the title "Thoughts on Religion." They are the record of a very real search after truth,

and give a satisfactory answer to the question, "What bearing has the science of our day on belief in God and the Bible?" Jesus Christ made a place in his church for the honest skeptic who wants evidence before he believes, and is ready to believe when he gets it.

The character of Romanes is so manly and attractive, his intellect was so vigorous and healthy, his search for truth so real, so persistent, and at last so successful, that I have selected a few passages from his "Life,"[1] written by one who shared his inmost thoughts, in order that we may learn his secret and take new courage from the helpful lesson of his experience. It is a lesson for the time, especially a lesson for young thinkers, coming in their turn to some slight degree face to face with things as they are, and wishing, as all should wish, to think for themselves. Too often, in this mood, the swellings of conceit may be mistaken for the workings of new truth within; or the mere desire to be free from

[1] "Life and Letters of George John Romanes," Longmans & Co.

the restraints of Christianity impels one to join the cry, "Let us break their bands asunder, and cast away their cords from us." It is a time to think earnestly, prayerfully; to make sure that we choose the best, that is, the truest—the eternally true.

"In addition to other scientific and purely philosophical work, Mr. Romanes had, even while writing his Burney Prize, entered on that period of conflict between faith and skepticism, which grew more and more strenuous, more painful, as the years went on, which never really ceased until within a few weeks of his death, and which was destined to end in a chastened, a purified, and a victorious faith. His was a religious nature, keenly alive to religious emotion, profoundly influenced by Christian ideals, by Christian modes of thought. As time went on he felt, like all philosophically minded men, the impossibility of a purely materialistic position, and as he pondered on the final, ultimate mysteries, on God, immortality, duty, he arrived very slowly, very painfully, but very surely, at the Christian position.

"But the years were, to him and to many, years of peculiar and of extraordinary difficulty. Roughly speaking, the time between 1860 and 1880 was a time of great perplexity to those who wished to adhere to the faith of Christendom."[1]

"In 1878 he had touched the very depths of skepticism, and he would have rejected the idea of a possibility of return, and would have rejected it in terms of unmeasured regret."[2]

"The reaction against the conclusions of the essay [his 'Candid Examination of Theism'] set in far sooner than has been at all suspected. Perhaps the first published mark of reaction is the 'Rede Lecture,' of 1885."[3]

"Many influences were working in him; a ripening judgment, a growth of character, a deepening sense of the inadequacy of scientific research, philosophical speculation, and artistic pleasures to fill the vacuum in the soul of man."[4]

[1] "Life and Letters of George John Romanes," p. 81.
[2] *Ibid.*, p. 87. [3] *Ibid.*, p. 86.
[4] *Ibid.*, p. 261.

A beautiful little sonnet written about this time (1890) tells better than anything else the story of his longings:

I ask not for thy love, O Lord ; the days
Can never come when anguish shall atone.
Enough for me were but thy pity shown,
To me as to the stricken sheep that strays,
With ceaseless cry for unforgotten ways—
Oh, lead me back to pastures I have known,
Or find me in the wilderness alone,
And slay me, as the hand of mercy slays.
I ask not for thy love ; nor e'en so much
As for a hope on thy dear breast to lie ;
But be thou still my shepherd—still with such
Compassion as may melt to such a cry ;
That so I hear thy feet, and feel thy touch,
And dimly see thy face ere yet I die.

And so the soul struggle went on, side by side with his splendid work in biological research, in which his interest never flagged to the last.

"Nothing can be more erroneous than to suppose that the change in point of view was sudden, or due to any fear of death, or that it caused mental suffering to the author of 'Thoughts on Religion,' or that

he was influenced by any one, priest or layman." [1]

Not long before his death he said: "I have now come to see that faith is intellectually justifiable." [2]

"The change that came over his mental attitude may seem almost incredible to those who knew him only as a scientific man; it does not seem so to the few who knew anything of his inner life. To them the impression given is not of an enemy changed into a friend, of antagonism altered into submission; rather is it of one who for long has been bearing a heavy burden on his shoulders bravely and patiently, and who at last has had it lifted from him, and lifted so gradually that he could not tell the exact moment when he found it gone, and himself standing like the Pilgrim of the never-to-be-forgotten story, at the foot of the Cross, with Three Shining Ones coming to greet him." [3]

Lastly, it should be remembered that this change from Agnosticism to Christi-

[1] "Life and Letters of George John Romanes," p. 372.
[2] *Ibid.*, p. 379. [3] *Ibid.*, p. 382.

anity was not due to any decline in intellectual vigor, but was the deliberate act of ripened powers and mature judgment. In the obituary notice written for the Royal Society, Dr. Burdon Sanderson says: "Up to the end he preserved not only his mental vigor, but the keenness of his interest in his scientific pursuits."

One cannot help thinking with regret how much lasting value might have been added to the helpful and illustrious career of Huxley, if when he quarreled with ecclesiasticism he too had turned to a patient search for the faith that satisfies, to be guided at last to the school of Christ.

Attitude of the Leaders

I think there are many who do not know that what Gladstone has said of the master minds among men of affairs, is also true of men of science: the vast majority of the leaders in all departments are Christian men. The desperate and continued efforts that are made to produce the impression that science discredits Christianity are mainly the work of men who have no real knowledge of the doctrines of Christianity; it

is a work seldom joined in by any one who could be called a master in science. On the other hand, the ranks of all the sciences contain men unsurpassed in genius and attainments, holding that the author of nature is the God of the Bible, men who freely testify to the truth and value of Christianity.

Turning to the past we have the illustrious names of Kepler, Newton, Pascal, Herschel, Buckland, Faraday, Miller, Brewster. Among their worthy successors, yet living or but lately passed away, may be singled out Guyot, Joseph Henry, Asa Gray, Clerk-Maxwell, Carpenter, Balfour Stewart, Sir James Paget, Sir George Stokes, Sir Andrew Clark, Adams, Lockyer, Young, Lord Kelvin. Among chemists of high repute are Sir H. E. Roscoe, of England, and Professor Cooke, of Harvard. Among geologists, Geikie, the first authority in Great Britain; James D. Dana, Louis Agassiz, and Sir Wm. Dawson, in America. These and many others ranking beside or next after them, show by their Christian faith that nothing has yet

been discovered by scientific research which renders a belief in God unreasonable, or in any sense unscientific.

More than this is true. The free discussions now going on as the real bearings of the doctrine of evolution become more apparent, and the keen scrutiny of natural selection and other explanations of the method of evolution in the light of extended observation, tend to emphasize the dependence of nature on God, and illustrate anew the wisdom of Bacon's words: "It is true that a little philosophy inclineth man's mind to atheism; but depth in philosophy bringeth men's minds about to religion."

That the progress of knowledge has not weakened the force of these words we have the testimony of the foremost living representative of science, a man who has won the honor and gratitude of the world.

Lord Kelvin, a president of the British Association, president of the Royal Society, has also been chairman of the Christian Evidence Society. Speaking in the latter capacity he said:

"I have long felt that there was a general impression in the non-scientific world that the scientific world believes science has discovered ways of explaining all the facts of nature without adopting any definite belief in a Creator. I have never doubted that that impression was utterly groundless." [1]

These are Clerk-Maxwell's words: "I have looked into most philosophical systems, and I have seen that none of them will work without a God." [2] His biographer says of him: "For more than half of his brief life he held a prominent position in the very foremost rank of natural philosophers. In private life he was one of the most lovable of men, a sincere and unostentatious Christian."

Tyndall tells of dining with Faraday; before dinner Faraday said grace. Tyndall says: "I am almost ashamed to call his prayer a 'saying' of grace. . . In the language of Scripture it might be described as the petition of a son into whose

[1] "Report of Chr. Evidence Society," 1889, p. 45.
[2] "Life," p. 426.

heart God had sent the Spirit of his Son, and who, with absolute trust, asked a blessing of his father." [1]

Tyndall seems to have regarded Faraday with more than filial devotion; and it was no mere mild spiritual goodness that won his admiration. He says of him: "Here, surely, is a strong man. . . Underneath his sweetness and gentleness was the heat of a volcano," and he calls him: "Just and faithful knight of God." [2]

Michael Faraday was one of the few who in any generation can lay claim to the title of philosopher. He believed in God, not merely the God of the philosopher, an intellectual abstraction receding from us as we strive to approach, but the God of the Christian, the Heavenly Father, one who invites us to draw near, who asks us to open the door of our hearts to him, yet who grows grander and holier as we feel after him and find him.

There is abroad a spurious reverence which would destroy all helpfulness in re-

[1] "Fragments of Science," Vol. I., p. 420.

[2] "Faraday as a Discoverer," pp. 37, 171.

ligion, one that forbids us to apply any terms to the Author of nature except the most abstract and indefinite ones. This, we are told, is necessary in order to avoid the error of attributing human characteristics to the divine. Such warnings against anthropomorphism generally amount to this, that we must empty our words of all the significance they have for us before we use them in speaking of God, a course that reduces God to the unreal and religion to indifferentism.

On the contrary, the Bible has shown an insight into the nature of the human soul that human philosophy has been unable to attain, and in it the words employed to express the attributes of God are those whose strength and beauty have been made known to us by the holiest and most familiar experiences of human life. "Like as a father pitieth his children, so the Lord pitieth them that fear him." "As one whom his mother comforteth, so will I comfort you." "I have called you friends." This conception of God as the Heavenly Father, the Divine Friend, is

one which man need never mistake, can never outgrow. It will always stand above him to help him upward, whether he tills the field or guides the progress of the world. The minds foremost in science have not left it behind.

It has been said that the scientist, as such, is not peculiarly fitted to act as judge in matters of religion. There is reason in this; no one will hope to establish the truth of Christianity by counting votes, or by an array of great names, because we know that there are men of eminence in science, as in other departments of learning, who do not subscribe to the Christian faith.

Of these, it should be said in passing, not a few have never thoroughly studied the highest expression of religious truth as we have it in the life and teachings of Christ. This was the case with Darwin. He received many letters intended to draw from him some expression of faith in the great doctrines of religion. His uniform answer was, in effect: "I feel in some degree unwilling to express myself publicly

on religious subjects, as I do not feel that I have thought deeply enough to justify any publicity. . . Now I have never systematically thought much on religion in relation to science, or on morals in relation to society." [1]

With the majority of *active* opponents of Christianity, the case is quite different. They hold up a miserable caricature of Christian teachings, and proceed to demolish this caricature as though they were destroying Christian truth. This deceives mainly those who are willing to be deceived, for all fair-minded men agree that arguments against the perversions of a doctrine are of no avail as arguments against the truth of that doctrine.

But the Christian scientist, and he alone, can give a satisfactory answer to one grave question: "Does science render belief in Christianity unreasonable?" There are many who declare that it does, and it is in this case that the emphatic negative from

[1] "Life," Vol. I., pp. 275, 276. Very significant, as revealing belief, is a letter from Darwin to Romanes, published in the "Life" of the latter, p. 88.

such men as Newton, Faraday, Clerk-Maxwell, Kelvin, Dawson, is an assurance of the utmost value to us. They have tried both, tried them side by side during a lifelong experience; their deliberate verdict has immense weight.

The opinions of men who are at once candid and able can never be a matter of indifference to us, and admissions made by some of these who do not rank themselves as Christians, often help the puzzled inquirer by sweeping away from his path a host of the most popular objections to belief in Christ.

But if the study of nature not only allows, but favors such belief, how is it that we not infrequently hear the adjective infidel joined to the substantive science? There is no such thing as infidel science, though there are infidels who would gladly engage science to prop up their doubts; there are objections of science, falsely so called, and vain philosophies, but science truly so called, is not answerable for any of them.

Causes of Skepticism

The causes of skepticism are various. Not all men are anxious to find truth; not all are willing to accept it when they find it. The prime cause of defective faith is a defect of will. The claims of God are supreme—heart, brain, hand, everything. Many do not wish to acknowledge this claim; it humbles the pride of the human intellect that would be sufficient to itself, interferes with what they call their freedom of action, demands that life be devoted to the service of God; they have other plans. They will not consider that God's spiritual laws, like the natural, are revelations to us of the conditions to which we have been created subject, and only in obeying them can we be free; that in fact the evident purpose of our freedom is that we may find out what is true, in order that we may do what is right. Free thinking is good only when it leads to right thinking, for then only is it free. Much that is boastfully put forward as "free thought" is in reality thought in bondage to human frailty.

An unwillingness to give the heart leads

men to try to justify the refusal. Some seek refuge in metaphysical subtleties, and profess to doubt what they are asserting belief in by every thought and act of life; others collect the objections to Christian belief that have been accumulated during many centuries, and give their attitude that strange name, "thinking for themselves." The man who follows Paul or Calvin or Wesley, is at least as much an independent thinker as one who commits the guidance of his mind to Hume or Spencer, Mill or Ingersoll, and the former has the better leader. There is nothing especially "liberal" in rejecting the Bible.

Not a few have ranked themselves as disciples of Darwin, only because they have received an impression, often as vague as it is false,[1] that in some way that great naturalist has rendered belief in God no longer necessary. When Darwin's theory of the origin of species was first published it was hailed by materialists as

[1] In my most extreme fluctuations I have never been an atheist in the sense of denying the existence of a God.—"*Darwin's Life*," *Vol. I., p. 274.*

a confirmation of their views, and it was hastily assumed that natural selection had set aside the argument from design, nature's clearest testimony to the existence of an intelligent Creator.[1] There were naturalists who saw the fallacy of this conclusion from the first. Huxley admitted manfully that evolution leaves the argument from design just where it found it.

A few Christian scholars recognized in the new teachings fresh revelations of the glory of God, but the many were bewildered by the clamor of debate, and hastily committed themselves to a denial of the truth of the theory, instead of giving it a fair examination. It is so easy to brand a doctrine that offends our preconceived notions as "contrary to the Bible"; but that breaks the command to "prove all things," the only way in which we may find what is the good which we are to "hold fast."

[1] The design argument is not an instrument of scientific research; it is the only rational explanation of the ordered relations between the different parts of nature, the harmony which science reveals.

I trust we are growing wiser; but we have yet cause to heed Bishop Butler's warning not to claim for the Bible what it does not claim for itself. As we rid ourselves, one by one, of human improvements on divine works and ways, we are enabled to see more clearly that the rejection of Christianity finds no warrant in any discovery of science.

There are other causes that hinder men from coming to a knowledge of the truth, and one is the preoccupation of the mind. We may keep ourselves "too busy" with the pursuits of life, legitimate in themselves, to afford time to consider. The day may be so filled with the care of other things, business, teaching, study, recreation, as to leave not even moments for sober thought. We have been warned against this as one of the causes why men miss the kingdom of heaven. The student of nature is especially in danger from this source, as his pursuits are so absorbing and yield results so valuable.

Man is closely linked with material nature, that sum of created things made

known through sense. His life is dependent on material conditions, and he must know something of them or perish. He studies them, impelled by this necessity seconded by an innate desire to know, and the splendid rewards of his study are seen when we contrast the material civilization of New England with the squalor of the savage who once inhabited it; the contrast is not merely in material things, it is a contrast between the lore of the medicine man and the knowledge and culture of a Rumford or a Dana. For the study of nature we have the highest warrant, for nature is the creation of God.

It is not strange then, that men have devoted their lives to such uses. Knowledge of nature has grown slowly at first, for the reason that man persists in carrying with him a head full of preconceived notions and in trying to find realities to match his whims. The history of science furnishes one of the most instructive chapters in the study of human nature, showing as it does how hard it is for us to lay aside the childish mind and acquire the

childlike mind, the indispensable condition of gaining truth.

But science has flourished where man was free; has flourished most healthfully in lands that favored an open Bible. Now the time is forever past when even a Humboldt can be a representative of universal science. A man of many acquirements, a man of genius, may investigate only a very small part of the great field with anything that can be called thoroughness, and at the end he will be forced to confess that he needs to carry over his work into eternity, not because he has been disappointed in finding so little, but because he finds so much; and for every question he settles a score of new ones start up demanding solution. This is the explanation of the splendid humility of Newton, and others of like stamp.[1] Nature is greater than our

[1] I do feel profoundly grateful. But when I think how infinitely little is all that I have done, I cannot feel pride; I only see the great kindness of my scientific comrades, and of all my friends, in crediting me for so much. One word characterizes the most strenuous of the efforts for the advancement of science that I

wildest dreams. Nature knowledge may be compared to a spark struck in the dark from which a feeble flame is kindled. Ready hands feed the flame; succeeding generations supply it with fresh fuel. Man learns to render its light permanent, to increase its brilliance; and we rejoice in all the wonders revealed within the sphere of its illumination, bask ourselves in its light, and enjoy its warmth. But the widening sphere of the known only reveals the greater area of the unknown, into which science sends its searchlight and finds no hint of a limit. No wonder that in such pursuit the eager mind may lose all thought of other things.

It is plain then that the student of nature may easily become so absorbed in his daily work that his mind is wholly pre-occupied and he is unready to consider other

have made perseveringly during fifty-five years; that word is failure. I know no more of electric and magnetic force or of the relation between ether, electricity, and ponderable matter, or of chemical affinity, than I knew and tried to teach to my students of natural philosophy fifty years ago.—*Lord Kelvin, in "Nature," June 25, 1896.*

pursuits that reveal truth, or other truth besides that which he seeks, or even the bearings of what he has discovered on the supreme questions of human life. True, he is blinded, but it is like a blindness produced by gazing at the sun. Worst of all, those who try to convince him of his error very commonly begin by denying what he knows to be true, or by belittling what he sees to be great.

Yet science gives to its thoughtful disciple a warning against the danger of this narrowness of admitting as truth only that which can be seen and handled. The verities of science are held, not by sight, but by faith. This does not refer to theories, such as evolution, the undulatory theory of light, or the atomic theory. Every student of science knows that these are held as convenient explanations in the highest degree probable, good working hypotheses, yet not science, only speculations. The verities held by faith are those necessary inferences which reason demands. Place two elements together under the required circumstances; they

combine and form a new thing in which can be distinguished none of the individual qualities of its originals. You at once understand that you are in the presence of a power capable of producing this effect, and you name the cause chemical affinity; you do not know what it is, but you do know that it is, and as your study extends you learn more and more about its effects, its methods, and how thoroughly we may rely on its uniform action. This is scientific faith, the evidence of things not seen; and it is by such faith we are enabled to unite our knowledge of facts and form a science.

Religion is not alone in requiring faith; all truth makes a similar demand. That the faith it demands may yield well-grounded belief, religion offers the same method of verification as that which is most relied on by science, the experimental method.

The proofs of the existence of God are various and converging. One line of evidence is furnished by the study of nature, whether we pursue it in the classroom, or

abroad gather the harvest of a quiet eye. We miss the highest use of the knowledge science gives if we fail to recognize that science itself not only makes it reasonable to believe in a Maker, but cries out for God, affirms that he is, and that he is knowable as other realities are knowable, through manifestation.

The eye notes changes going on in objects presented to it, as the action of a magnet on fragments of iron, or of one magnet on another. Reason at once compels us to believe in something the eye cannot see nor any other sense apprehend, a force which is the cause of the observed effects. When we advance a little farther and find that we are unable even to form a mental conception of the nature and mode of action of this force we do not for that reason give up our belief in its existence. We hold it by faith, faith founded on experience, by an act in which the mind lays hold on a truth which it cannot wholly comprehend.

We find that this and other forces operating in nature are regular, so by observing

what effects they produce under given conditions, we may always secure similar effects by reproducing those conditions. The study of things sensible enables us to apprehend that which lies beyond sense, to reach a knowledge of those laws of nature to which our lives must conform. These laws, each uniting many diverse phenomena under one natural cause, enable us to reach that unity which we call a science, the limit of this mode of investigation: but not the limit of man's power to discover truth.

Reason compels the mind to take a wider range, to ask how matter and force came to be, how order and law have been established and maintained, what put such valuable helpers within the reach of man and gave man power of brain and hand to reach and use them?

If we begin to question about the origin and meaning of the humblest object or simplest process in nature, there is found no place of rest for the mind until we reach an intelligent first Cause, the only sufficient cause of an intelligible universe.

The man of science who is so ready to caution us against the folly of believing in uncaused events, should not reprove us when we conclude that the order of the universe must have a cause.

That order is so admirable, so manifold, so harmonious in its correspondences between parts varied and remote; it answers to our intelligence so completely as knowledge grows; it shows such evident anticipation of future events, even provision for repair of injuries due to accidents that may not occur; it offers so many helps by which man may improve his condition, so much by which man becomes the fashioner of his own life, that we feel compelled to attribute to that cause intelligence, power, and goodness in the highest degree.

Nature furnishes a vantage ground from which we may see beyond the natural. Scientific naturalism furnishes the data for rational supernaturalism. The facts of science are symbols, literally hieroglyphics, expressing in human thought that central truth which fills the universe with light, "God is." Religion, which alone sur-

passes this thought in its supreme revelation, "God is Love," rightly takes the being of God for granted.

"For the invisible things of him since the creation of the world are clearly seen, being perceived through the things that are made, even his everlasting power and divinity" (Rom. 1 : 20).

IV

NATURAL LAW AND MIRACLE

Prove all things; hold fast that which is good.

—*Paul*

IV

Science and religion take directly opposite views of nature. When the student of science allows himself to become wholly absorbed in his chosen pursuits, he cultivates a habit of mind which may cause him to miss truth even more valuable than that which he seeks. The Christian, regarding things only from the point of view of religion, is often sorely perplexed by the received doctrines of science, which nevertheless his reason forbids him to set aside. This perplexity is harmful and should be removed, if possible, for next to Christianity science is the world's greatest benefactor. The perplexity is not only harmful, it is unnecessary.

Two Views of Nature

Religion starts with a first cause, God, and interprets nature as his work. Science begins with nature, studies its phenomena, strives to "explain" them by referring

them to natural causes, *i. e.*, the conditions which uniformly accompany them, and gives as the grand result of its investigation the conclusion that every event in nature whose relations it has been able to trace is but one link in an unbroken sequence of cause and effect, our modern principle of continuity. This conclusion is unavoidable; we all accept it as a correct statement of the ordinary course of events.

According to the religious view, the lightning is the fire of God, the thunder his voice. But what do we mean when we say, "It is so hot to-day, I think there will be a thunder shower"? We mean that even in this, one of the most mysterious of the manifestations of energy in nature, all goes on according to exact and unvarying laws, as much as in the flowing of a river, or the falling of a stone. In fact, we do not deem it unwise to provide even our churches with lightning rods.

Now this vision of invariable law may so grow upon us as to bewilder us wholly, may overshadow our faith in human freedom

and Divine providence. I think that with many the difficulty is simply a passing from one idea which the intellect enforces to another which the heart clings to, with the lingering fear that they are not only opposite, but hostile. To any but those who hold religious truth by a marked spiritual experience, not past but present, this uncertainty is liable to bring an eclipse of faith, as it has to many. Christianity demands a surrender of the intellect truly, but does it require us to stultify reason?

Are God and nature then at strife?

It will be quite worth while for us to fall back on the very simplest considerations, on the knowledge gained by experience of familiar things, the belief which our unstudied speech betrays, to determine for ourselves whether these two views, the religious and the scientific, are mutually exclusive.

For instance, a strange plant springs up in the garden, bears a beautiful flower which attracts your attention. You do not know how it came there, and are curious to

find out. A child fresh from the story of creation in Genesis has an explanation and cannot understand your perplexity: "God made the plant grow there." That is the religious view.

You know that some seed, or root, or cutting capable of producing the plant became embedded there and has grown up through natural causes. You look at the child and smile indulgently at the simplicity of his faith. Well, that is the scientific view, including the smile.

Yet we also believe that "God made." Our faith is fixed there, and science authorizes that faith. But we believe as well in the uniform sequence of cause and effect in nature, the general uniformity of its processes. How are we harmonizing these two ideas? Some are keeping them both—faith in God is too precious to be parted with, that fire will burn is too certain to be questioned—and their spiritual life is an effort to hold the two apart for fear that either will destroy the other. Can they be reconciled? They do not need to be reconciled; the religious view of nature and

the scientific view are different views of the same thing from opposite sides; in this sense only are they opposite. Do not try to hold them apart; let them meet and mingle; knowledge will be all the clearer and faith all the stronger.

How to Harmonize

It is indeed true of religion and science, as is often said, that each has its own province and methods, and we must not try to apply methods where they are not applicable. They are separate lines of mental activity, but they are not parallels whose only requirement of each other is that they be kept forever apart. They are ordinates springing from a common origin in the divine. All truth is one and harmonious; whatever is found to be true in one department must supplement truth in every other department. God has not called us to confusion in the intellectual sphere of our being any more than in the emotional. We shall soonest end strife between reason and faith by giving the verities of both their fullest expression, and letting them act and react upon each other with all their

energy, for so we shall soonest learn how much of our difficulty comes from our own misconception.

Watch a printing-press striking off a great "daily." Here it seizes the end of a roll of paper, miles long; there it delivers the printed sheet at the rate of many thousand copies an hour. Between is a bewildering array of revolving cylinders. Take up one of the papers and examine it: four, eight, perhaps more, pages crowded with the latest news of the world, the paper cut, printed on both sides, pasted, folded. Did the press print the paper? Yes, and no. The press had to be supplied with power from the engine room. Then the press and the engine printed the paper? Again yes, and no. In wondering at the "automatic" machine we are really paying a tribute to the genius of its maker; when we watch wheels and levers in motion, we see the manifested activity of a thinking mind. Mind printed the paper, but it was mind using as instruments the tools that mind had contrived. We may very profitably study the "evolution of the

printing press," going back to the first rude hint of its becoming, back to the origin of the implements by which its parts were fashioned, and thus we shall discover additional proof that it is a product of mind. Mind planned and started its evolution; mind presided over every stage of its unfolding.

Now let us return to the plant in the garden. It sprang from a seed, under the conditions of heat, moisture, and darkness. These conditions did not make it grow; the seed itself must have possessed a certain energy which we call vitality, obtained by inheritance. Nor are all these together sufficient to explain the growth of the plant. These necessary antecedents and conditions had to be caused; had to be nicely adjusted and co-ordinated before that wondrous cycle of growth, from seed to the plant bearing seed in itself, could be repeated. This is a condition of things that could be originated and maintained only by an intelligence able to understand and fitted to desire what is implied in co-ordination, a power capable of securing it.

What made the plant grow? The answer is inevitable: Mind made it grow.

If we choose to study the evolution of the plant, tracing it back through its varied changes, searching through the many generations of the past to find the primordial germ from which it was derived, it will become more and more evident to us that the evolution was designed, begun, and carried out by Supreme Mind.

So we reach the answer to our question, "What made the plant grow?" from the religious side: "God made the plant grow." But we also reach that answer from the side of science. It has pleased the Creator to work through instruments, and according to a certain order; matter and energy are his instruments, natural laws are his methods—orderly because he is without variableness and man is dependent. We safely rely upon the regularity of nature, because that is simply to rely upon the veracity of the Creator. It is because man was made in the image of God that he too is able to discover those meth-

A Double Answer

ods and use those instruments in his measure.

Science then is the study of methods in nature; that is its province. We investigate a given event, one will serve for all, say the sprouting of a seed. We find that certain other events precede or accompany this change, and if any one of these is wanting the seed will not sprout. We have come to call these invariable antecedents, uniform conditions, the *causes* of the sprouting of the seed. It is found also that in general each event in nature is the effect of preceding events, and the cause of other events that follow. This continuity in the succession of events is what makes it possible for us to gain some real knowledge of the world in which we live, a knowledge whose value can scarcely be overrated. Now it is clear that these antecedents and conditions are causes only in a very limited sense of the word; yet, as this is the sense in which it is commonly employed, we may describe them as proximate causes, secondary causes, or natural causes. This is the meaning in which the word cause is used

in science: evidently it does not reach the origin and *source of efficiency.*

A philosopher noted the fall of an apple and asked its cause. He might have given either of two answers, "God made it fall," or "Its fall was due to natural causes." While admitting the first as an ultimate truth, he recognized the second answer as also true, the minister of a glorious revelation of truth, and following in the path it indicated was able to complete the long course of investigation resulting in the greatest discovery that has ever fallen to the lot of man, universal gravitation. Let us not be puffed up for one against the other answer, but clearly apprehend and frankly acknowledge the truth and value of both.

Religion deals with ultimate cause, and makes little account of secondary causes; hence the direct language of the Bible in accounting for an event: God made——" Science cannot reach ultimate cause at all; that is beyond its realm. It studies nature as it appears, discovers the order of events in nature, makes known natural causes,

but in so doing strengthens the demand of reason for a spiritual first cause.

So, when we ask the cause of the growth of a plant, or any other process in nature, the question is two-fold and the answer is two-fold also. "It is proximately due to the action of natural causes, ultimately due to the will of God, whose instruments natural causes are."

Free or Inevitable

Yet, you may ask, are not these uniform methods after all methods of the inevitable, that make it reasonable to believe in a Supreme Ruler and Maker but forbid belief in man's freedom, Divine providence, the efficacy of prayer? Do they not show the impossibility of those miracles which the Gospels attribute to Christ, works so interwoven with his teachings that if we lose faith in the one, we shall soon find ourselves bereft of the guidance and consolation of the other, and so lose the best thing life has to offer?

The freedom of the human will involves a problem that yet awaits solution. Hidden in the deeps of personality, the will

lies too close to us, too near the central mystery of our being, for us to scrutinize it. In its operations as in its essence it is no doubt a riddle too hard for man to read. The testimony of consciousness that we are free to choose, and the sense of responsibility for our own actions which we cannot shake off, assure us that "Our wills are ours," but when we come to inquire further concerning the nature and origin of that dynamic expression of character which we call an act of the will, we are compelled to add, "We know not how." [1]

It is evident that our relations with nature confirm this innate belief in our freedom; though we are limited by conditions and greatly influenced by surroundings, heredity and environment are not all that make us what we are. The last consideration that turns the scale, that decides for this rather than that, is our own choice, the manifestation of our own individuality, as we have molded it by our own acts.

But, it may be objected, man is himself a part of nature and therefore bound.

[1] "In Memoriam," I. 4.

When we give the term nature its widest application it includes all existence except the Creator; man then, is a part of nature, subject to its laws.

But man, a soul, finite and dependent, yet a soul, stands above material nature, including his bodily share of it; in this relation he is himself a cause—a supernatural cause. One reason why we so often draw false inferences from a knowledge of the resistless forces and unvarying laws of nature, is because we do not rightly estimate the familiar fact that man can interfere with the workings of nature. Man is set over nature; he not only uses its materials, but he can act with its laws and determine their operation so as to produce results which would not have been without his self-determined activity. Does he shrink from the winter's cold? He encloses a portion of space and produces in it a summer temperature. Is his arm too feeble for its tasks? See him harness the flowing river and bid it grind his corn, draw his carriage, turn night into day in his streets and dwellings.

The laws of nature are not fetters to bind us; from them are wrought the instruments of our power. We learn their modes of action, act with them, and cause new effects. The hand is puny; gravitation enables it to give the blow of the trip-hammer. The eye is feeble; a knowledge of the laws of light imparts to it the defining and space-piercing power of the microscope and the telescope.

It is not necessary that laws of nature should be set aside or "violated" in order that a new thing may arise quite outside the regular operation of natural causes; it is only necessary that an intelligent agent should employ those laws. Standing at rest, the arm naturally gravitates to the side, but you can raise it, overcoming gravitation. The mind, active as will, exercises a control over the muscles, and the operation of one force is modified by another. A man falls, stunned, between the rails before an advancing train. He is powerless; gravitation holds him; the train, too near to be stopped, will certainly crush him. But no, a bystander

rushes in and drags him from before the wheels. Where man is so evidently free it would be absurd to contend that God is limited.

We come then to inquire how this view of the meaning of natural law affects belief in Christian miracles,[1] acts of divine power in human history quite outside the action of that power in what we call the ordinary course of nature.

Grounds of Miracle

1. *Miracle is not impossible.* Only an atheist can consistently maintain that miracle is impossible; his inconsistency with nature lies in his being an atheist. The agnostic freely admits, "I urge no claim of impossibility"; while that crude view which regards the universe as a gigantic machine, started ages ago, whose maker sits idly or helplessly apart and sees it go, makes no claim on intelligence.

No objection can be raised against miracle on account of the greatness of the work it implies. Creation and the orderly

[1] I refer to the miracles of Christ for the sake of brevity, and because the whole question centers in them.

processes of nature are at least as wonderful in themselves as any miracle recorded in the Bible. Through day and night continuously, the heavens repeat their silent declaration of the being and rule of God;[1] but they could not bear immediate witness to the truth of a special revelation from God. We can think of nothing so fitting for this as the works recorded of Christ.

There is no force to the objection that miracles are contrary to experience, for no one is able to say that they are contrary to the experience of all mankind. The miracles of the Bible are comparatively few in number, so they are contrary to the experience of the majority, but this economy of miracle argues strongly in favor of the reasonableness of a belief in its use.

2. *A world governed according to law is necessary for miracle.* It is only in an ordered world that the miraculous could be employed with significance. The general uniformity, instead of rendering the spe-

[1] Ps. 8 : 19; 65 : 104; 139 : 148; Isa. 40 : 12–31; Job 38–41, etc.

cial exception impossible, supplies a prerequisite for it. If miracles were "liable to happen," or could be served up fresh on call, as some philosophers appear to demand, the event would have no value as a divine sign.

3. *A miracle is not necessarily a violation of a law of nature.* It cannot be maintained that a miracle is a violation of a law of nature, and therefore impossible. So Hume defined it; but Huxley does not hesitate to point out his error: "The definition of a miracle as a violation of the laws of nature is in reality an employment of language which, in the face of the matter, cannot be justified." [1]

We have experience of only a small portion of universal nature; we know a few of its laws, and of these our knowledge is but rudimentary. What appears to us exceptional action may be a part of the Creator's plan, a law of the universe as a whole, as truly as the regularity which we daily experience is his ordinary method of government in that small fraction of the universe

[1] Huxley's "Hume," p. 129.

which is the school of our earthly life, and in which it has pleased him to limit his ordinary action to these uniform methods so that it may be a fit school.

Bishop Butler says: "And from hence it must follow that persons' notion of what is natural will be enlarged in proportion to their greater knowledge of the works of God, and the dispensations of his providence. Nor is there any absurdity in supposing that there may be beings in the universe whose capacities and knowledge and views may be so extensive as that the whole Christian dispensation may to them appear natural, *i. e.*, analogous or conformable to God's dealings with other parts of his creation; as natural as the visible known course of things appears to us." [1]

Much difficulty is removed when we clearly apprehend this fact that Christian miracles, events quite outside the known laws of our world, may yet be in perfect harmony with the unknown laws of the universe of which our world forms so small a fraction.

[1] "Analogy," p. 46, Glad. ed.

It is equally important to remember that miracles cannot be brought within the domain of natural law, in the restricted sense in which that term is always used in exact science, and generally in common language; for so it means the laws of nature of which we have experience. It is the very essence of miracle that it is an unusual act of the Creator within the sphere of human observation as the "natural event" is his usual act. They have the same Cause; they are equally wonderful in themselves; they differ in method.

4. *The improbability of miracle bears in its favor as well as against it.* Miracle is not impossible, but it is improbable; here lies the difficulty it presents. The believer in Christianity is the one who should realize this to the full, for he not only believes that miracles have been performed at various critical periods in a long course of related events culminating in the mission of Jesus Christ, but he practically sets aside other events claiming to be miraculous as not sustained by sufficient evidence.

Miracles Demanded

What sufficient evidence have we for believing that those inherently improbable "works," "signs," *miracles*[1]—to use the term most familiar to us—narrated in the Gospels were really performed by Christ. It is easily seen that if we admit their genuineness it is their improbability, that is, their unlikeness to ordinary events, which enforces the conclusion of Nicodemus that they were wrought by the power of God, accrediting the claims of him who did them.[2] But how do we meet this improbability in the full light of knowledge that has swept away all belief in magic, witchcraft, and the like?

5. *The character of the being who wrought miracles and the doctrines they accompanied*

[1] This term has now a settled meaning in discussions like the present, but it is perhaps unfortunate in emphasizing unduly the *strangeness* of the event it is used to denote. The words employed by the writers of the Gospels—*sign* and *power* by the Synoptists, *sign* and *work* by John—call attention chiefly to the *significance* of the display of Divine power, as the appropriate *work* of a Divine Being.

[2] John 3 : 2. See also the reasoning of the blind man restored to sight (9 : 30-33); and the Lord's reply to the messengers of the Baptist (Matt. 11 : 4-6).

supply an answer. There is one view, clearly defined and commanding, which presents evidence so strong, so self-consistent and appropriate, that it at once becomes more reasonable to believe that the miraculous events did take place than that the records are untrue. It is the view that accepts the declaration which Jesus made of himself, that he was one with the Father.

Consider how reasonable the Christian scheme becomes when viewed in this light. On the one side are seen the power and love of God; on the other the helpless misery and guilt of man, dwelt on by many historians, by none more vividly portrayed than by Paul in the opening passages of the Epistle to the Romans. In the fullness of time the Redeemer came. He gathered up in living words all spiritual truth uttered by sage or seer in times past, revealed all truth needed for time to come. That men might know[1] that the Son of Man hath power on earth to forgive sins, he showed openly and plainly before their eyes the unmistakable evidences of divine power in

[1] Matt. 9 : 2-8.

the miracles he performed. For sacrifice he offered himself—an exhibition of love to win love; for proof of his divine mission to the ages to come, a proof growing stronger as the ages pass, he chose that transformation he effects in the souls of all who receive him.

His three years of public ministry have changed the whole outlook of human life from despair to hope, have modified the whole course of human history. It is a body of evidence too strong in its character, too harmonious in its relations to be set aside. Christianity as Christ taught it, as Paul understood it, is too good, too great not to be true.

6. *The occasion demanded the miracles.* It is often urged that the excellence of Christian doctrine is sufficient evidence of its divine origin. So it is *after* it is in the world and men have understood and accepted it; but those who first listened to Jesus did not have this evidence. To them he would be merely one more claimant to the Messiahship; it would have been mockery indeed not to have given them

the signs which alone could be to them infallible proofs of the validity of his claim.

Human envy and hate would allow him only a few years in which to accomplish his public work. In that short time he must attract the multitudes to himself, win honest and thoughtful men who could become competent witnesses, and make it possible for them to believe in him and admit the extraordinary claims he made, despite general rejection and apparent overthrow. The miracles of Christ performed this service; it is impossible to think of anything else that could have done it.

I say that miracle was duly wrought
When, save for it, no faith was possible.
. . . . . .
So faith grew, making void more miracles
Because too much : they would compel, not help.[1]

We, looking back across the centuries, recognize the fitness of these divine signs to attract, to inspire confidence, and to render belief possible to the first hearers of the word. We do not wish that they might be expunged, we do not want them

[1] Browning, "A Death in the Desert."

explained away; their presence in the record is a help, their absence would create a difficulty hard to overcome.

All seeming impossibility is removed from Christian miracles by restoring God to nature; all improbability vanishes when we accept Jesus Christ as God manifest in the flesh.

But the value of evidence is dependent on the spiritual position of him who examines it. To those who assign to Jesus a lower place, this strong evidence for his miracles—the inherent reasonableness of belief in them, because recognizing the occasion as demanding them—is wanting. For them the improbability must retain great force; and as their respect for the grand personality of the Great Teacher rises, the want of harmony between their conception of him and the only record of him which we possess must often occasion grave unrest. Modern rationalism, masquerading in the vestments of Christianity, cannot be expected to regard belief in the miraculous with anything more than indulgent pity.

7. *The contrast between Christianity with and without its miraculous elements is itself decisive.* We may not repeat the experience of a Nicodemus or a Thomas; but there is one test which has immense significance for us in these days.

Effect on Religion

When Christianity is accepted as a miraculous revelation from God it is strong; as soon as it comes to be viewed as merely an incident in evolution, a product of developing humanity, its power begins to wane. Yet the moral beauty of its teachings remains the same in both cases. Why is it that in the first case the gospel wins the heroic devotion of some and arouses the fierce opposition of others, while in the second case its opponents deem it scarcely worth attacking and its adherents begin to doubt whether it is worth the cost of preaching it to every creature? It is because Christianity, divested of its miraculous elements, is like a body separated from the soul that had energized it.

Unwavering faith in the word as a direct revelation from God was what inspired its

early ministers and secured the surprising triumphs of the first centuries, while it was yet too obscure to win the selfish patronage of ambitious rulers. A like faith has attended every great religious awakening. It inspired the heroes of the Reformation and enabled Wesley to startle Christendom out of the slumber of formalism. Down to the present time—even if it is true, as some of its critics declare, that miraculous Christianity does not enjoy the full favor of the world—it is doing the best work that is being done for the world.[1] It is easy to see why opponents of Christianity have striven so persistently to undermine this citadel of its strength, but difficult indeed to understand why any of its true friends should think the time has come for its surrender.

There is nothing in natural science to

[1] Gladstone says, in his Glasgow address: "Christianity, even in its sadly imperfect development is, as a matter of fact, at the head of the world." And again: "For the last fifteen hundred years Christianity has always marched at the head of all human improvement and civilization, and it has harnessed to its car all that is great and glorious in humanity."

make that surrender imperative. No truth of science, no well-established principle, no consistent theory, is fatal to a belief in Christian miracles. One may define evolution as the only and universal method of divine activity, and infer that this definition excludes miracle. Very good! But the definition rests on an assumption for which science affords no basis. The results obtained by those who are now at work on the problems of biology show plainly that if evolution can rightly be called a universal process, as we speak of universal gravitation, it can by no means be claimed to be the only process operating in the world.

Evolution gives no explanation of the cause of variation, nor of the preparation for evolution, which has brought it about that things and environment act and react upon each other in such very different ways as we see them doing. Side by side with evolution march degradation and destruction. In fact, if we are to be shut up to Darwinism, destruction is the rule, development the exception; the vast

multitudes of living beings are cast as rubbish to the void. Exact science is very distinctly calling for pause in the extravagant worship paid to evolution as a fetich by enthusiastic devotees who use the name of science as their warrant.

The truth is this: we are only at the beginning of a theory of evolution. One attempt has been made to apply what we have to answer one question, and that a lesser one, about the origin of species, how a variation may be preserved after it has been produced. In the estimation of masters in science like Huxley, Romanes, and others, all ardent evolutionists, the answer given is not yet perfectly satisfactory.

The evolutionary process, as we fashion it in our imaginations, is a magnificent one, and, to use the best knowledge and thought we possess, it seems worthy of God; but we must not therefore think of God as bound helplessly to this one process, like Ixion to his wheel, as some ardent advocates of evolution appear to represent him. This is to put evolution first

and God second. Men who are not quite prepared to banish God from the world are willing to let him serve under evolution. He may act, if indeed he has any will to act, but he must act strictly in accordance with that philosophic notion called evolution or they will refuse to believe in his activity. All this is tending back again to non-Christian philosophies that place blind necessity or intellectual abstractions void of intellect at the summit of being. It is fraud to call such doctrines either modern or scientific.

On the contrary, the thoughtful study of nature tends to confirm our belief in a Maker who cares, desires, plans, does, and therefore is the Perfect One. He may even, if occasion arise, do a new thing, "leave the ninety and nine in the wilderness, and go after that which is lost, until he find it."

If there had been no violation of law, evolution might, perhaps, have been sufficient to secure an upward tendency, a harmonious progress; but since voluntary transgression has made corruption and

misery common facts of human life, more is called for. And there is more : man's sin became the occasion of God's miracle of redeeming grace.

Granting that there has been evolution in the unfolding of the scheme of the universe in time and space, it does not follow that there has not also been miracle. God fulfills himself in many ways, and no one is qualified to declare that the creative activity of the Self-existent in universal nature has been limited to those methods of which we have daily experience in the ordinary course of events in that minute fraction of the universe which is "nature" to us.

8. *Science accepts one miracle, creation.* When we inquire about the origin of matter and energy, of life and mind, we are compelled to refer to creative acts other than those with which we are made familiar by what is seen of the operation of "natural causes." [1] Science recognizes the reality

First of All

[1] This remains true, whether we regard our universe as the earliest cosmos or not.

of the time-world as the groundwork of its conclusions; it thereby accepts the miracle of creation. Evolution does not attempt to account for the origin of nature; that lies quite beyond its scope, and must be viewed as the direct act of God. The new creation of the human soul, the central event of human history, may fitly be classed with it. Both nature and Christianity exhibit in their unfoldings this "favorite method" of the Creator, the method of growth, evolution; but the grain of mustard seed must first exist with its potentialities and harmonious environment before its growth can illustrate the nature of the kingdom of heaven. Without the miracle of creation nature would not exist; but for the miracle of revelation there would be no Christian religion.

That inevitable tendency of human thought toward unity in its search for cause, is not satisfied by evolution. For a time the grandeur of the conception overawes, but closer inspection shows that, grand as it is, it is not original, but derived, and must take its place among

things secondary. Unity of cause is found only in the will of God. There is then but one question regarding Christian miracles, and each of us must decide it in his own heart. Have we good reasons for believing that it has pleased God to make known the way of life through One who came down from heaven?

Under the stress of material things, when nothing seems real but the busy concerns of this earthly life, when belief in God has grown feeble, we may hesitate to give an affirmative answer. When the vital power of Christianity, accepted as it is taught in the New Testament, taken in its simple grammatical meaning, is experienced in the soul or even honestly estimated in history, doubt vanishes and reason is satisfied that God has so willed. And nothing forbids, not nature, nor the lapse of centuries, nor the limitations of human testimony.

For us the doctrines justify the miracles. The gospel, with its miraculous elements, is the power of God unto salvation to every one that believeth; without them

it may become the rule of formalism, the forerunner of indifferentism. The former startles the world with the declaration, "If ye believe not that I am he, ye shall die in your sins"; [3] the other soothes with that older text, more flattering but always misleading, "Ye shall not surely die."

Herbert Spencer has lately finished his great work on "Synthetic Philosophy," begun many years ago. In the division treating of religion he says: "But one truth must grow ever clearer—the truth that there is an inscrutable existence everywhere manifested, to which he (the thoughtful observer) can neither find nor conceive either beginning or end. Amid the mysteries which become the more mysterious the more they are thought about, there will remain the one absolute certainty—that he is ever in presence of an infinite and eternal energy from which all things proceed."

Thus philosophy, following the lead of

[3] John 8 : 24. Evidently John would not agree with the modern teachers, who assure us that Jesus laid very little stress on *belief*.

science, finds everywhere behind the phenomena of nature indications of a supernatural Cause which it is yet unable adequately to make known. So if man is to have definite knowledge of his Creator it must be through a miraculous revelation.

Philosophy's Consent

Christianity recognizes in this "*infinite and eternal energy*" of the philosopher the one living and true God whom the Bible reveals, and addresses to the modern agnostic the words of Paul to the devotees of the unknown God at Athens, "Whom therefore ye ignorantly worship, him declare I unto you."

And what of the Christian's faith in the efficacy of prayer, his trust in Providence? The farmer plows his field, turning down the sward to decay in the darkness. He prepares the soil, sows and covers the seed. What does he expect that he thus buries the grain, which might have become food for man, and leaves it to die in the ground? Does he hope by his puny efforts to interrupt the continuity of cause and effect, to set aside the laws of nature?

No, he does not expect to set aside the laws of nature; he has probably never even heard of determinism; but experience has given him a robust faith in the human will as one of the causes that determine.

His act is a sublime expression of faith in those unvarying laws as the instruments through which his labor may secure a real good which without that labor would never have come to him. The result justifies his reliance when the harvest brings to him, in manifold returns, seed for the sower and bread for the eater. Just as wise and just as scientific is our belief that the laws of man's spiritual being afford avenues through which our strivings after God and efforts to do his will can bring to us returns quite as real as the fruits of the cultivated field, and far more precious and enduring than they.

V

NATURE A MANIFESTATION OF GOD

Call my works thy friends
At nature dost thou shrink amazed?
God is it who transcends.

—*Browning*

V

While we recognize that in this universe of things governed by mind the belief in natural law is not hostile to a belief in Christian miracles, we must not forget that the familiar processes of nature are also witnesses to God's being and government, in one way more urgent, because they are repeated continuously day after day before our waking sense. They cannot be explained until they are referred to him as their cause, and being referred to him as their cause they are voices that speak to us of him. I mean that the flowing of the river, and the streaming currents that are making green once more the blades of grass on field and lawn, the unfolding buds on the trees, and the opening flowers of woodland and meadow, have a message to deliver to us from God, if only we have ears to hear.

There may be sometimes an undue ten-

dency on the part of the religious teacher to employ unusual occurrences whose conditions are unknown to us—the tempest, the flood, the earthquake—as proofs of the reality of God's government in nature. I know that the perplexity of an inquirer is often increased in this way; for he cannot but reason that as all the events we can adequately investigate are found to depend on natural causes, so the mystery of these rarer occurrences would be removed if we could only trace their antecedents. All this perplexity is removed for him when he is brought to set himself face to face with the fact that the same "mystery" is present in the simplest and most ordinary event in nature, as truly as in the most uncommon and stupendous. We have no adequate explanation for the falling of a stone until we clearly understand that it is not produced by natural causes, but by the power of God acting through natural causes; and the same explanation is equally adequate to account for the crumpling and rending of the earth beneath our feet, or the stately march of the con-

stellations above our heads. All natural events are equally mysterious in this sense. A master in science tells us that the evolution of the universe is not more nor less difficult to understand than the evolution of a bird from the egg. If you are inclined to regard that as touched with the exaggeration of the specialist, listen to this:

Mystery in All Life

> Flower in the crannied wall,
> I pluck you out of the crannies;—
> 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. [1]

Then such representations as are in the one hundred and fourth Psalm, in the closing chapters of Job, in the words of the Master about the sparrows, are not merely allowable as poetry but are true to science.

The sum is this: nature cannot account for itself. It refers us for an explanation to something above nature; that is what we mean when we speak of the demand of reason for a belief in the supernatural.

[1] Tennyson.

We may refuse to lift up our eyes and ask, "Who hath created these things?" but this is blank unreason, an exaggeration of agnosticism. If we do ask the cause of even the simplest process in nature, there is no place to pause along the whole line of inquiry until we reach an infinite First Cause.

The orderly processes of nature, the manifold relations of its many parts, all acting in harmony as the tides obey the moon, proclaim that this universal frame was planned, is the working out of a grand design. Design implies self-conscious thought, personality; the infinite First Cause is a personal God.

It follows then that this world in which we live, this realm of the natural that spreads out before our eyes, and answers to our touch; this world of secondary causes, conditions, relations, effects, only acquires its full dignity in the estimation of the Christian. He, of all men, will be most anxious to read its lessons aright, will be most ready to accept the truth it declares. He may not affect to look down upon

material things, when he recognizes matter and mechanism as the handiwork of the God whom he worships.

The discoveries of science have not tended to remove the mystery of causation in nature, or to cast doubt on the declaration of religion, which refers it to the will of God. But science has done much to increase our knowledge of the processes that go on in nature, and for these there is a marked tendency to assign what may be called mechanical explanations, that is, explanations involving mechanical, physical, or chemical operations. It is not easy to understand why many good men seem to regard this tendency with apprehension.

The structure of the human arm, the uses of food, the exhaustion of brain that follows long-continued mental activity, show us that the Creator is not averse to using mechanical and physical and chemical operations. Mechanical processes may well be co-extensive with the material universe and play their fitting part in the changes that go on in the living cell. These are matters for investigation to de-

cide, and we may confidently hope that they may be decided in the affirmative, for such an answer would substitute knowledge for ignorance.

But what is mechanism? Contrivance for the successful application of force to the accomplishment of a desired end. There still remain the questions: Who desired the ends we see accomplished in nature? Who originated the contrivances? Who supplies and directs the energy necessary for working them? For these questions there is evidently but one answer; but science—rightly—does not attempt to answer them; its part is to set them before us in their full force and integrity.

The votary of religion must learn how widely mechanical contrivances prevail in nature, and must welcome them as the signs by which intelligence recognizes intelligence and determines the method of its working. He will then be prepared to point out to the devotee of physical science the sheer unreason of maintaining that nature reveals nothing but mechanism.

For the mistake of naturalism [1] is not so much that it declares the cosmos to be mechanical, from the point of view of science, as that it declines to go on and acknowledge frankly that mechanism implies plan on the part of some self-conscious being.

There is no antagonism between the view that regards nature as ordered through mechanism, and that which affirms it to be governed by Divine Will. Spencer may be substantially correct in his general conception of the world-process, evolution, the method of growth; and also his greater contemporary Browning may be wholly right in his solution of the world-problem which Spencer relegates to the unknowable:

> The world,
> The beauty and the wonder and the power,
> . . . and God made it all!

We may with perfect consistency hold

[1] Naturalism, the term used by Balfour, and others, to include all creeds founded on the doctrine that we can know only phenomena and their laws.—"*Foundations of Belief*," *pp. 6, 7, 92, etc.*

that the history of our world and its inhabitants is in its general course an evolution, brought about through natural causes, and at the same time recognize it as the gradual unfolding of a Divine plan.

Causation and Seeming

It is wholly reasonable to believe that if an intelligence of the highest human order could have watched the process of creation from the beginning, seeing only as we now see, from the outside, there would have appeared to him no breach of continuity.

Light is called out of darkness; but our observer hears no creative fiat any more than we do when we watch the morning dawn above the Eastern hills. Things before unseen take shape beneath his gaze; so we see the great cumulus clouds become visible as the heated air of summer streams upward into colder space. New wonders arise; but so they do to one who from childhood has watched the almost changeless growth of the so-called century plant, and at last in old age sees it suddenly send up its tall scape and unfold its blossoms for the first time.

Even if our imagined observer were fortunate enough to be present at the first mysterious union of the great four elements, to record the origin of protoplasm, to hail the advent of the first living germ, and watch its progressive development, he could trace changes, more manifold truly, but not in kind different from those we see when we study the evolution of a bird from the egg.

He would have a view of nature, only; he would see processes continuous, successive, natural. He could not point to any part and say, "This is not natural."

To rest here is to be content with naturalism, materialism; but reason forbids man to rest here, refuses to rest anywhere short of the Author of all this harmony.

To a higher intelligence, watching creation from the other side, all wonder at the multiform unfoldings of the mighty plan would be adoration of the Creator's power and wisdom. Whether that which now is had existence at once by the creative word, or was evolved through long ages, the only language that could convey the truth fitly

to primitive man, the only language that can convey it fully to us is, "God created," "God fashioned."

He originated; he maintains. His thought is energy; his will is cause and gives efficiency to that mysterious nexus that makes one event the antecedent or consequent of another. That continuity of cause and effect which science declares to be the rule of nature is simply the continuity of Divine activity. Science hopes to discover a unity of origin for the different forms of energy: religion finds it in the will of God acting with purpose.

Sometimes the believer in the Bible objects to this close association of things natural with things divine, and warns back any one who would bring from the study of nature a proof of God's existence, a witness to his attributes. But here the Bible itself is against him. At its very opening it claims nature as the workmanship of God. In the writings of prophet and psalmist, in the teachings of our Lord and his apostles, lessons to strengthen faith are drawn from these visible surroundings.

Indeed the only argument used in the Bible to show the certainty of God's existence is the argument from intelligent design in nature.

If the Christian of these latter days had made himself familiar with his Bible, if he had entered into the spirit of the sacred writings, he would have discovered that everywhere in them nature is recognized as the creature of God, all things are his servants,—"fire and hail, snow and vapor; stormy wind, fulfilling his word," [1]—and the good man would not have been so badly terrified, though he might have been surprised, to learn that as knowledge advances natural events are found to be connected by natural causes, and nature thus shown, more and more certainly, to be the harmonious thought of one mind; and he could scarcely fail to see with delight to how great an extent that mind was made accessible to the mind of man through self-manifestation in the continuous and orderly activities of nature.

Neither would he have been scared by

[1] Ps. 148.

the growing probability of a new theory of the origin of species[1] into hiding away his belief in design, or in wrapping it in apologetic terms borrowed from philosophy, to escape the scoff of the unthinking or the indulgent smile of the scientific.

Nothing has transpired to make the present relations of man and nature explicable on any other view than as A DESIGNED END. We may therefore rest assured that he who designed the end designed the means, and though we cannot always see where things remote find their place in the great scheme, or that possibly every means is an end in itself, some failure in this direction may reasonably be set down to the fact that the human mind is not infinite.

[1] The acute champion of teleology, Paley, saw no difficulty in admitting that the "production of things" may be the result of trains of mechanical dispositions fixed beforehand by intelligent appointment and kept in action by a power at the center—that is to say, he proleptically accepted the modern doctrine of evolution; and his successors might do well to follow their leader, or at any rate to attend to his weighty reasonings before rushing into an antagonism which has no reasonable foundation.—*Huxley*, "*Life of Darwin*," *Vol. I., p. 555.*

Let us not fear to bring out the good old argument—this argument from design in nature: of all external evidences for the being of a wise and good God, it presents the strongest, the clearest, the most available, and the most satisfactory to sound reason. It alone furnishes an explanation of the cosmos worthy its existence.

The pantheist looks upon the sum of things natural and calls it God, only a more poetic form of the grosser "no God." Christianity makes known the living God, in whom all things consist, manifested in nature and supreme over nature.

Tennyson has well expressed for us this Christian view of nature as a visible manifestation of the invisible Spirit in his "Higher Pantheism," which means something higher than pantheism. In matters wherein touch so palpably exceeds grasp the poet is often our best helper:

THE HIGHER PANTHEISM.

The sun, the moon, the stars, the seas, the hills, and the plains—
Are not these, O Soul, the Vision of him who reigns?

Is not the vision he? tho' he be not that which he seems?
Dreams are true while they last, and do we not live in dreams?

Earth, these solid stars, this weight of body and limb,
Are they not sign and symbol of thy division from him?

Dark is the world to thee: thyself art the reason why;
For is he not all but thou, that has power to feel "I am I!"

Glory about thee, without thee: and thou fulfillest thy doom,
Making him broken gleams, and a stifled splendor and gloom.

Speak to him thou, for he hears, and Spirit with spirit can meet—
Closer is he than breathing, and nearer than hands and feet.

God is law, say the wise, O Soul, and let us rejoice,
For if he thunder by law the thunder is yet his voice.

Law is God, say some; no God at all says the fool;
For all we have power to see is a straight staff bent in a pool;

And the ear of man cannot hear, and the eye of man cannot see;
But if we could see and hear, this vision—were it not he?

Our Lord bade us consider the lilies how they grow; for one who obeys his injunction there are thousands who merely consider the beauty of the saying. Perhaps this is one reason why the divine warning against worry is so little heeded.

There is an objection in many minds to this humble mode of learning from common things, a mental attitude perhaps rather than an uttered thought, which may be expressed in this way: "These sensible things are mere phenomena, appearances, the changing aspects of the material and the finite. What we want is some knowledge of the spiritual and the infinite, the underlying reality that abides."

Knowledge through Symbols

Good; it is to convey knowledge of the spiritual and the infinite that we are surrounded by these material phenomena. They are symbols by which we learn something about the one underlying re-

ality; object-lessons on the invisible, utterances of the inaudible, manifestations of him who in all ages and among all nations left not himself without witness.[1] The teachings of nature do not afford a full revelation of God, else we should not need the Bible; but they are the everywhere present reminders of the truth of his being which the Bible endorses, which it uses as the elementary truths of religion.

This is their highest use for us; mountain and river, the stars that shine, the flowers that bloom, are here to speak to us of that one reality. You catch the charm of a landscape, wonder at the glory of a sunset, and your heart leaps with a thrill of joy. The doctrine of evolution by natural selection is powerless to explain that thrill of emotion. It is the soul within you recognizing in the unspoken language of nature the voice of God, saying:

"O heart I made, a heart beats here."

The awe inspired by the grand in nature, the insignificance we feel in its pres-

[1] Acts 14 : 17.

ence, are not because a mountain or an ocean is a greater thing than a man, for it is not. These feelings rise within us because we at once and instinctively understand that we are in the presence of a Power infinitely superior to ourselves. Sea and crag are there to teach this lesson, a lesson by which we begin to climb from a sense of our own limited capacity to some apprehension of the Infinite One.

Only the rare poetic soul can unfold the meaning of this lesson for us, as Coleridge has done in his sublime "Hymn before Sunrise." So too, the exquisite tracery of the snowflake, the modest beauty of the wayside flower, bring to him who will consider them the welcome message of divine care.

We hold intercourse with our fellowmen, mind answering to mind, through material symbols, the look, the gesture, the spoken or written word. So nature is mind revealed through those two mysterious physical agencies which we name matter and energy. The natural is the expression of the spiritual, as language is

the expression of thought. It is spirit that is real; but we know spirit through its manifestation: it is spirit that quickeneth, and to this end the Word was made flesh.

But instructive as the world appears to the thoughtful observer, it reveals a deeper significance under the close scrutiny of science. Man's knowledge of nature is, in its full extent, the communion of man's mind with the mind of the Author of nature, as our understanding of Hamlet is the measure of our communion with the mind of Shakespeare. The human soul, through its association with a material organism, is able to receive impressions from the things of sense, to learn both about them and through them. The first constitutes science; the second affords the lessons of a wider wisdom for which the results of scientific investigation furnish the data. To stop with the first is to imitate the child who might think that he had mastered the great drama because he could name every letter in it, or, at most, the grammarian, caring only for parts of speech, the forms

and combinations of words, and neglecting the thoughts for the expression of which words and their relations exist.

So far as our knowledge of nature is accurate it is knowledge of Divine thought, that is, of reality. Order, design, care, and the rest, are forms of speech through which the Author of nature makes himself known to man. The material universe is the manifestation of the Divine mind. The shaping of a crystal or the formation of a drop of dew is a message direct from the mind of the Maker.

It would correct many of our misconceptions about the hostile relations of science to religion if we could save more time to consider these thoughts of God that are to us-ward in nature. The silences are eloquent with them. If we would declare and speak of them they are more than can be numbered.

The Cause of Conflict

What conflict there has been, and still is, between theology, man's interpretation of the Bible, and science, man's explanation of nature, is largely due to one cause.

We know in part; we are ambitious to prophesy in full. The ill-defined annoys the intellect as it does the eye. We are in haste for a completed system of belief, expressed in Articles of Faith numbered and stereotyped, and for a universal science centered in a single thought. We have neither. In Christianity we have a "kindly light," sufficient, if we follow it, to make sure our next step out of the miry slough of self and toward the city of God. In science we have a little real knowledge of first principles, gained in spite of many failures, the failures being valuable correctives of our own frailties, reminders of our own limitations, and the effort being that which gives to the knowledge its greatest value.

Theology and science are both progressive, because human and incomplete. Christianity, by its perfect adaptation to the needs of man, vindicates its claim to be final like nature, to be the work of the same author. Nature and the gospel remain; theology and science fluctuate, though moving forward to a nearer view of the unity and harmony of truth.

Again and again statements of belief which were honestly intended to embody only the eternal verities of Christianity are seen to have included some transient phase of human opinion, and have to be restated in the light of a clearer understanding of the original records and a fuller appreciation of the lessons to be learned from the history of the faith. In like manner, explanations of natural phenomena once held to be sufficient have been gradually modified or wholly abandoned. More than this, two text-books on the same science, published to-day, may contain conflicting explanations of the same fact. Different men have different views of the same thing, and so the struggle after truth soon becomes the battle of beliefs. The theologian is often represented as the one most ready to draw the sword in defense of his creed; if so it is wholly to his honor. But he must not claim all the credit. The goodly brotherhood of scientists have also their differences of opinion, and the epithets they exchange are not always those most appropriate to the ex-

pression of brotherly love and mutual admiration. The conflict between Neo-Darwinian and Neo-Lamarkian may not exhibit all the fervid glow of that between Arminian and Calvinist, but then the latter combatants wage battle on a more momentous issue.

Men have contended about the definite combination of elements, the factors of evolution, and like questions, and worthily, for in the strife of rival views truth becomes manifest. No apology is required for the earnestness the Christian has shown in defending any opinion he has thought to be implied in belief in God, immortality, and inspiration.

Man's progress toward truth has been mainly by the elimination of human misconceptions. His first views are almost always inadequate, often wholly erroneous. This is seen alike in the history of the formation of a natural science and of a system of theology. It is true that we have spent more centuries and made more failures over the lesson implied in the words "Our Father," than in finding a rational explanation

for the occurrence of fossils in the rocks, because the hindrance of a defective will operates more strongly in the former case. Both instances alike illustrate man's capacity for bungling. A record of the errors of the human mind at work on the doctrines of Christ, since those doctrines were fairly put before the world, makes lively reading; so does a similar record of the efforts of man to explain natural processes, efforts which have none the less resulted in the formation of sciences of great value, such as astronomy, geography, geology, medicine.

A skillful writer, who might think it worth his time, could easily compile a "History of the Conflict of Medicine with Science," which would make a very sorry showing for the physician. It would only be necessary to record the mistakes that have been made concerning the structure of the human body and the functions of its organs, the cause and cure of disease, and hold them up as examples of the doctrines of medicine, and on the other hand credit all valuable discoveries to science—plainly

its due, since science is truth. A graphic description of the quarrels of rival schools would give zest to the whole, while the pharmacopœia of different ages would prove an inexhaustible treasury from which to draw absurdities sufficient to match any system of theology.

But such writing would not be history; it would not even be a valuable contribution to the study of human nature. An impartial record of the progress of the human mind in the interpretation of either nature or the Bible would be most valuable, but it must be attempted by one who has full sympathy with man in his search for the light. A splendid record it is, full of failures; not splendid because of its failures, but because of the earnestness that can take to heart the kindly lesson of failure and try again. Such a one must also have caught some hint of the divine sympathy expressed in the conditions of man's lot. So precious is the honest desire to find the truth that, by supreme appointment, he only may find it who seeks for it as for hid treasure; he who thus seeks shall find.

Nature is the manifestation of God in things material; Christianity in things spiritual. Even in the least of his works the being and attributes of the maker are shown. All truth is divine truth, harmonious and helpful, whether discovered or revealed. Science has already done valuable service to religion by widening our conception of the order of the universe and helping to deliver us from much hurtful superstition. Religion is pointing out to science that any explanation of nature that regards only material things utterly fails to be final, because it cannot answer the most pressing questions suggested by a study of those material things. Religion alone reveals that unknown factor encountered in every phenomenon, the cause of natural causes, which is only rendered more necessary as mechanical explanations are extended—even God, incomprehensible yet knowable, infinite yet personal.

Supplementary Manifestation

If there is this helpfulness and harmony between science and the Christian religion, as so many of the leaders of science in

every department assure us there is, then this harmony tends to enforce the claims of that religion on our loyalty. Authorities tell us that the greatest theological monograph in our language is Butler's "Analogy." [1] Its theme is this: The constitution and course of nature, *i. e.*, the providential treatment of man in nature, make known the same kind of divine government as that which revealed religion declares; they present the same kind of difficulties, so "that he who denies the Scripture to have been from God upon account of these difficulties may, for the very same reason, deny the world to have been formed by him." The argument shows that Christianity is wholly reasonable.

[1] It is to be regretted that the "Analogy" has become too difficult reading for the modern student. It may be true, as is often said, that its reasoning is adapted to a phase of doubt through which the world has passed, but it is a phase often repeated in the spiritual history of the individual. It is a curiously weak objection to make that, at best, it only proves Christianity to be "not unreasonable." Not a few would be steadied to endure the stress of the storm of doubt by the settled conviction that the Christian scheme is not discredited in the high court of right reason.

This harmony reaches farther than we often think. We are accustomed to speak of religion as resting on faith and of contrasting with this the method of science, which is to supply knowledge or demonstrated truth.

But science also demands faith of its followers, faith in the unseen, for instance those mysterious forms of energy which we cannot even fashion to our fancy. A scientific induction is, in analysis, an act of faith. Without this faith there would be no science. It is equally true on the other hand, that religion offers knowledge as a foundation for the faith which it requires. Christ promised that if it be the will of any man to do God's will he shall know of the doctrine. Paul, with masterly insight into the strength as well as the weakness of human nature, gave his great lesson in the statement of a creed, "I know whom I have believed." The assurance that satisfies him is that hereafter he shall know in its fullness what he now knows but in part.

Those modern teachings that would find a shelter for religion from the windy storm

and tempest of nineteenth century doubt and criticism in the fact that it satisfies the emotional nature, offer but a doubtful good. Religion does not seek a shelter; it offers one, the only one. It speaks with authority and to the whole man. That it does satisfy the emotional nature, refine and sanctify the feelings is much; but there is more—it also addresses the intellect. Christian faith stands rooted in knowledge.

A Sufficient Explanation

The Bible furnishes the only rational basis for philosophy, including all being under the two terms of a relation, Creator and created. It defines that relation, saving us from much fruitless speculation, "One God and Father of all, who is above all, and through all and in all."[1] Its warrant approves of the freest investigation of nature by assuring us that it is God's handiwork, and therefore that it will not put us to in-

[1] Eph. 4 : 6. The doctrine of the *immanence* of the Creator in his creation is not a new idea, as many seem to suppose. It was thus admirably stated by Paul, and, to prevent its being volatilized into pantheism, he fixed it with the other half of the whole truth—the *transcendence* of God.

tellectual confusion in our efforts to search out its meaning.

Christ has given us the only explanation of human life and human duty which is consistent with the conditions of life and the nature of man: "Strive to enter in at the strait gate: for many, I say unto you, will seek to enter in, and shall not be able."[1] In the sense in which this is optimistic, optimism is true; in any other sense it is partial and misleading.[2]

Christianity demands the submission of the intellect to its authority; but its arguments addressed to eye and ear, its analogies with the conditions and experiences of this earthly life, as well as its proofs afforded to the spiritual perception, render that submission a reasonable service, as reasonable as is the sick man's submission

[1] Luke 13 : 24.

[2] Christianity is optimistic in that it holds out a promise of the final triumph of good; but it uniformly represents that triumph as to be shared, not, as the eager optimist seems sometimes to assume, by those who trust to the current of human tendency, but by those who struggle against that current through the help which the gospel brings.

to the authority of the skilled physician, as reasonable as is the traveler's submission to the authority of an accredited guide. So we yield to authority in many things, not merely through habit or ed cation, but because we recognize in that authority a wisdom superior to our own. No one of us will claim that he has found a guide to fullness of life who can for a moment endure comparison with Jesus Christ. In admitting this we have bound ourselves by the most solemn obligation to yield our lives to his guidance. That is what the submission of reason to authority in matters of religion means, to yield our own inadequately informed reason to the direction of the superior reason of an unerring guide, an act which our own reason requires so far as ours is right reason.

Christ takes possession of the very citadel of the soul, directing and strengthening the will. He elevates the moral sense, transforming duty into love. If the triumphs of Christianity are more evident in this latter aspect, it is because reason and will and feeling have wrought as one in the

conflict with evil. The life of classic Greece, in the pride of its intellectual supremacy, is put to shame by the humanity of a Christian New England village, because in the latter, to the full extent to which it is Christian, Christ has not only won the affections but has also received the allegiance of the understanding.

Christianity is much more than a stirring or refining of the emotional nature. Faith like that which abounds in the eighth chapter of the Epistle to the Romans cannot find its necessary inspiration in myths, however beautiful or instructive, or even in the excellence of moral precepts alone. Christ claims the whole man, and he alone makes man whole. It is true that we may find among skeptics men of kind hearts and admirable lives, but we must remember that they have grown up under the influence of a Christian environment and a public opinion whose most valuable precepts are derived from Christian teachings.

Those who offer us rationalism as a guide for the intellect, retaining religion as a solace for the feelings, propose a divided

allegiance, an impossible service of two masters. Christianity must be supreme; only so can its triumphs continue. It rules out all that is false, it gives a welcome to all that is true, from whatever source it may come. "He that is not with me is against me," is coupled with "He that is not against us is for us," an authoritative definition of Christian exclusiveness and Christian liberality. Error is to be excluded, no matter how plausible; truth is to be accepted, however offensive to human nature, humiliating to party spirit, or hostile to preconceived opinion.

Christ Supreme

It is its completeness of adaptation that makes Christianity the only natural religion, the only one fully qualified to touch human nature on every side, to reach its deepest needs and direct its loftiest aspirations, hence the only religion fitted to be universal.

There may be ten great religions in the world, or more, or less. The Bible does not authorize us to belittle what is excellent in creeds not Christian. Its teachings are

explicit on this point. God has furnished for all generations in all lands witnesses to his rule of power and right, in the heavens above and in the earth beneath, and in the law written in the heart of man.[1] Whoever has listened to these has gained precepts of wisdom for the guidance of life. Whatever of truth heathen systems contained was a light glimmering in a dark place, to which men did well to take heed. In the gloom of the night the shining of the faintest ray is a welcome guidance, but now that the night is past and the Sun of Righteousness is risen, we do not want the help of torch or taper.

We do not need to decry the teachings of the seers and philosophers of the heathen world, neither are we called upon to become their disciples. All that they have given, and it is much, Christ also gives with much more. We search out their sage precepts in ponderous volumes; Christ endowed his words with life, with eternal youth and freshness, and sent them forth to mingle among men, to be companions

[1] Rom. 2 : 14, 15.

and friends, to meet us in the streets and talk with us in the home. The good Samaritan is a man we know, and the return of the prodigal happened in our native village.

Often it seems that the most astounding of miracles is this: The words of Jesus, all we have of them, make together not more than a thin pamphlet, not much longer than an old-fashioned sermon, yet they contain, as Ewald said to Stanley, all the wisdom of the world. Who shall estimate their power in the world? a power greater to-day than it ever was before! The world has not outgrown them, it has not yet grown up to them; if in any period it has neglected them, that has been a period of decline, not advance.

We may learn many profitable lessons by the comparative study of religions, if we inquire wisely, but none more valuable than this, the matchless superiority of Christ over all other masters.

The religion which holds the promise of the future is that which expresses the gospel of Christ in its completeness and

simplicity, and equally reflects that full sympathy with nature which is a marked characteristic of the Bible, recognizing that the teachings of nature form a part of God's message to man. It is not claimed that the pulpit should herald each fresh discovery of science, or approve each new hypothesis; it has better work to do. But it must not condemn any doctrine of science as contrary to the Bible unless it has evidence sufficient to sustain that verdict.

Theology should have science as its ally; it may do so by frankly acknowledging what is true in science. The alliance makes no call for compromise.

The essential unity and inner harmony of all truth from every source have been recognized by the noblest souls in past generations, and are especially enforced in our own age by the rapid progress of investigation which is bringing the boundaries of the various realms of thought nearer together. Sooner or later all these artificial boundaries will disappear.

The Christian must not hesitate to ac-

cept, in the fuller meaning it has to-day, the sublime utterance of the psalmist,

The heavens declare the glory of God.

The student in the laboratory may find fresh inspiration for his work in the triumphant cry of the devout astronomer, half dazed with the splendor of the laws he had discovered,

O God, I think thy thoughts after thee.

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