THE NEW TRUTH

AND

THE OLD FAITH

BY

A SCIENTIFIC LAYMAN

LONDON
C. KEGAN PAUL & CO., 1, PATERNOSTER SQUARE
1880

Are God and Nature then at strife,
That Nature lends such evil dreams ?
So careful of the type she seems,
So careless of the single life ;
* * * *
" So careful of the type ? " but no.
From scarpèd cliff and quarried stone
She cries, " A thousand types are gone :
I care for nothing, all shall go.

" Thou makest thine appeal to me :
I bring to life, I bring to death :
The spirit does but mean the breath :
I know no more." And he, shall he,

Man, her last work, who seem'd so fair,
Such splendid purpose in his eyes,
Who roll'd the psalm to wintry skies,
Who built him fanes of fruitless prayer,

Who trusted God was love indeed
And love Creation's final law—
Tho' Nature, red in tooth and claw
With ravine, shriek'd against his creed—

Who loved, who suffer'd countless ills,
Who battled for the True, the Just,
Be blown about the desert dust,
Or seal'd within the iron hills ?

No more ? A monster then, a dream,
A discord. Dragons of the prime,
That tare each other in their slime,
Were mellow music match'd with him.

O life as futile, then, as frail !
O for thy voice to soothe and bless !
What hope of answer, or redress ?
Behind the veil, behind the veil.

TENNYSON, *In Memoriam.*

PREFACE.

THE present is an unquiet age, a period of transition, in which the new truth, or what seems to be the new truth, is undermining the foundations of the old faith. There has been a logical scepticism in all times, but positive science is a new agent in the world, an agent whose results cannot be argued away; and whatsoever in the old order of ideas is inconsistent with these, must of necessity fall. The strength of positive science lies in the fact that Nature is ever present to give it proof. She has been in the past a silent witness of the fancies and contentions of men; but now they have learned to question her, and to every appeal she answers truly. Nature cannot lie, and any error in science must arise from our interpretation of her oracles. Therefore, since there can be no discord between physical and spiritual truth, the things that are true in religion must not conflict with the things that are true in science.

With the solid ground of nature to support him, the hardy man of science has grown bold in his attacks upon

the pale priest whose citadel is built on air. Armed with his objective facts and theories, the philosopher vigorously assails the theologian whose weapons are merely those of feeling and tradition. Free thinking and free speaking were never before so rampant as they are now. Scholars are casting doubts upon the authenticity of Holy Writ, and even Scotch divines accept the book of Genesis as a mere poem and an old-time tale. Our most learned reviews appear month after month laden with atheism, infidelity, and neo-paganism. The simple faith of the great naturalists that have passed away, of Newton, Brewster, and Faraday, who ever associated the creation with its Creator, the Lawgiver with His laws, and worshipped Him with awe while they set themselves to find out His handiwork, is apparently a thing of the past; for their successors have banished God from His own universe, and jest at the faith and reverence which is the most precious possession of the human heart. They tell us that the universe is a soulless mechanism governed by chance, and eternally shaping a brood of automata which live because they are not yet killed, and die because they cannot withstand the blind forces arrayed against them. Men are no longer the "children of God," nor indeed the children of anything better than the fossil monsters, excavated from the rocks. The Adam of Scripture is scouted as a myth; and the real Adam is found to be the scion of a noble stock of apes and quadrupeds, not to mention reptiles and jellyfish, so that the escutcheons of our proudest families might truthfully be garnished with a far greater variety of bird or beast

than they bear at present; and an unsuspected addition to their ancestral portrait galleries be found in the bowels of the earth. Man is a slavish engine, fancying himself free; a tool of flesh and blood to be worn out with use, then broken and flung away. His prayers are futile, his tidings of a higher world are all a flattering dream, and his hopes of a life beyond the grave are vain. The divinity of Christ is a fraud, and Christianity is doomed, like every other superstition, to die of being found out!

It is an age, too, which is socially unstable and corrupt. We are struggling for wealth and distinction, forgetful of higher things. Doing is all in all; being is lost sight of, for the beauty of life does not reveal itself to us. Faithless and hopeless, men, weary of the restraints of Christianity, have sunk into a new paganism. Gilded vice now sneers at virtue, ambition scoffs at law, and luxury smiles at ruin.

Whether or not the scientific scepticism of the time be a direct cause of this degraded state of society, it is of course impossible to say. There are certain philosophers who hold that materialism cannot have a pernicious effect on society at large; but since society is composed of individuals, it is difficult to see how that should be. At all events it will be granted that at such a time it is dangerous for a young man or woman to be without a guiding faith and rule of life. When winds are fickle and seas are raging, the bark should not be rudderless. Yet the present writer can assure these philosophers, that the hard gospel of atoms and force, which they so eloquently preach, has fallen like lead upon the souls of numbers of the youth

of this country, and shadowed many a bright young life with sunless gloom. Scientific materialism preys upon the very noblest natures; for they accept it seriously in their devotion to the truth, although the new doctrine too often blights their enthusiasm and stifles their loftiest aspirations.

The writer was trained in the ways of the old faith by Christian parents, but as he grew up he became a student of the new truths; and felt for years the internal warfare of knowledge and belief, the shadow and the void within a soul robbed of its creed. He has experienced many of the doubts of the time, and has been impelled to become their humble exponent; while at the same time he is seeking their antidote.

Amid the multitude of polemical voices, clerical and scientific, the scientific sceptic can find none which resolves the difficulties of the subject in at once a masterly and simple manner. If he goes into a church he hears only the old dogmas preached once more, the old hymns sung, the old prayers said. Yet all the while, he is harbouring a conviction that the service is a delusion and the creed a mockery. The clergy are, as a rule, so deficient in scientific training, that they cannot grapple with the scepticism which is paralysing their efforts. They have not thought out the bearing of all the new scientific doctrines on the articles of the faith they teach; and either in fear, or in trust, they shut their eyes to the danger which is threatening, and go on blindly as they have been going.

Finding no cure for his complaint, which he believes

to be the complaint of thousands more young men and women of the period, the writer sought, by private study of the problem, to arrive at his own solution of it, and if possible to recover his lost faith. He therefore undertook a systematic comparison of the old faith with the new truth, and what is put forth as such. The present work is the result of his task. In it the leading doctrines and the established laws of science are, it is hoped, clearly and popularly explained, so that all readers may readily understand them; and a comparison is drawn between them and the leading articles of the Christian belief. The writer makes no pretensions to that philosophic arena where pugnacious professors cleverly contend in throwing intellectual javelins at each other, very much for their own vainglory and the amusement of their friends; the stakes at issue being things no less sacred than men's Faith in Christ, and the Goodness of God. His aim has been to utter to the world the conflicting ideas which are floating in the minds of the younger generation, and to bring them into harmony where he could. Where he has failed in reconciling them he will at least have shown their disagreement, and having in this way stated the case, it will perhaps be easier to find the remedy.

The work being a progressive study, the reader is invited to suspend his judgment of it until he reaches the close.

The method which has been followed consists in explaining and comparing the views of so-called revelation and science on those great mysteries of his origin, habitation,

and destiny, which man is ever brooding over, and endeavouring to solve. Conformably to this plan the book is divided into three distinct parts, dealing with the three separate questions, MAN: WHENCE IS HE? WHAT AND WHERE IS HE? WHITHER IS HE GOING?

CONTENTS.

INTRODUCTION.

As thought by thought is piled till some great truth
Is loosened, and the nations echo round.

SHELLEY: *Prometheus Unbound.*

EVER since man opened his wondering eyes upon the beauty of the earth, he has been searching into the causes of the things around him, and seeking an answer to the great problems concerning his origin, dwelling-place, and destiny. His earliest facts were observed appearances, and his earliest theories were the fictions of his imagination: but as civilization grew, he learned that appearances were deceitful, and that ideal interpretations, like those of the Greek and other ancient sages, were erroneous. The inductive method of Aristotle, revived by Bacon, finally gave the rule of scientific progress, and since Bacon's time the advance of positive science has been more and more rapid and sure. The lesson of Bacon is, that a knowledge of the true nature of things cannot be found out by thinking alone; but has to be discovered by reasoning upon the results of observation and experiment.

The first-born of the sciences was astronomy, and the starry scroll of the sky was nightly watched by the

Chaldean magi, thousands of years ago. The properties of terrestrial bodies were also studied by the early alchemists, and the sciences of mathematics, hydraulics, and mechanics, in time arose. Facts accumulated, new instruments were invented, correct theories were framed, and general laws at length came to be formulated. From the heavens to the earth, from matter in gross to matter in fine, the scrutiny of man has been extended; he has put the sun in his crucible, and the atom in his callipers. His gaze has penetrated into infinite space, and seen the forging of new worlds in the workshop of the Creator; he has traced back the foot-prints of infinite time and gleaned the history of the earth from the waifs and strays of the rocks; till, at the present, he is striving to elucidate the very stuff and framework of the universe, and his mind is lost in the endless vistas of being that open to his wondering view.

Ever since his birth, too, we may suppose that man has endeavoured to explain the meaning and end of life, and to form some idea of its Creator; that is, of the Source from which the universe has emanated. The legends and mythologies of savage and barbaric races are an expression of their thoughts upon this subject; and they are all characterized by a poetical tendency to personify principles, or peculiar effects of nature. At first, deities were seen in almost every natural thing; then, as knowledge grew, the number of gods dwindled, and monotheism arose; but still the god was a natural object, such as the sun, but further removed from the arena of human experience than the older gods. The Jews early arrived at the conception of one invisible God, almighty, maker of heaven and earth, and their ideas on the creation of the world and the origin of man were believed to be inspired, or specially revealed by God Him-

self to the Hebrew prophets. These ideas were united to the Christian faith, and have come to be ours also. It is necessary, therefore, that we should bear in mind what they chiefly are.

The religious or teleological view of nature regards it as the creation of an all-wise and all-powerful God, whose beneficent *design* is everywhere apparent in it. God created the world in the beginning, and now preserves it by His power. He provides for all the creatures upon it, according to their needs, and has formed them according to their uses. His eye is over all, to guide and protect them from danger. Of all these creatures, man, to whom He has given free-will, has alone the privilege of asking His help and counsel; and God, on hearkening to man's prayer, sometimes interposes and alters the regular course of nature in man's behalf. Man was made in the likeness of God, his duty on earth is to do the will of God, and his chief end is to glorify God, and to enjoy Him for ever. On the other hand, God has framed everything for man's happiness; and death and sin came into the world through his own fall, for the first man was originally created pure and perfect.

As positive science has advanced from one great truth to another, there has been a series of battles between it and this religious or teleological view of nature. The aged Galileo only escaped the torture-chamber of the Inquisition by recanting his doctrine that the world revolved round the sun, and Jiordano Bruno was brought to the stake for affirming, in spite of monkish dogmas, that the earth was not the centre of the universe. We know now that the earth is but a dust-mote among the myriad systems which throng the infinite fields of space. Again, when geology opened up the buried manuscripts of the rocks and

read in their stony pages that the world had not been created in six brief days, but had been slowly fashioned during the lapse of æons, there was another sharp conflict between science and the Church. A new interpretation was put upon the old words in the Hebrew text of the Bible, and those men of science who had faithfully propounded the truth came in for no mean share of the *odium theologicum*. Time passed on, and the waves of classical disturbance again subsided, until the Darwinian hypothesis was propounded, and the origin of man derived not directly from the dust of the ground, but from a long intermediate lineage of wondrous living creatures. The storm raised by this bold speculation has not yet died down; men have not reconciled themselves to their unexpected descent from the brutes, and are still hoping for some loophole of escape from that unpleasant connection.

The doctrine of the Conservation of Energy preceded the doctrine of Evolution by a very few years: but as its consequences were not so manifestly opposed to the teaching of religion, it was allowed to pass unchallenged, and even accepted by many divines. These two great principles are the latest conquests of science, and it is their influence upon the old faith which chiefly occasions the scepticism of the day.

In order to clearly comprehend the doctrine of the Conservation of Energy, we must first understand what is meant by *energy* in a scientific sense, and for this it is necessary to form an idea of *matter* and *force*.

We cannot certainly say what matter is, although we can form some conceptions of it; nor can we say what force is, although we may define it. There are strong grounds for believing that matter is not a continuous substance, but

possesses a grained structure. The stuff out of which the universe is formed appears to be moulded into minute blocks or atoms, and those molecular edifices which we call bodies are built up of them or torn down in ruins by the physical forces, in much the same way as houses of brick or stone are reared and demolished. The atomic theory seems to have originated with Democritus, some five hundred years before Christ, and it was fully expounded by the poet-philosopher Lucretius, in his great poem on the "Nature of Things," which was written to dispel the fear of the gods and the hope of a future state, to destroy religion, which he says is the root of evil, and to raise us to the level of the gods themselves by showing us how the world is made. According to Lucretius there are an infinite number of atoms, but only a finite number of kinds; and these infinitely hard atoms, having primitive motion by virtue of their weights, clash together, and produce vortices from which the things which we see are formed. This atomic theory of Lucretius, as modified by the English chemist Dalton, is the working hypothesis of all modern chemistry.

It is supposed that there are certain classes of elementary atoms; for example, the class of oxygen, the class of gold, the class of carbon. All the atoms in each of these classes are primordial, perpetual, twin. The number of classes is limited, not quite seventy having yet been found on the earth, but the number of individuals is probably infinite. It is by the grouping of these diverse atoms together that all the varied materials of the universe are composed.

Each group, or atom cluster, is called a molecule, whether it comprise atoms of the same or of different kinds. Each atom is believed to be very complex in construction, and in a state of most intense vibration; so that each molecule,

while vibrating as a whole, is also vibrating in each of its atomic parts.

The best explanation of this wondrous pulsating frame, the atom, is to be found in the vortex theory of Sir William Thomson. We have all seen those beautiful smoke rings produced by sudden jets of smoke puffed from the mouth of a smoker or the funnel of a locomotive. Very perfect vortex rings can also be fashioned in water, and propelled for some yards through its mass. Now, it has been suggested by Sir William Thomson that the atoms of matter are simply similar vortex rings formed in a perfect fluid; that is, a fluid perfectly incompressible, frictionless, and yet possessing the property of inertia, a property which is common to all matter. All smoke rings are seen to vanish in thin air, and water rings to dissolve in the water around them, by reason of the internal friction of both of these fluids breaking them up; but in a perfect fluid these vortex rings once formed would last for ever.

On this hypothesis, the atoms of different elements would be vortex rings of different size and period of vibration, and molecules would be formed by groups of these vortex rings, either linked together in a lacelike fashion or huddled close by an attractive property of their vibrations.

Some idea of the actual dimensions of the atom has also been given us by Sir William Thomson. He estimates that if a drop of water could be magnified to the size of the earth, each single atom in that drop would be as large as a cricket ball. A cubic centimeter of air is also estimated by Mr. Johnstone Stoney to contain one thousand trillion molecules. This being so, we can never hope to see an atom even with our most powerful microscopes; only in the eye of mind can they be figured, and only by the ideal rule of mathematics can they be measured.

Until quite recently it was taught by eminent men of science that the elementary atoms have remained unchanged since the beginning of nature, a doctrine which would agree with the eternity of the atom as deduced from Thomson's vortex theory. There are strong grounds, however, for believing with Prout and Norman Lockyer that the "elements" are not really elementary at all, that oxygen or carbon atoms, for instance, are formed from atoms of a simpler substance by change of conditions, and that the dream which fired the ancient alchemists with the hope of transmuting the baser metals into gold was not so vain after all. Dr. Prout observed that the atomic weights of the elements are nearly all multiples of half the atomic weight of hydrogen, and suggested that the atoms of the so-called elements were formed by clusters of hydrogen atoms. Mr. Lockyer argues that different substances are produced from one primordial matter, hydrogen, by differences of temperature, and that if you could take a piece of coal or chalk and heat it to the required degree in a furnace, you would reduce it to a mass of hydrogen gas.

To support his view, this hard-working astronomer has made a vast number of observations on the spectra of the heavenly bodies and on terrestrial substances at different temperatures. He finds that the hottest, or white stars, such as Sirius, give the simplest spectra, and seem to contain hydrogen only; yellow stars, which are cooler, are found to give a more complex spectrum, and to contain iron and sodium, but none of the metalloids; while orange and blood-red stars furnish the spectra of metalloids, or of compound substances only. The older a star is the less free hydrogen is to be found in it, since it is gradually

being used up in the formation of other matter. Thus the earth, being an aged star, has no free hydrogen at all.

If this hypothesis be correct, then, our inability to notice any change in the so-called elements may spring entirely from our lack of means to alter them, and not from their inherent fixity.

The modifying effect of temperature, which is now being traced in the atoms, has long been observed in the masses of matter. Recent science has shown that the three physical states—the solid, liquid, and gaseous—are common to all kinds of matter, and that the temperature and pressure of the substance determines which of these states it shall be in. All solids can be liquefied, and vaporized; all gases can be liquefied and solidified. Solid water, or ice, becomes liquid at the zero temperature of the centigrade scale under ordinary atmospheric pressure, and steam at 100° on that scale. But even the so-called *permanent* gases, such as oxygen, which were deemed impossible of liquefaction, have been not only liquefied but solidified by the French physicists Pictet and Cailletet. Hydrogen was compressed and cooled by them until it issued from their alembic in a steel-blue liquid jet; and the wandering air was frozen into solid hail, which rattled as it fell upon the floor of the laboratory.

That which distinguishes the solid from the liquid, and the liquid from the gaseous condition, is the strength of the cohesive force binding the different molecules together. In solids the atoms are rigidly held in the bonds of cohesion, in liquids they are free to glide over each other, while in gases they are almost entirely emancipated from this restraint. Temperature is the freeing force, and it would seem to have the power not only of liberating the molecules of a body

from the ties of each other, but also of loosening the yoke which binds the atoms together.

A fourth state of matter, beyond the gaseous and only to be observed in a very highly rarefied vacuum, has recently been surmised by Mr. Crookes, the inventor of the radiometer. In what we understand by the gaseous state, according to the kinetic theory of Clausius and Maxwell, a given volume of gas contains millions of millions of molecules, moving rapidly in all directions, each colliding with its neighbours millions of times in a second. But by rarefying this volume to a high degree, the free path of each molecule may be lengthened out till the number of hits it makes in a second are negligible as compared with the number of misses, and the molecule is ordinarily free to move unimpeded. When the mean free path is comparable to the size of the vessel containing the gas, the properties which distinguish the gaseous state are reduced to a minimum, and a new state with exalted properties is brought about. In this state, for example, the corpuscular theory of light seems to hold good, and the rays do not always move in a straight line. This new world which is revealed to us is one, however, we can never enter, and we must be content, says Mr. Crookes, to watch it from without.

If matter may be likened to the bricks of the universe, the ether may be likened to its mortar. It is believed to fill all space and to permeate the molecular interstices of bodies; so that the atoms of matter are steeped in an ocean of ether. We know of its existence from the light and radiant heat which it bears to us from the sun, moon, and stars; and from certain magnetic properties which it has; but we know even less about its real nature than

we know about matter. Light is known to be a tremor of this ether communicated to the brain by the eye; and hence it has been supposed by some to be an elastic solid like a jelly. But a more probable hypothesis gives it a gaseous texture, or in other words, a volume of small particles moving in all directions.

These particles may, on Thomson's theory, be vortex rings of an infinitely smaller type than the atoms of matter; and, indeed, the votex rings of matter may be generated from the ether itself. They may be clusters of ether rings hanging together, or rings formed out of the fluid ether, as smoke rings are formed out of smoke. Some idea of the extreme tenuity of the ether may be formed from the inferior limit to its density given by Sir William Thomson. Reasoning from the amount of sunlight in a cubic mile of air near the earth (12,000 foot-pounds of radiant solar energy), that great physicist arrived at the conclusion that the mass of ether contained in that cubic mile of space could not be less, but might be greater, than *one thousand millionth of a pound.*

Science is just beginning to suspect the vast importance of the ether in the economy of the universe; and it is thought by many that it is the source and treasury of motion, as well as the mechanism whereby material changes are effected. The ether appears to be a fountain-head from which the energy which lights our fires, drives our mills, and swells our veins, is drawn, and to which it is in time restored. It surrounds us with an infinite stock of concealed power which we should never dream of, were it not for the terrific violence of the lightning flash which sometimes reveals it to us. And frail as we are, we yet live in the midst of it, because the powers of destruction are so finely balanced.

Matter and Ether are the vehicles of Energy. What, then, is Energy? To answer this question we shall first have to consider what is Force. In common talk we speak of the force of a blow, the force of circumstances, the force of habit, and in popular science we hear of the physical forces—gravitation, cohesion, chemical affinity, electricity, magnetism, and so on. Indeed, when a new seat of energy is discovered by a man of science, it has been customary to style it his particular force. The strictly scientific definition of force is something different from all these vague conceptions, and was earliest given by Newton in his first Law of Motion. Newton defined a force to be that power which tends to compel a body to change its state of rest or motion. If the body is at rest, force is that which tends to set it in motion; if it is moving, force is that which tends to change its velocity or its direction of motion. Hence the change of motion produced by the force is a measure of the force, and is called the *acceleration* of the motion. If the motion is increased by the force, the acceleration is a positive quantity; if decreased, the acceleration is negative. For example, the acceleration brought about by the force of gravity on a body falling to the earth is, for the latitude of London, about 32·2 feet per second; that is, a body falling in London nears the ground faster every succeeding second by some 32 feet, under the pull of the earth's gravity. Gravity being a diffused molecular force, acts on every particle of the mass of a body alike, and therefore this acceleration is a measure of its intensity, for any part of the earth's surface. In the case of other forces however, whose application to a body is restricted to one point, and not spread equally over the mass, we do not get a true measure of the value of the force without

taking also into account the mass or quantity of matter moved. Whether it be a ton or a grain-weight that is dropping to the ground under gravity, the acceleration is the same in both; but if a mechanical pressure or a magnetic attraction were applied to these two masses the resulting acceleration would be very different in each case. Hence it is that in the science of Dynamics the intensity of a force is measured by the product of the acceleration and the mass.

Energy is a term restricted by science at present to the work done by a force operating for some time. A body is said to possess two kinds of energy; *kinetic* energy, by virtue of its motion; and *potential* energy, by virtue of its position. When the force causes a mass to move through a certain space, as in the instance of a man winding up the weights of a clock, the work done by the man is said to be equal to the change of kinetic energy of the weights; that is, the product of the mass moved and the space it is moved through. And, on the other hand, the weights, when wound up and left at rest, are said to possess potential energy, because their position is such that they can, if let free to fall, restore the kinetic energy or work which was spent upon them in raising them there. In the same way, a bent spring, a boulder on a crag, a pendulum at the end of its beat, and even a charge of gunpowder, is held to possess potential energy, since it is in a position to yield a supply of kinetic energy, and is, in fact, a latent store of power. Nevertheless, it appears to the writer that there is a fallacy in this term "potential energy." For how can a mass possess *energy* by virtue of its *position*, which is a mere accident, and no property of the body or the forces acting on it? It seems to him that the hypothesis of potential energy is only

a mask for our ignorance of the real condition of things; that energy can only be of one kind, namely, that due to matter in motion, and that no body really at rest can possibly possess energy, whatever its position. If the *mass* would seem to be at rest, then it will probably be found that the *molecules* are not, and that the potential energy of position is the balanced kinetic energy of particles. When a force is too feeble to shift a large mass, it cannot be said that no motion at all is produced, although there is none visible; for the mass is strained and its atoms are moved. Similarly it will probably be found that the kinetic energy of mass, which has apparently disappeared when a body comes to rest in a potential state, as in the case of the wound clock weight, has become the kinetic energy of the molecules and ether particles in a state of equilibrium.

If we accept the dual hypotheses of kinetic and potential energy for the nonce, however, as a convenient makeshift, we shall find that all the protean forms which energy assumes in the universe may be relegated to one or the other class. Energy is either kinetic or potential, and the working of nature consists in changing from one kind to the other. The shuttle of Time's loom flies from rest to motion, and from motion to rest, in eternal rhythm. Even the planet swinging round the sun quickens and slackens in its career at different points of its orbit; while the atom pulsates in its tiny path. And there is not only a passage of energy from rest to motion or motion to rest, but from one form to another. Mechanical energy becomes heat, heat becomes electricity, electricity becomes magnetism, and so on. Every quantity of energy in one form has its exact equivalent in another form; and no energy ever disappears from the universe—it simply alters its mode.

Thus man may transform energy, but he can neither create it nor destroy it.

These transformations evidently take place through the mechanism of matter and ether interacting with each other; but it is still impossible to say how. The universe apparently consists of matter and ether in motion; but the form and essence of these is an inscrutable secret. Emboldened by her researches, however, Science does not hesitate to teach that the sum of matter and the sum of motion, or, in other words, the sum of energy in the universe, whatever its transformations may be, is a constant quantity, and that no fresh energy is born into nature or dies out of it. Such is the well-known doctrine of the Conservation of Energy.

The principle of the conservation of energy seems, at least in spirit, antagonistic to the teleological view of nature, since it would establish the supremacy of law, and banish an active Creator and an intervening Providence from the universe. It may admit that, in the beginning, the Creator constructed and set a-going the great mechanism which we call Nature; but it maintains that ever since that time He has left it to operate of its own accord without His interference. And, moreover, Sir William Thomson's theory of the dissipation of energy, which is a corollary to the said doctrine, draws the analogy between the universe and a machine still closer. According to this theory, which is based on the physical action of a heat-engine, all the energy in Nature tends during its transformations to become frittered down by molecular friction into heat, until, in course of time, the universe will acquire a uniform temperature. But in a heat-engine no work can be done unless there is a difference of temperature between the boiler and condenser; and hence no work will be performed in a universe whose parts are

all at the same temperature. Some modification of the theory may be required to take into account the energy which could be obtained from two different gases at the same temperature diffusing into each other; but the grand deduction is in the main legitimate, that the universe is running down like a clock which has been wound up, or an engine whose furnace-fires have been plenished once for all, and that this majestical frame of life and light which we see around us will inevitably sink into a ruin of death and desolation.

The doctrine of the conservation of energy, as proved by Joule, Clausius, Thomson, and others, was soon followed by the doctrine of evolution as completed by Darwin and Wallace. The former expresses the means, and the latter the way, by which the present condition of things has been brought about. The one teaches that the stuff or basis of the universe is a fixed amount of matter and energy, capable of certain transformations; and the other teaches that this matter and energy, by the inherent properties with which it is endowed, and also because of its original arrangement, has developed into a certain order of material and living forms, culminating in those which now exist. It also teaches the factors which have operated in this process, and sets forth the order in question. In fine, it endeavours to tell the story of the universe from its cradle onwards.

The general theory of globe development, as enunciated by Kant and Laplace, begins with the origin of solar systems. The matter forming a sun, say our own, with its attendant planets was once a revolving cloud of diffused atoms, a fiery nebula spread out in space. These atoms, under the influence of the force of gravity with which they were endowed, gradually collected into solid masses, at a

glowing heat, the central mass being the sun of the system, and the outer ones the planets. Being in a molten state, they acquired a globular form from their axial rotation, and the original whirling motion of the nebula from which they were thrown off. The middle orb being largest, would take a much longer time to cool by radiation than the others, which would in course of time grow dark and fit for life.

How life originated in these planets when they were quite ready for it, is as yet a mystery. Some hold with Dr. Bastian, that when the necessary conditions were ripe, the first germ of life sprung spontaneously from the soil; but all experimental attempts to create life in this manner have egregiously failed. Professor Helmholtz and Sir William Thomson have suggested that it may have been borne to them on some meteoric stone or dust, from other realms of space. Others there are who look upon the beginning of life as due to the intrusion of an unseen universe.

The modern development theory, of which Darwin is the principal exponent, does not concern itself, however, with the origin of planets or of life. It starts with the first germs of life, and then traces out the subsequent evolution of all plants and animals. There are three factors in this process of evolution, namely, Heredity, Environment, and Adaptation. Heredity expresses the tendency of an organism to grow in the likeness of its parent; environment is the sum of the physical conditions surrounding the organism by which it is influenced; and adaptation expresses the tendency of an organism to become modified into harmony with its environment. This result may be accomplished either by progression or retrogression on the part of the creature; that is, either by attaining a higher level of organized existence or falling back to a lower.

Evolution occupies itself with two classes of problems which are the inverse of each other. It studies the effect of environment on the organism, and also from the organism deduces the nature of the environment. According to Darwin, the process of adaptation is carried on by Natural Selection ending in Survival of the Fittest. It is well known that all the varieties of pigeon-carrier, fantail, or pouter, have been bred from the wild dove, by artificial selection on the part of the fancier. Darwin claims that by a similar method on the part of nature, not only varieties of breed, but even different species of animals and plants have been produced from one original stock in the course of untold ages. A curious and significant feature in selection, whether human or natural, is a certain tendency to minor variations from the parent, or the typical form, on the part of some individuals. We cannot say how these minor variations arise, but it is by taking advantage of them that the breeder is able to get a new variety. The influence of environment, transmitted by heredity, and this tendency to minor variations, together with what is called Sexual Selection, or the pairing of opposite sexes, appear to make up the process of development. The controlling principle of natural selection is the survival of those organisms which prove themselves best fitted for their environment. By this rigorous and searching law of life all that is weak is rooted out, while all that is strong is perpetuated. Plants and animals are permitted to survive, because they have stood the ordeal of the forces of nature arrayed against them, and could not be killed away. If the environment is practically constant, it follows that the later organisms will be superior to the earlier ones, since they are better harmonized to it. On the other hand, if the

environment change, the organisms may either become degraded or improved, or annihilated altogether; and a certain change of environment is conceivable which will gradually alter one species into another, if continued long enough.

The test of species lies in their typical form, or in the mutual fecundity of their members. All the individuals of a certain species have a common peculiarity of shape, or morphological characteristic. Similarly, they all possess the capacity for interbreeding, and yielding offspring which again can interbreed with the production of fertile offspring. For example, the foals of an Arab stallion and a Norman mare would be fertile with the foal of a Shetland pony, for all these different breeds belong to one species. But the hybrid of a horse and an ass would be barren with another mule. Hence the horse and the ass are not of one species.

Wide as is the differentiation of organisms into species, the Darwinian theory maintains that all species and varieties of flora and fauna originally sprang from one or, at most, a few primordial germs by a slow accumulation of slight differences. In his *Descent of Man*, Darwin points to the resemblances between the structure of man and the inferior animals, particularly the anthropoid apes, and to certain rudimentary formations, which are useless to him, as indicating his ascent from lower forms of life.

The doctrine of evolution, like the doctrine of the conservation of energy, dismisses the intelligent action of a Creator to the very beginning of the universe. It does not deny the existence of a supreme Being, of inscrutable attributes and power, but it will not allow that He interferes with the order of things established under the reign of law;

and hence it is antagonistic to a special Providence, and what is commonly understood by the efficacy of prayer. It is opposed to the Mosaic account of creation, which asserts that God called suddenly into existence every living thing by the word of His power, in the space of six days, some six thousand years ago, and pronounced it good, or requiring no improvement, then rested on the seventh day from all His labour. For it teaches that each species is not independent of the others, or separately created, but that all species are inter-related, branches of the same tree of life, and derived from one another. It seems to confound the argument for Design in nature, since it shows that the fitness of an organism for its place is the result of natural warring forces ; and that had the creature not been adapted to its circumstances, it would not have been alive at all. Thus, the eye has been shaped to see and the ear to hear, by external nature operating on the plastic matter of life.

These two doctrines uphold the principle of continuity in nature, which means that the chain of cause and effect is never broken. According to this principle, the supernatural must not be invoked in our explanation of nature, if the operation of natural laws will suffice; and no arbitrary interference with causation, such as would put the human intellect to confusion, can be admitted.

Taken together, they furnish us with a meagre outline of the Creator's mode of working ; a vision, dim and partial, of the birth and growth of worlds, from fiery star-mist to solid planets, from the irregularity of inanimate matter to the symmetry of life, from rude organic forms to higher and more delicate types, from the herbage of the rock to mankind, with his living soul. And further, they reveal to us that the very grandest productions of Nature, her suns and

systems, are equally with the tiniest submitted to the law of change. The planet, and perhaps also the entire Cosmos, develops from the nebulous embryo to full maturity, then lapses to decay, even as the flower which clings to it unfolds itself to fullest bloom, then slowly droops and dies.

BOOK I.

WHENCE?

They say
The solid earth whereon we tread

In tracts of fluent heat began,
And grew to seeming-random forms,
The seeming prey of cyclic storms,
Till at the last arose the man.

TENNYSON, *In Memoriam.*

THE NEW TRUTH AND THE OLD FAITH.

CHAPTER I.

THE BEGINNING.

In the beginning God created the heaven and the earth.

And the earth was without form and void; and darkness was upon the face of the deep. And the Spirit of God moved upon the face of the waters.

And God said, Let there be light: and there was light.

And God saw the light, that it was good: and God divided the light from the darkness.

And God called the light Day, and the darkness he called Night. And the evening and the morning were the first day.

And God said, Let there be a firmament in the midst of the waters, and let it divide the waters from the waters.

And God made the firmament, and divided the waters which were under the firmament from the waters which were above the firmament: and it was so.

And God called the firmament Heaven. And the evening and the morning were the second day.—GENESIS i. 1–8.

THE Creator has not left us without a material revelation of what has taken place on earth in the past and what is now going on in the heavens. He does not, indeed, furnish us with a complete record of His creation classified, like a botanist's herbarium, or a biologist's museum. Man must tax his ingenuity and skill over it, to read the imperfect lines. But as time unrolls and all things change, there are pieces saved from the ruin of the rich and varied fabric which He rears upon the bosom of immensity. Shreds of fern imprint their delicate patterns on the clay,

the stems of palms are buried in the sand, and the bones of slaughtered carrion are coffined in the rock. These stony fossils are the shattered seals in which the Creator has impressed his signature, the shrunken vestiges of His ancient handiwork.

Like the broken fragments of Chaldean tablets, they have to be put together and patiently deciphered in order that we may glean from them the true legend of creation. Every scratched pebble is an engraven secret; and as the geologist's hammer breaks open the hoarded manuscripts of the crags beneath, and lays bare their stony pages, so does the astronomer's telescope pierce the mystery of the skies, and resolve those golden orbs sown broadcast on the abyss of space, into countless suns and systems of worlds, in all stages of growth and decay. Every meteorite which falls through the air, scattering its train of fire behind it, is a messenger from space, bringing samples of cosmical matter to us for our examination; every ray of light which reaches us from the remotest star is a swift courier, bearing a despatch which, under the scrutiny of the prism, reveals the constitution of the body which gave it birth.

By comparing the earth with other planets, and planets with suns, and suns with nebulæ, the astronomer is able to arrive at some idea of the origin and development of the earth, just as the physiologist, by a comparative study of animal life, is enabled to throw some light on the origin and development of man.

If we dig down into the bowels of the earth at any place, whatever be the rock or clime, we pass first through a series of stratified rocks, of clay, sand or chalk, containing fossils, and bearing traces of having been deposited at one time by water. But under these, we find a series

of rocks, such as granite and gneiss, which are plainly old stratified rocks, altered by heat and steam; and below these again, we encounter hard crystalline beds of basalt, or solid lavas, which, indeed, thrust themselves up amongst the overlying rocks in huge bosses and veins. These fundamental rocks are similar in kind to the cold slags of active volcanoes, and many of them are associated with volcanoes now extinct. As we dig down, too, we find the temperature of the bore rising at the rate of 1° Fahr. for every 50 feet of descent, after the first hundred feet have been passed. These two observations together point to a high temperature inside the earth, a conclusion which is supported by the existence of quick volcanoes. Whether the core of the earth is fluid or not is still a moot point, but it cannot be doubted that there are lakes of molten matter in cavities of the interior, which sometimes overflow their banks and spout their liquid fire up to the surface of the crust. Moreover, the increase of igneous rocks as we pierce downwards, and the general prevalence of volcanoes in past times, are proof that the earth's temperature was once higher than it is now. And if we add to this evidence the significant fact that the spheroidal shape of the earth is just such as a fluid or plastic mass would assume were it spun on its axis as the earth spins, we are fairly warranted in concluding that the world was once a white-hot ball of molten rock, in fine, a miniature sun.

If, instead of burrowing underground, we could soar away into space, and survey the universe with the piercing eyes of Uriel, we should behold worlds in all stages of formation. Directing our gaze first upon the sun, the sovereign of our system, and sustainer of its life, we should

see him no longer shorn of his glory by the glowing veil of the earth's atmosphere, but clothed in all his terrible majesty, —a stupendous globe in conflagration, whirling through the void, no man knows whither, and bearing his girdle of attendant planets with him. His dazzling atmosphere is a scene of awful tumult and commotion. Thick clouds of gaseous metals and mists of vaporous rock whirl themselves together and belch outrageous flames of hydrogen, or are torn asunder by fearful hurricanes so as to reveal through their yawning gulfs the insufferable brightness of the molten nucleus within; and his enormous oceans of liquid metal, wide-weltering in fiery surges, are lashed by showers of iron hail and red-hot rain. What earthly artist could picture the appalling grandeur of these solar tempests, their inconceivable extent and fury, the wild colours of the elemental war! A terrestrial thunderstorm with its gloomy rack overwhelming the flushed sky, its blustering squalls, and sheets of vivid lightning, is a theme transcending the power of human pencil. But what shall we say of a storm where the winds are flame, and the billows molten metal, —of a cyclone raging in an atmosphere flagrant with the green haze of volatilized copper, the orange glow of blazing sodium, or the lurid glare of burning zinc!

No doubt this magnificent spectacle of cosmic riot, the smelting of a sun, and forging of a world, would, if too nearly regarded, appear both harsh and terrible to our eyes; but when witnessed from a proper stand-point in space, it would entrance us with its loveliness, sublimity, and splendour.

Nor does this crude description exhaust the sources of the solar pomp. For beyond the liquid nucleus, wrapped in its thick folds of glowing vapour, the eye distinguishes

a luminous corona, encircling the solar disk like an aureole, and extending far into space. On close examination, this curious appearance is found to be due to countless streams of meteoric stones, converging in perihelion round the sun, and lit up by his beams. It is a kind of solar aurora, and the beauteous hues of its electrical displays enhance and radiate the glory of the orb itself.

If we turn our eyes from the sun to the moon we pass from a theatre of intensest energy to a scene of utter desolation and death. The landscape of the moon is without wind or clouds, rivers or seas, tides or seasons. Vast cinder plains, blistered with the craters of extinct volcanoes, and crossed by yawning rifts and chasms, bask in the sun's untempered heat, and weird crags of lava or glittering basalt loom starkly in the airless light as if they would topple over and fall. Everywhere there is the same ashen grey hue, as of hoary age, the same wizard nearness of sight, the same deathly stillness, and arid blank. Not a green leaf, not a jet of sparkling water, to refresh the weary eye; not a hum of insect or a song of bird to charm the ear; there is no sign of life or motion anywhere around, except indeed it be the dull puff of some expiring volcano, breaking the silence like the last gasp of a dying man.

Let us next take a peep at each of the planets in turn, beginning with the minor planets within the zone of asteroids. Mercury, which is nearest to the sun, is seen as a small bright globe apparently muffled in a thick atmosphere of clouds. The intensity of the sun's rays on his surface is about ten times what it is on the earth, his year lasts only three months, and gravity is only half as powerful as it is here. It is difficult to understand how life, such as we know it, can exist on Mercury, unless it be at the poles.

On Mercury the seasons only last three weeks, so that the vegetation must grow at a magical rate; and bodies are so light that the unwieldy mammoth would skip there like the mountain roe. Moonless Venus resembles the earth, and is almost as large. She has a vaporous atmosphere, and shores washed by tides obeying the sun. Life, whether it be the "microscopic animalcules with silicious coverings," fancied by Dr. Whewell, or of a higher grade, is probably confined to her polar and temperate regions.

Passing over Terra, we come to Mars, the ruddy planet with its two tiny moons. Mars is really a miniature earth, and affords us a glimpse of how our own world looks as it rolls its lonely course on the ocean of sunlit space—a dappled green and reddish ball, with white spots at the poles. The greenish blue patches are seas, the reddish brown patches are continents, and the bright spots at opposite sides are polar snow-caps. Clouds, too, are seen to obscure the surface of Mars, telling of wind and rain, rivers and lakes. Mars is evidently well adapted for the support of such kinds of life as are familiar to ourselves.

Beyond Mars we cross the great zone of small planets, which fence the minor planets from the major. Then Jupiter, the giant of the system, surrounded by his four satellites, engages our attention. His immense disk is streaked with belts of cloud, very bright at the equator, but paling through yellow, to brown, and even to grey at the poles. It would seem that Jupiter is still self-luminous, at least at the equator. Though probably cooled to a dark crust at the poles, his central regions are apparently still glowing and red hot. These unquenched internal fires must give rise to boiling seas, breaking on cindery shores, and eruptions of volcanic ash. Life, except in its lowest forms,

can hardly yet exist on this dying sun himself, but it may now flourish luxuriantly on his moons.

Saturn, with his eight satellites, and his three wondrous rings, is a second Jupiter, though not quite so large; and though the beauty of his night sky, adorned as it is with shining moons and luminous bows, is well worthy of intelligent appreciation, there is little reason to conclude that any but the lowest types of life have yet found a home upon his surface, although his satellites may be the seat of a noble order of beings.

Leaving Saturn, we seek the remote arctic planets, Uranus and Neptune, on the far confines of the solar system, the latter being no less than thirty times farther from the sun than is the earth. To the naked eye, Neptune appears no other than a bright star as seen from the earth, yet his diameter is 37,000 miles, or five times greater than that of the earth. At Neptune, the intensity of the sun's heat is only $\frac{1}{900}$ of what it is on the earth, so that unless the planet is still heated by internal fires, it is probably in an arctic state, and devoid of animal or vegetable life.

The solar corona revealed to us that countless flocks of meteorites were circling round the sun; Saturn's rings are obviously a phenomenon of a similar kind; and, in fine, a closer scrutiny of space shows that it is literally strewn with these small fragments of solid stone and iron, mixed with oxygen, carbon, sulphur, sodium, nickel, tin, copper, and other cosmical elements which are found to compose the sun and comets equally with the earth and other planets. They sweep in myriad streams through the regions of space, across the track of the planets, and in the wake of numerous comets which are also known to haunt the solar system. Some of these comets are merely clouds of glowing

vapours, others are white-hot nuclei in a solid or liquid state, surrounded and followed by long trains of burning gas and meteorites, while others again are simply a burning nucleus. There are thus comets all tail and comets all head, as well as those with the typical head and tail. They travel in orbits of great eccentricity, and mostly return at long intervals to the neighbourhood of the sun, if they return at all.

Having now taken a panoramic view of the solar system, and its visitants, let us briefly glance across the vast abyss at the sidereal system, or Milky Way, of which the sun himself is a single star. Here the vision is bewildered among millions of stars, some of which are smaller, others larger than our sun. Sirius, for example, is fourteen times bigger than our luminary. We see lone stars, double stars circling round each other, stars in groups of three or more, stars in clusters, whorls, and streams, even stars in drifting masses. These are of almost every magnitude, and many wax and wane in splendour like the solar orb. In short, they are suns too, with their coronas of meteoric streams, and are composed of the same metals and minerals which build up our own system.

But in addition to these suns, and the invisible planets which may be presumed to wheel their courses round them, we observe a third species of heavenly body, which we did not find in the solar system.

If we direct our gaze to the brilliant belt of the constellation Orion, we see one of these star-mists, or nebulæ, spread over the blue heavens like a veil of milky light, begemmed with stars. Some of these lambent star-mists are resolvable into congeries of stars, others are known to be masses of glowing hydrogen and nitrogen gas, millions of cubic

miles in volume. But between these two extremes there are intermediate kinds, gaseous nebulæ showing a solid or liquid nucleus, more or less developed. In fact, the various species of nebulæ merge into each other, and are found to be different orders of one family. But, if from this view of nebular varieties we are led to conclude that stars and star-clusters are gradually formed by condensation of the diffused nebular gases into solid nuclei, we are also furnished with ocular evidence that the reverse process may take place too; for variable stars, such as Eta Argus, sometimes blaze out in brightness from the sixth to the first magnitude, and a well-marked star in Cygnus recently faded into nebulous haze.

These millions of stars, big and little, and the nebulæ associated with them, are probably all members of the sidereal galaxy to which our system belongs. To give some idea of the immensity of this aggregation of worlds we have only to reflect that Alpha Centauri, the nearest to us of the sidereal suns, or so-called "fixed" stars, is twenty millions of millions of miles distant, or two hundred and thirty thousand times further from the earth than the earth is from the sun. Light, which takes eight minutes to travel from the sun to the earth, and four hours to speed across the gulf which separates us from Neptune, takes no less than three years to reach our eyes from Alpha Centauri.

The majority of the sidereal suns are apparently fixed in space, although a slight motion in some of the nearest has been detected. We cannot, therefore, be sure of their distances from us, but, judging from their distribution and brightness, we are not likely to be far wrong in estimating that some of these are so remote that their light occupies tens of thousands of years in coming to the earth. Nor can

we say that our keenest telescopes have penetrated to the outermost verge of the galaxy; for, in some directions at least, there is a faint glare on the sky, which a higher power of vision might break up into stars. There is reason to believe, however, that the sidereal system is finite in extent, for unless it be (as some experiments indicate) that rays of light are by degrees extinguished in their passage through space, it would follow that were the system infinite, the night sky would glow with the blended beams of innumerable stars.

Although the sidereal system is perhaps limited, however, it does not follow that there are not other galaxies clustering in infinite space, and in proportion as far removed from our galaxy as the solar system is from that of Alpha Centauri. There may be millions of galaxies in the Cosmos, just as there are millions of stars in the galaxy; and although the raw material of what we call Nature is seen to be common to the whole sidereal system, we cannot tell but that there may be new stuffs and other Natures far beyond our ken.

Having made this cursory survey of the celestial sphere, it is right for us to pause and consider what it teaches us of the architecture of the heavens, and the earth's place therein. We have learned that space is the theatre of ceaseless activity, on the most stupendous scale; and that suns and systems are still being shaped out of chaos; that the elementary matter of the visible universe is the same in kind, whether it be used to form a nebula, sun, or planet; that only the conditions of position and proportion under which it exists are found to vary; and that the earth is a comparatively small member of a family of satellites following a single star, which is one amid a myriad others of lesser and of greater splendour, scattered with their retinues of

worlds like specks of dust in the depths of space, but bound together by the self-same law. We have seen fœtal stars in the act of development from nebulous haze by segregation of particles, and passing through different stages of growth; and we cannot doubt that our sun was formed in a similar way, and that the planets girdling the sun, though most of them are now cold and dark, were once subsidiary suns of the same star-group, formed from the same nebula. We have also found analogies among the other planets, to the earlier states of the earth itself. The giant mass of Jupiter seems to be at once the glowing ember of a star and the crude core of a young world. Neptune, like the moon, is evidently a planet shrunk into old age, while the earth occupies the place of the golden mean, and now rejoices in the fulness of her prime.

When Hugh Miller, in 1856, wrote his *Testimony of the Rocks*, with the praiseworthy object of reconciling revealed religion and geological science, he remarked that the knowledge necessary to interpret scientifically the first and second days of the Mosaic account of creation had not yet been gained, and contented himself with explaining the third, fifth, and sixth, or true geological days, according to the science of his time, leaving out the first, second, and fourth days, which are astronomical. The nebula hypothesis of Laplace, and the development theory of Lamarck and other naturalists, were evidently regarded by him as ingenious dreams. Since Miller's day, however, both of these conceptions have been growing in likelihood, and taking a firmer hold on the minds of men. In 1859 Kirchhoff found the key to the solar spectrum, and enabled astronomers to analyse the heavenly bodies by means of the spectroscope. Till then the letters of rainbow light

written on the wall had waited in vain for an interpreter. But when Kirchhoff found that the light from incandescent solid and liquid bodies gave a continuous riband of coloured rays when passed through the prism, whereas that from incandescent gases gave a spectrum of isolated bright lines, —and also that the spectrum of light from an incandescent solid or liquid body, enveloped in an incandescent gas, was robbed of some of its light by the absorption of the gas, and presented only black lines where the bright lines of the gas should have been,—the secret of the composition of the sun, stars, and nebulæ was about to be revealed by the light radiating from them. In 1859, too, Darwin published his *Origin of Species* and elaborated his theory of Natural Selection. So that during the last twenty years, great strides have been made by science, and its position with regard to the Mosaic account of creation has been marked by changes. We can now attempt to relate with some degree of probability, the earlier part of the story of the earth's creation.

According to the nebular hypothesis of Kant and Laplace, the solar system consisted originally of a nebula, or diffused cloud of gases, extending far beyond the present bounds of the planets, and probably revolving with great velocity. This mass was endowed with the force of gravitation, but being, like existing nebulæ, in a glowing condition, its tendency to contract by gravity was opposed by the expansive power of heat. As the mass parted with its heat, however, by radiation into the cooler regions of surrounding space, gravity exerted its condensing influence, and a solid nucleus began to be formed. The shrinking of the mass, and the collisions of smaller nuclei on the central core, would produce a high temperature in the latter,

and keep it in an incandescent state. Hence as it grew in dimensions it would present the appearance of a comet's head, or one of those stars which are to be seen in the heart of a nebulous haze. It is conceivable also that zones of vapour would be separated from the rest, at a distance determined by the balancing of the inward force of gravity and the outward impulse of centrifugal force due to rotation of the mass. These zones would in time condense into secondary nuclei, revolving round the larger central nucleus in the same direction and plane of motion. In this way a cluster of stars would be formed, which in course of time would shape itself into the sun and planetary system; for the secondary nuclei, with their subordinate stars, would cool down into planets and satellites, wheeling round the central sun, which by virtue of its enormous mass would rule their motions and supply them with light and heat.

This nebular hypothesis of Laplace is supported by the fact that all the planets travel round the sun nearly in the same plane, and that each of them spins round its own axis in the same direction, namely from west to east. Such traits would seem to denote a community of origin.

The examples of star-mists, comets, and star growths, which are exhibited by the heavens are also in favour of such a theory; and Saturn with his zones of meteorites and numerous satellites, would seem to be in himself a standing model of the process. It is significant too, that Helmholtz explains the origin of the sun's heat by the gradual shrinking of his volume.

To supplement this theory of Helmholtz, which does not fully account for the solar temperature during all the æons of the past, Sir William Thomson has suggested that the meteoric streams known to be ever converging about the

sun are really trains of fuel rushing in from space under the force of his attraction, and lavishly showering down upon his glowing photosphere. On striking the sun the energy of their motion is transformed into heat, which helps to eke out the solar radiation. This notion of Sir William Thomson, which, it must be confessed, suggests a very likely replenisher of the sun's heat, has been expanded by Mr. R. A. Proctor into a meteoric hypothesis of the origin of the solar system. Acting upon the hint that meteoric or falling stars are constantly coming within the sphere of the earth's attraction, and dissipating themselves, by the heat of friction with the air, into dust or fragments which finally settle upon the earth's surface and slowly add to its mass, Mr. Proctor supposes that the planets have slowly grown up under the meteoric rain in a region thickly traversed by these stony torrents. At present the number of meteoric streams is legion, but it has probably been very much greater in the past, before the sun had consumed and the planets sifted them. Mr. Proctor accounts for the larger size of the planets farther from the sun, by the greater richness of the meteoric field at remoter distances from the central attracting mass, and the asteroidal belt becomes a kind of meteoric backwater between the eddy of Jupiter's attraction and that of the sun.

The fact that interlacing meteor-streams are associated with comets, that Saturn's rings as well as the Solar corona and the Zodiacal light are evidently caused by flocks of these discrete bodies, is cited by Mr. Proctor in confirmation of his hypothesis. But may it not be that the true process of world-making involves both the nebular and meteoric hypotheses? Meteoric stones, impregnated as they are with

melted globules of iron, copper, tin, and other chemicals, seem to have been condensed from heated vapours by cooling, and it is highly probable that they are the residue of nebulæ which have mainly shrunk into star-groups. As time goes on, however, this scattered cosmical rubbish, or star-dust, as we may call it, would be gradually absorbed by the principal masses. On this view of the case the nebula originates both star and star-dust, but the growth of the former is assisted by the contribution of the latter. Again, it must be remembered that the countless collisions of meeting meteor-streams might give rise to a temperature sufficient to fuse their materials into an embryonic nebula, from which, by a combination of the nebular and meteoric processes, the solar system might arise.

Whether it came about by one or other of these mechanical processes, or by a union of both, science is at least assured that the earth was once a miniature sun, revolving along with several others around its gigantic primary. Being in a white-hot and plastic state, it would readily yield to the shaping influence of its whirling motion and acquire a spheroidal form, flat at the poles and bulging at the equator, where the centrifugal force due to its velocity of rotation was greatest.

As it cooled down by radiation into space, and slackened in its speed by ether friction, it would tend to solidify, and in time a hard shell would begin to form at the poles. We may be sure that many convulsions would break up this incipient skin again and again, until at last it proved too strong for the plutonic forces of the red-hot interior. At first the temperature and the glowing surface would be such that the oxygen and hydrogen of the gaseous atmosphere enveloping the earth would be free, but by-and-by

these would combine into the form of steam, which would condense on the warm lavas and cinders of the reeking crust in lakes and streams of boiling water. Finally, as the earth from a hot state became merely warm, the ashes and vapours which had till then obscured the atmosphere would settle and the sky would clear.

Sir William Thomson has attempted to give us some estimate of the date at which the superficial crust was formed. His mathematical reasoning is based on the secular loss of heat now experienced by the earth, and he concludes that the hardening must have happened at least a hundred million years ago. Quite recently, however, Mr. T. Mellard Reade, C.E., in assuming that the fundamental traps and granite rocks are part of the original igneous crust of the earth, has arrived at the conclusion that the formation of the overlying strata of sedimentary rocks must have taken some six hundred million years. The estimate of Sir William Thomson has long been regarded by biologists as insufficient to meet the demands of the hypothesis of evolution; but Mr. Reade's value is considered ample enough to embrace all the changes which have taken place in the organic world. Probably the true date lies somewhere between these two results, which, although very diverse, are nevertheless interesting as giving an idea of the enormous interval which must have elapsed since the close of the lifeless period.

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In drawing a comparison between what is commonly called the Mosaic cosmogony and the development of the earth as taught by science, it is plain that we must regard the Azoic, or lifeless period, as equivalent to the first and second days of the scriptural account. And here it should be

said that if a literal day of twenty-four hours is meant in the Hebrew of Genesis, the Mosaic cosmogony cannot be seriously entertained for a moment as a revealed narrative of the creation of the world. No precise length of time is, however, stated, and it is open to those who lean towards the truth of the Mosaic description to argue, as Hugh Miller did with so much eloquence and skill, that the word "day" really means a long period of time, of which the "evening" and "morning" denote the dawn and close. Let us accept this interpretation (for the sake of argument) and proceed with the comparison.

Our panoramic survey of the heavens acquainted us with the fact that solar systems are evidently still in course of construction in the galaxy to which our sun belongs. It follows, therefore, that the Beginning in which God is said to have created the heavens and the earth must refer to the origination of matter. Having comprehensively stated the fact of the creation of the heavens in general, the sacred writer confines himself thereafter to his proper theme, the formation of the world and the solar system.

He asserts that the earth was formless and void, and that darkness was upon the face of the deep. Now, if the earth was once in a diffused nebulous condition, these epithets, descriptive of a chaotic state, might reasonably be applied, and the further allusion to the Spirit of God moving on the face of the waters, or fluids, if simply interpreted as a "mighty wind,"* would not be inconsistent with the raging of nebulous cyclones. But it is more difficult to see how the earth could be in a state of darkness, since a nebula is known to be a mass of *glowing*

* Of course this may also mean that the Spirit of God was arranging the chaotic mass of material so as to develop it into the habitable globe.

gas. The fact is, however, that nebulæ are often very feebly luminous, for Dr. Huggins has estimated that the intrinsic brightness of the nebula in the constellation Draco is somewhere between $\frac{1}{1500}$th and $\frac{1}{20.000}$th of a sperm candle. In addition to this, it should be borne in mind that the nebulous light is meagre in quality and deficient in rays of various wave-lengths. When rifled by the prism, it is found to consist usually of rays of a single or at most a few colours, whereas the spectrum of pure white light, such as is derived from the sun or the electric arc, exhibits rays of every hue. The "good" light, which God is poetically said to have called into existence by a fiat, might therefore be considered as a pure white light, such as would be emitted by the earth herself when she had attained the solid or liquid condition of a star, or by the sun when his incandescent nucleus, "sphered in a radiant cloud," began to illuminate space. All solid substances become luminous at a temperature of 1000° Fahr. They give out only red rays at that temperature, but at 1300° they yield also yellow rays, while at 2000° they emit also violet rays. A body raised to 2000° Fahr. and upwards will therefore furnish all the rays of the sun, and glow with a pure white light. It follows that so long as the temperature of the incandescent earth remained above 2000° Fahr., such a thing as night would be impossible, for the earth itself would be nightly luminous. As soon as the earth's temperature sank below 1000° Fahr., however, it would become a dark body, and its shadow in the sunlight would constitute what we term Night.

The achievement of this dark condition of the new earth undoubtedly completes an important phase of terrestrial development, since it implies the preparatory stage

and the formation of a globular crust. In the Mosaic cosmogony it marks the close of the First Day.

The great act of the Second Day, according to the Mosaic narrative, was the formation of a firmament, or open expanse of air, between the clouds above and the waters upon the surface of the earth. Now, it cannot be denied that long after the dark and solid crust had formed on the earth, it would still be unfit for the reception of life. Water boils at 212° Fahr.,* and until the superficial temperature had fallen lower than the boiling point, the thick envelope of mixed carbonic acid, steam, ashes, and other impurities which would muffle the earth, as Jupiter is muffled now, would barely commence to clear and rarify. This process would therefore occupy a vast period of time, a period attended by violent storms and volcanic eruptions, for it involves not only the purification of the atmosphere, but the deposition of the ocean. During this turbulent age the sun's light would be excluded from the seething waters, by the dense overhanging canopy of malignant gases; the earliest sedimentary rocks would sink as dregs to the bottom of the ocean, and the continued existence of life would yet be an impossibility:—

> "The earth was formed, but, in the womb as yet
> Of waters embryon immature involved,
> Appear'd not: over all the face of earth
> Main ocean flowed, not idle, but, with warm
> Prolific humour soft'ning all her globe,
> Fermented the great mother to conceive."

* Under the normal atmospheric pressure. It would take a higher temperature to make it *boil* under the heavy atmosphere of this era.

CHAPTER II.

THE PERIOD OF ANCIENT LIFE.

And God said, Let the waters under the heaven be gathered together unto one place, and let the dry land appear: and it was so.

And God called the dry land Earth; and the gathering together of the waters called he Seas: and God saw that it was good.

And God said, Let the earth bring forth grass, the herb yielding seed, and the fruit tree yielding fruit after his kind, whose seed is in itself, upon the earth: and it was so.

And the earth brought forth grass, and herb yielding seed after his kind, and the tree yielding fruit, whose seed was in itself, after his kind: and God saw that it was good.

And the evening and the morning were the third day.

And God said, Let there be lights in the firmament of the heaven to divide the day from the night; and let them be for signs, and for seasons, and for days, and for years:

And let them be for lights in the firmament of the heaven to give light upon the earth: and it was so.

And God made two great lights; the greater light to rule the day, and the lesser light to rule the night: he made the stars also.

And God set them in the firmament of the heaven to give light upon the earth,

And to rule over the day and over the night, and to divide the light from the darkness: and God saw that it was good.

And the evening and the morning were the fourth day.—GENESIS i. 9–19.

ACCORDING to the testimony of geology, the Azoic or lifeless period, when the crude material of the earth was fashioned and refined into an abode fit for the support of organic life, was followed by a vast era during which the earliest sedimentary strata yet known to us were deposited at the bottom of an illimitable ocean. These ancient rocks

are chiefly composed of gneiss and schists, all crumpled and twisted by the bending of the young crust, and steamed or roasted out of their original texture by the eruption of underground fires. The existence of clay slates, baked by heat and hardened by pressure, overlying these primordial Laurentian and Cambrian gneisses, would seem to prove an ultimate abatement of the violent conflict between fire and water; and it is in the limestone zones of the Laurentian series that the geologist has found the first signs of a living creature.

The *Eozoon Canadense*, as this primordial fossil is called, consists of the aggregated cases of a large foraminifer, which must have flourished in these ancient oceans, much in the same way as the microscopic globigerina are known to teem at present throughout the waters of every existing sea, and to rain their minute but delicately sculptured tenements in an incessant shower, which covers the ocean bed with a cushion of calcareous ooze, blended here and there perhaps with particles of cosmic dust, blown from exploded meteors, or the red dregs of floating pumice and wave-worn lavas. The old Laurentian seas were doubtless rich in lime, dissolved from the calcium slags of the new crust by waters heavily charged with carbonic acid, and these abundant foraminifers may have played the part of living filters, to purify the ocean from its excess of chalk and flint, just as the rich vegetation of the subsequent Carboniferous era absorbed the poisonous carbonic acid from the atmosphere and left it pure and sweet. At any rate their cast-off cases would assist in the formation of future land-surfaces, just as the clustering coccoliths and coccospheres of the Atlantic of to-day are slowly forming the chalk hills of an epoch yet to come.

More important to us, however, than the knowledge of this early life is the question of its origin. How did life begin on the globe? The thorough-going evolutionist cannot admit that the Creator directly intervened to produce it, and is forced either to suppose with Helmholtz and Thomson that the first germs of life were derived from some other world, and borne on cosmical matter to this earth, where they lived and grew when the environment was favourable, or to believe with Professor Haeckel that as the planet cooled, certain atoms of carbon, and sulphur, hydrogen, nitrogen, and oxygen,* would accidentally combine to form a plastidule of albumen. This bleb of jelly would become a living monera, capable of growing, moving, and multiplying copies of itself, by a process so rapid that erelong the whole surface of the earth would swarm with moneras, even if the happy play of chemical forces which formed the first had only chanced at one spot. Engendered, to begin with, in the sea, perhaps, when the temperature of its water had fallen below the point at which albumen curdles, these simple moneras would install themselves also in the fresh-water streams and pools, or in the humid earth; and by the natural process of development, an increasing variety of higher forms of life would, in course of time, develop from them.

Although it is remarkable that the sole form of life as yet discovered in the most primitive organic strata that we have thus far laid bare, is so closely allied to the moneras of Haeckel, and although to the ardent evolutionist the rise of organic matter from inorganic by the interaction

* Reproductive protoplasm particles are said to withstand a temperature of 300° Fahr. Liebig's formula for the composition of albumen is $C^{40}\ H^{338}\ N^{51}\ S^{3}\ O^{68}$.

of the common physical forces is regarded as a certainty, we must not overlook the important fact that no one has ever seen or been able to cause the transformation of matter dead to matter quick. There have been many triumphant alarms of this mysterious metamorphosis; but they have all turned out false as yet. What Dr. Bastian creates, Dr. Tyndall uncreates; and for aught that science can show, the doctrine of Harvey *omne vivum ex ovo*, although it requires to be modified so as to include propagation by fission, budding, and alternating generation, remains substantially true in asserting the need of parentage for all kinds of life. Of course the mere fact that no physicist has been able to generate animate matter from inanimate, or to witness the germination of meteor-wafted seeds, is no proof that these processes do not take place. The grand alchemic secret may not yet be discovered, or the terrestrial conditions may now be such as to render the occurrence at best exceedingly rare. Nevertheless, positive science advances by proof and can accept nothing on trust, therefore the existence of abiogenesis is a matter of pure faith rather than of exact knowledge.

The fact that even the living jelly lumps of Haeckel have specific modes of self-propagation, does not speak in favour of their spontaneous generation; and we cannot for a moment doubt that all the higher kinds of life are under the law of biogenesis. A formless protoplasm, *Bathybius Haeckelii*, lodging in the deep hollows of the ocean, was, however, believed by some to be a lower form of animation than the monera, and to be directly formed from the elements; but it is right to add that naturalists are now all but agreed this living slime has really no existence.

The birth-place of terrestrial floras is at present

engaging the attention of many naturalists. It was an idea of the illustrious Buffon,* that as the earth cooled from a red-hot state, her pristine crust would commence to form about the extremities of her axis, and her polar areas become the seat of earliest life.

This speculation has recently been elaborated by Count Gaston de Saporta, in an interesting essay entitled *L'Ancienne Vegetation Polaire.* Saporta assumes that the Azoic period ended when the water of the earth had cooled to the point at which the clotting of albumen does not occur, and that organic life first made its appearance, not in contact with the atmosphere, but in the water. He regards the locality of its origin as being at, or near the North Pole, and holds that for a long period life was active only there. In evidence of this he cites the well-known facts—that the rocks richest in fossils are found between fifty degrees of north latitude and the Pole; that the Laurentian and Silurian rocks of the Paleozoic period are found in Canada, Greenland, and the North of Europe; and that the coal formations, while extending to the polar islands, are extremely rare within the tropics. The discovery of a fossil tree-fern among the arctic coal-beds, has led to the conclusion that the polar climate was once warm, equable, and moist all the year round.

To account for this anomaly in a region where the year consists of one long day followed by a long night, M. de Saporta suggests that the atmosphere was then charged with fog, which wrapped the land as in a blanket, checking radiation, and that the solar light was then far more diffused over the whole earth, the sun not having then arrived at its present state of condensation. The inherent

* *Epoques de la Nature.*

warmth of the earth's crust would also aid the general effect, and transform the soil into the hot-bed of a forcing-house, in which a luxuriant vegetation would thrive and batten.

All the geological formations, paleozoic, carboniferous, jurassic, cretaceous, and tertiary, are alike found within the polar area, and hence it is probable that this region was the centre of origination for the successive phases of plant and perhaps also of animal life, which gradually overspread the globe.

The first signs of the refrigeration of the polar clime are afforded by the appearance of fossil conifers or pines in the cretaceous rocks, following the giant cryptogams or palms of the Carboniferous and Jurassic periods. After the conifers come fossils of dicotyledons with deciduous leaves, trees like our own beeches and elms, which indicate that the polar summer and winter had at length become strongly contrasted. Saporta regards the introduction of these deciduous leaved trees as the greatest revolution in vegetation which the world has ever seen, and he conceives that after being evolved they rapidly increased in variety and number from that distant epoch until the present time.

In confirmation of Saporta's theory, it is remarkable that the miocene rocks of the polar area exhibit a profusion of genera, the majority of which have living representatives which must now be sought in latitudes some 40° farther south, and to which they would seem to have been driven by the approaching cold of the Glacial period; while eocene flora now luxuriate in Madagascar, and Australia is still peopled by the marsupials of the Secondary age. Moreover, twenty years ago, Professor Asa Gray showed clearly that the

ancestors of the United States flora had been driven from high northern latitudes by the glacial cold; and quite recently, Mr. Thistleton Dyer, by a study of existing floras and their present distribution, has traced them to a hypothetical cradle in the northern hemisphere.

"Perhaps," says Sir Joseph Hooker, "the most novel idea in Count Saporta's essay is that of the diffused sunlight, which (with a densely clouded atmosphere) the author assumes to have been operative in reducing the contrast between the polar summers and winters. If it be accepted it at once disposes of the difficulty of admitting that evergreen trees survived a long polar winter of total darkness, and summer of constant stimulation by bright sunlight; and if, further, it is admitted that it is to internal heat we may ascribe the tropical aspect of the former vegetation of the polar region, then there is no necessity for assuming that the solar system at those periods was in a warmer area of stellar space, or that the position of the poles was altered, to account for the high temperature of pre-glacial times in high northern latitudes; or, lastly, that the main features of the great continents and oceans were very different in early geological times from what they now are. Count Saporta's views in certain points coincide with those of Professor Le Conte of California, who holds that the uniformity of climates during earlier conditions of the globe is not explicable by changes in the position of the poles, but is attributable to a higher temperature of the whole globe, whether due to external or internal causes, to the great amount of carbonic acid and water in the atmosphere, which would shut in and accumulate the sun's heat, according to the principles discovered by Tyndall and applied by Sterry Hunt in explanations of geological times, and pos-

sibly to a warmer position in stellar space, a more uniform distribution of surface temperature, and a different distribution of land and water." *

Whether or not we accept the striking conclusion of Saporta, it is plain that geological evidence points more and more to the northern regions of the earth as being the birth-place of vegetable life. It is probable that the first moneras were engendered in the tepid seas which flowed over the sunken continent of Eurasia † or of America. Perhaps they unfolded to the day in the reeking waters which are now locked in the rigid grasp of palæcrystic ice. Once originated, we may infer that these moneras rapidly increased and multiplied, until they swarmed at all depths in the ocean; and that higher forms began to appear amongst them as time went on.

The contraction of the earth in the act of cooling, and the expansive forces of underground temperature, would, as in the case of volcanoes, either violently upheave portions of the young land or slowly elevate them above the level of the sea. The vitrified crust, worn with wind and rain, would in time crumble into a soft and virgin soil, fit for the growth of seeds. Algoid germs would lodge in it and take root and flourish, and just as in the sea, so on the shore would the race of new-created organisms increase in number and complexity. The fossil zones of the Laurentian rocks prove that some kind of minute creatures were at work in countless millions, secreting chalk from the ancient brines ‡ to build their tiny caskets. The sandstones and shales of the Cambrian era, which succeeded, are tolerably

* *Nature*, Dec. 5, 1878.

† Europe-Asia.

‡ The palæozoic seas would be rich in the dissolved minerals of the volcanic crust.

prolific in the tracks of sea-worms, and the remains of fucoids, trilobites, and the characteristic *Oldhamia*, which some take to be a nullipore and others a zoophyte. The Silurian era, which followed after that, discloses a great variety of trilobites, corals, and stone lilies, nautili and cuttle-fish, with sea-weeds in profusion; while among the later beds of the series, placoid fishes of the vertebrate type, and terrestrial plants of the thallogen or flowerless order, begin to present themselves. During the Devonian or Old Red Sandstone eras, these ganoid and placoid fishes reached an inordinate state of development. Armed with bony plates and spines like the sturgeons of to-day, they appear to have been the tyrants of the seas, which must have been a scene of living strife, pain, and material turbulence. It is worthy of note, too, that many of their forms have a reptile affinity, big with the promise of the later reptiles which were ushered in before the close of the epoch.

The Carboniferous era, which came next, was marked by an extraordinary luxuriance of vegetation, as our coal-fields can testify. It is probable that the world was then muffled in a thick atmosphere, rich in carbonic acid and moisture, so that it became a vast greenhouse "covered with smoked glass," as Hugh Miller happily expresses it, having warm earth and steaming air in the interior, and a flaming sun overhead. The land appears to have been flat but extensive at this time, and the climate equable throughout the year and over all the earth,—a result due perhaps to the internal heat of the planet and the diffused body of the sun. The luxuriant forests which sprung up and furred the hills and valleys were entirely composed of cryptogams, or flowerless trees. Colossal club mosses or lepidodendrons

giant mares-tails or calamites, graceful tree-ferns, and curiously ornate sigillaria with scaled and fluted stems, waved their green and glossy crests in the breeze, under the snowy clouds and soaring blue of the skies; but their dank and tangled shades were haunted by a twilight gloom, through which many a strange and uncouth shape of reptile, fish, and fly stole silently after its prey, by tainted stream and baleful swamp. The resiny spores shed by these moss-like wildernesses, mixed with the trash of fallen fronds and scaly bark, have in the course of ages become carbonized into the coal which blazes in our grates, thus yielding up to the beings of a later time what seems to be the treasured radiance of the primeval sun.

Although the principal fossils of the coal measures are extended into the beds which follow next in the geological series, they are not there so numerous; and despite a number of characteristic forms, it is evident that the wealth of vegetation, as well as the abundance of animal life, seriously dwindled over the regions in which the red marls and sandstones of the Permian era were deposited. The strong family likeness between the Carboniferous and Permian fossils, and the marked dissimilarity between these and the species which succeed them, as well as the indiscriminate manner in which the later strata overlie the worn and upturned edges of all the earlier formations, have, however, determined geologists to rank the Permian era as the rear end of the Paleozoic period.

* * * * * *

If we turn now to the Mosaic cosmogony in order to contrast it with the geologic record, we shall find that, although Moses (?) describes the Creator as first dividing the waters from the land, and afterwards causing vegetation

to spring, he yet includes both acts within the third day. Geology has nothing to say against this plan, for all her proof goes to show that the elevation of continents from the Silurian Sea, and the rise of land floras, went on hand in hand. The main agents in the upheaval of hills above the waters of the ocean or the surrounding plains were the volcanic forces imprisoned in the earth's interior, and the shrinking of the young crust as it parted with its intrinsic heat. So far, no traces of volcanic action have been found in the Laurentian or Cambrian formations; but these begin to appear in the Silurian. The hills of North Wales have been erected during the Lower Silurian age and those of Kerry during the Upper. They are the result of lava streams poured out upon dry land; and of volcanic ash mingled with the mud and shells of the sea-bottom. Volcanoes were also busy during the Devonian and Carboniferous epochs; but what is singular, they seem to have become rarer during the Permian and succeeding eras.

The evidences of frequent rise and fall of the land-surfaces are abundant from the Cambrian to the Permian times. Professor Ramsay has pointed out that the red strata of the Devonian and Permian beds are poor in fossils, and appear to have been laid in inland seas while the country was rising. In fine, he regards them as a sign of the gradual shallowing of the Silurian Sea. As the level of the basin became higher, the waters would contract from seas to lakes, and change from brackish to sweet; while their shell-fish would slowly perish, and the iron rust which colours the beds would deposit itself among the silt in peace. In Carboniferous times oscillations of the land-level were particularly numerous. Every fresh seam of coal indicates a fresh movement of the ground, and in the South

Wales coal-field as many as eighty distinct seams have been recognized.

The Paleozoic period was therefore one of continental birth.

The later formations are not only free from violent volcanic disturbance, but are comparatively local in extent, and if Saporta's hypothesis of a dense mist and a diffused sun be true, it is highly probable, as Sir J. Hooker notes, that the main features of the great continents and oceans were not very different in early geological times from what they are now.

The length of time occupied by the paleozoic changes must have been enormous. When we remember that a coal seam represents the spore-dust shaken from trees in the course of centuries, and know that some of these seams are twenty feet thick, and occur in scores, one above the other, with layers of clay between, we may well infer with Huxley * that the coal measures must have taken hundreds of thousands of years to form. Mr. Reade, indeed, allows two hundred million years for the formation of the Laurentian, Cambrian, and Silurian strata, and two hundred millions more for the Old Red, Carboniferous, Permian, and New Red.

Moses is peculiarly silent upon the beginnings of life in the world—the simple moneras and flowerless plants of a low type which preceded the land plants of the third day. This may be due to ignorance of the existence of these elementary organisms, which have only been discovered by modern science; but it may also be due to a literary purpose, or to the nature of the revelation.

We observe, too, that he separates plants from animals

* Huxley's *Physiography*.

in the order of creation, whereas geology shows that, although vegetation developed more rapidly than animal life, they progressed together. It is certain that while the grass, herbs, and fruit trees of Genesis grew in the soil, fish swam in the waters and insects breathed the air. We cannot, therefore, accept the Mosaic story in a literal sense. But if we take it as dealing not in fine but in gross, with groups rather than with details, we shall see that it is right in the main. For the rocks tell us that terrestrial vegetation reached a climax of luxuriance during the coal measures, long before animal life attained a similar condition.

We have seen that the Carboniferous era nourished a rich crop of spore-bearing trees, ferns, and naked-seeded pines. "It was," says the eloquent Hugh Miller, "emphatically a period of plants," herbs yielding seed after their kind. "In no other age did the world ever witness such a flora: the youth of the earth was peculiarly a green and umbrageous youth, of dusky and tangled forests, of huge pines and stately araucarians, of the reed-like calamite, the tall tree-fern, the sculptured sigillaria, and the hirsute lepidodendron. Wherever dry land, or shallow lake, or running stream appeared, from where Melville Island now spreads out its ice-wastes under the star of the pole, to where the arid waters of Australia lie solitary beneath the bright cross of the south, a rank and luxuriant herbage covered every foot-breadth of the dank and steaming soil; and even to distant planets our earth may have shone through the enveloping cloud with a green and delicate ray." *

The "enveloping cloud" here alluded to is the dense

* *Testimony of the Rocks.*

vaporous atmosphere which probably shrouded the earth at this period, and helped to maintain its tropical character, even at the poles. And we may refer the reader, in passing, to the "mist" spoken of in the sixth verse of the second chapter of Genesis, which went up out of the earth and "watered the whole face of the ground." We merely mention this passage casually, because it is thought by some scholars that this supplementary version in the second chapter is by another author.

Hitherto we have met with no obstacle to the agreement of the Mosaic and geologic cosmogonies which cannot be removed by a liberal interpretation of the Scripture. Before proceeding to discuss the fourth day, however, we must point out that the first vegetation of the third day is described as grass, which was followed by the herb yielding seed, and that again by the tree yielding fruit, *whose seed is in itself.* Now, the true grasses, as well as the palms and angiosperms (trees whose fruit is seeded *inside*), did not appear in the geologic record until the Cretaceous period, although it is probable that the cycads and conifers (trees whose fruit is seeded *outside*) were common in the Permian era, as they were in the Jurassic or New Red, which came next. The earth was not furnished with the grasses and fruit-bearing trees, so useful as food to the larger animals, until the long period between the Cretaceous era and the advent of man. Now, this is an interval which we are compelled to deem a part of the *fifth and sixth* days. We can, therefore, only preserve our faith in the accuracy of the Mosaic narrative, by assuming either that Moses, by the word "grasses" really intended spore-bearing herbage, and that just as he omitted the lowlier plants which went before, so he included some of the higher trees which came

later than the third day, or by regarding the geologic register as imperfect and misleading. The recent discovery of a moth's wing in the carboniferous shales of Belgium,* would seem to favour this view. The fossil vegetation of this era, which has been preserved to us in the coal measures, is evidently the growth of hollows or morasses, and it is probable that the *upland* woods were tenanted by gaudy moths and brilliant flies which fluttered through the green shade, or hovered over many a crimson blossom.

The Fourth day of Genesis was dedicated to the completion of the sun, moon, and stars, which were to be lights unto the earth, and to be for signs and for seasons, for days and for years.

Knowing as we do that the sun, moon, and stars are themselves prodigious worlds, we are forced to discard at once the notion that they are mere "lights" set in the firmament to give light unto the earth. The Mosaic cosmogony seems here to degenerate into a childish and petty view of the awful grandeur of Nature. For all that, these celestial bodies do light the earth and rule the seasons. Humboldt has called the stars eternal time-keepers: but is not the blot of human folly visible in the astrological command that they shall also serve for "signs." If "signs" are meant for omens, not astronomical objects, we may judge that the sacred record is either garbled or not purely divine, for we cannot suppose the Deity to have purposely inculcated error.

It is remarkable, however, that Moses should place the creation of the sun, moon, and stars so long after the creation of light, knowing, as he must have done, that light emanated from these bodies. Indeed, he expressly speaks

* An. de la Soc. Entom. de Belgium, t. 18, pl. v.

of them as being made to illuminate the earth; yet day and night had been formed before. Perhaps he regarded them as receptacles for the luminous essence, an idea which Milton beautifully expresses:—

> "Of light by far the greater part he took,
> Transplanted from her cloudy shrine, and placed
> In the sun's orb, made porous to receive
> And drink the liquid light, firm to retain
> Her gathered beams, great palace now of light.
> Hither, as to their fountain, other stars
> Repairing, in their golden urns draw light,
> And hence the morning planet gilds her horns."

Allowing for poetical diction, this allegorical version of the finishing of the sun bears a striking resemblance to the actual process. During the Paleozoic period the sun very probably was as yet a white-hot liquid nucleus, surrounded by a great nimbus of flaming gas and shining meteorites. On Saporta's hypothesis, this immature sun, by its diffused mass, helped to keep up a torrid temperature all over the northern hemisphere, and foster the shaggy vegetation of the Carboniferous era. The impoverished flora which succeeded may have been due, at least in part, to the further condensation of the sun and contraction of his bulk. It was remarked by the late Principal E. Forbes, that the Permian and Triassic eras were very meagre in the production of generic types of life. Up to the close of the Carboniferous era, the climate over the whole northern half of the world was evidently uniform; but then ensued a period of change, which some geologists have associated with a glacial period. Since the Carboniferous era there have been seasons, tides, and winds, very much resembling our own. It may therefore be that this transition state corresponded to the fourth Mosaic day; and that, for aught we know,

the sun finally absorbed his enveloping nebulæ, and the sidereal system took its present shape during the æons which succeeded to the "period of plants." The fourth day may, indeed, have extended beyond the Permian era, into the Jurassic, and covered the time of passage from the ancient life to the new, when—

> "God said, Let the waters generate,
> Reptile with spawn abundant, living soul:
> And let fowl fly above the earth, with wings
> Display'd on the open firmament of heaven."

And—

> "Forthwith the sounds and seas, each creek and bay
> With fry innumerable swarm, and shoals
> Of fish, that with their fins and shining scales
> Glide under the green wave, in sculls that oft
> Bank the mid sea: part single, or with mate,
> Graze the sea-weed their pasture, and through groves
> Of coral stray, or sporting with quick glance
> Show to the sun their waved coats dropt with gold;
> Or in their pearly shells at ease attend
> Moist nutriment, or under rocks their food
> In jointed armour watch; or smooth the seal
> And bended dolphins play; part huge of bulk,
> Wallowing unwieldy, enormous in their gait,
> Tempest the ocean; there leviathan,
> Hugest of living creatures, on the deep
> Stretched like a promontory, sleeps, or swims
> And seems a moving land, and at his gills
> Draws in, and at his trunk spouts out, a sea."

CHAPTER III.

THE PERIOD OF NEW LIFE.

And God said, Let the waters bring forth abundantly the moving creature that hath life, and fowl that may fly above the earth in the open firmament of heaven.

And God created great whales, and every living creature that moveth, which the waters brought forth abundantly, after their kind, and every winged fowl after his kind: and God saw that it was good.

And God blessed them, saying, Be fruitful, and multiply, and fill the waters in the seas, and let fowl multiply in the earth.

And the evening and the morning were the fifth day.

And God said, Let the earth bring forth the living creature after his kind, cattle, and creeping thing, and beast of the earth after his kind: and it was so.

And God made the beast of the earth after his kind, and cattle after their kind, and everything that creepeth upon the earth after his kind: and God saw that it was good.

And God said, Let us make man in our image, after our likeness: and let them have dominion over the fish of the sea, and over the fowl of the air, and over the cattle, and over all the earth, and over every creeping thing that creepeth upon the earth.

So God created man in his own image, in the image of God created he him; male and female created he them.

And God blessed them, and God said unto them, Be fruitful, and multiply, and replenish the earth, and subdue it: and have dominion over the fish of the sea, and over the fowl of the air, and over every living thing that moveth upon the earth.

And God said, Behold, I have given you every herb bearing seed, which is upon the face of all the earth, and every tree, in the which is the fruit of a tree yielding seed; to you it shall be for meat.

And to every beast of the earth, and to every fowl of the air, and to every thing that creepeth upon the earth, wherein there is life, I have given every green herb for meat: and it was so.

And God saw every thing that he had made, and, behold, it was very good. And the evening and the morning were the sixth day.

Thus the heavens and the earth were finished, and all the host of them.—GENESIS i. 20–31; ii. 1.

WE have seen in the last chapter that the beginning of geological-life history is lost in the abyss of time, like the date of a fairy tale; but that geologists have agreed in classing certain rocks as Primary strata formed by the action of water during a vast cycle of ages, termed the Paleozoic period, or period of ancient life. The antique character of the fossils in these rocks have led to this designation; for it betrays a wide variation from the life of recent times. The paleozoic rocks were succeeded by others, termed Secondary, which were formed during the Mesozoic period, or period of middle life, and these again by Tertiary strata, deposited during what is called the Kainozoic period, or period of modern life.

This division of the whole series of sedimentary rocks is more or less an arbitrary one, geologists having agreed to draw the lines of separation somewhere. Between the primary and secondary rocks, indeed, there are signs of great convulsions and terrestrial changes having taken place, which, in Britain for example, result in the secondary rocks being laid down upon the tilted, worn, and broken edges of the primaries below. But between the secondary and tertiary rocks the distinction is less marked, and the only reason for making two classes out of these, instead of one, is that, so far as known, the secondary rocks, although they indicate a life liker that of the present than that of the primary rocks, do not contain any fossil forms of surviving species; whereas in the tertiaries a few remains are to be found of species which still survive. This is clearly a very unstable boundary between the two groups

of strata, since on the one hand existing species may yet be traced into the secondary beds, and on the other, the few living representatives of those discovered in the tertiaries may in time become extinct. It was therefore suggested by Principal Forbes, the naturalist, both from paleontological and petrological considerations, that the chosen limit between primary and secondary rocks should be abolished, and all geological time divided into two periods only, the Paleozoic and the Neozoic, or the periods of old and new life. For the purpose of this work we shall adopt the latter arrangement.

The Triassic or New Red Sandstone beds are now accepted by geologists as the first rocks of the Neozoic period. Formerly the Permian strata were considered as part of the New Red, until Sir Roderick Murchison classed them with the Paleozoic series. The sandstones, marls, and conglomerates of the New Red, like those of the Permian era, are not very rich in new fossil types. They yield, however, a fair supply of older ferns, conifers, and cycads; fish, shells, and stone lilies, while tracks of giant reptiles are prevalent in their ancient river muds. The clays, marls, and pellet limestones of the Jurassic or Oolitic era contain a variety of ornate shells, and sea-eggs, intricate corals, fishes, insects, and a few small marsupial mammals; an abundance of prodigious crocodiles, the huge fish-lizard, icthyosaurus, with its enormous eyes, the snake-necked plesiosaurus, the long-snouted teleosaurus, and the dinornus, a gigantic ostrich, ten feet in height.

The chalks, sands, and clays of the Cretaceous era inclose many remains of land-snails and turtles, sea-shells, corals, and bony fishes, together with the giant lizard Iguanodon; the anomalous pterodactyle, a flying reptile,

with the head of a bird and the wings of a bat on the body of a saurian; and the skeleton of a small bird, about the size of a gull, and belonging to the order of swimmers (natatores).

During these Mesozoic times, the land appears to have been on the whole very flat, with great rivers sluggishly flowing through muddy fertile plains. Monstrous alligators wallowed in the slime of these ancient floods; gigantic lizards basked on the hot earth, and terrible flying dragons haunted the dusky vaults of the forest, or winnowed the sunlit air on clumsy wings. It was a time of uncouth and repulsive life, of loathsome worms, of horrid griffins, of huge whales, and awful sea-serpents, such as frighten the imagination of a child. The mediæval tales of tremendous leviathans and "chimæras dire" are, indeed, amply justified by this chapter of the earth's middle history. With these representatives of a cumbrous and temporary life, however, there were associated the forerunners of new and more permanent kinds of beings. Small birds, and dwarf mammals of the lower or pouched order now made their appearance on the scene; and innumerable insects courted the flowers of wood and swamp.

That division of the great Neozoic period which offers the first specimens of existing species is called, as we have seen, the Tertiary or Kainozoic. The Tertiary rocks are subdivided into three groups, the Eocene, Miocene, and Pliocene, marked by the percentage of living molluscan species which they contain.

This mode of classification has been adopted, owing to the patchy distribution of these rocks, in order to indicate their ascending order. The clays and sands of the Eocene, or lowest beds, comprise about five per cent. of existing species of molluscs. They furnish also the bones of crocodiles, cay-

mans, and lesser mammals. The leaf-beds, clays, and sands of the Miocene strata are remarkable for a profusion of familiar flora, the palm, the vine, the oak, the laurel, and the fig. Ferns, too, flourished abundantly, and lignite beds formed even in Greenland bear witness to the prevalence of a warm climate and a vigorous vegetation over the whole northern hemisphere.* Through these rich forests roamed the unwieldy megatherium, or giant ground-sloth; the dinotherium, or giant tapir; the colossal mastodon; the hairy mammoth; the stegodon, a link between the mastodon and the elephant; the camel, ostrich, giraffe, monkey, and the deer. The hippopotamus rooted on the rushy banks of the streams, and there were whales, seals, and narwhals in the seas. Besides the above plant-eating land animals, there were also some flesh-eaters, and a gigantic tortoise, the *colossochelys atlas*.

The miocene beds have only some twenty-five per cent. of existing species of molluscs, whereas the overlying pliocene sands and gravels possess over fifty per cent. Bones of the elephant, tiger, tapir, and deer are mingled with these molluscs, and likewise a profusion of beautiful corals. The most notable peculiarity of the pliocene beds is, however, the presence of molluscan types, which inhabit the cold seas of the north, amongst those of prior times and warmer areas. These indicate the slow approach of that frigid climate which culminated in the Glacial period, when almost the whole northern hemisphere was locked in ice, and arctic shell-fish flourished in the Mediterranean.

* The recent researches of Professor Nordenskiöld, in Spitzbergen, have also brought to light abundant fossil evidence of a characteristic flora there during Carboniferous, Jurassic (Oolitic), Cretaceous, and Tertiary times. It indicates a cooling of the climate from the tropical Carboniferous era downwards; and the oaks, planes, and cedars of the middle tertiary correspond to the trees of California to-day.

The Glacial, or Pleistocene * era, which succeeded the Pliocene, is characterized by a series of surface deposits, in which all the shells are of living species, and all the mammalia, too, except in the older beds. The southerly migration of pliocene molluscs on the advance of the arctic cold can be demonstrated from these fossil forms. A bed of sand and gravel, rich in the rubbish of an old forest, at Cromer in Norfolk, has preserved, amid the leaves and mast of birch, oak, and hazel trees, the remains of the mammoth, the musk-ox, the bison, reindeer, and beaver. The age of this bed is therefore probably pre-glacial, for though the musk-ox and reindeer are denizens of the far north, these other animals are natives of a temperate, or, at least, subarctic region.

The first unmistakable signs of the Glacial era are found in the "boulder clay," a stiff, confused mass of clay and broken stones of all sorts and sizes, which lies over the worn and scarred surfaces of the rocks beneath. Thick sheets of ice, such as now cover the interior of Greenland, appear to have overspread the northern continents, grinding down the angles of the mountains underneath and scooping out the valleys. The harder rocks of all northern countries, and the "rubble" stones of the boulder clay, are found to be rasped and filed by this grinding process, just as the bed of a glacier and the stones of its *moraines* are striated by the icy river. Solitary blocks of stone, far removed from their original crags, are also found scattered over the face of Europe and America. Erratic boulders, as they are called, of Scandinavian granite are strewn over the plains of Germany and the steppes of Russia; the Alps and Hima-

* Post-pliocene, Post-tertiary, QUARTERNARY, are other terms for this interval of time.

layas are grooved with ice-marks far above the present level of their glaciers; the prairies of America bear traces of polar icebergs within 40° of the equator. If the rounded hummocky forms of our hills are due to the friction of the sliding ice-cap, the boulder clays and wandering blocks suggest a period during which the land was under water, and floating icebergs dropped their freight of mud and stones on the bottom of the sea. After these beds come drifts of gravel, raised beaches, and well preserved moraines, or rubbish-heaps of glaciers, to attest the re-elevation of the land and the continuance of the glacial cold. The alabaster cave-deposits, the peat-bogs, sand hills, and alluvial deltas of existing rivers declare the subsequent amelioration of the climate, and complete the geological scale up to the present day.

During the Glacial era the greater part of the northern hemisphere was tenanted by arctic animals exclusively, and the elephants, tigers, and hippopotamuses of tropical pliocene times gave place to the musk-ox, the reindeer, the woolly rhinoceros, and the hairy mammoth, whose frozen carcases, encased in ice, have been dug out of a Siberian cliff in so fresh a state as to be relished by the wolves, and whose superb tusks are largely quarried for their fossil ivory.

The cause or causes of the Glacial period are not definitely known, perhaps they never shall be. It has been conjectured, however, with a good deal of plausibility, that the orbit in which the earth courses round the sun was at that time more eccentric—that is, more oval than now; and that the northern winter occurred when the earth was in aphelion, or at its farthest distance from the sun. This would have the effect of intensifying the cold, and enshrouding the land in a vast load of snow and ice. Mr. Croll has also shown how the Gulf Stream could be stopped, owing to the equa-

torial current being deflected southward, along the east coast of South America, by means of the powerful trade-winds which would then blow from the icy pole to the equator. An arctic severity would reign over the northern hemisphere, while a warm equable temperature would prevail in the southern.

If the true cause of the Glacial period be a cosmical one, we may well inquire whether or not there were other Glacial periods in remoter eras; and geologists have put forth certain rock formations as evidence of Ice ages in the Permian, Old Red Sandstone, and Cretaceous eras; but these slight proofs are as yet of too vague and imperfect a nature to be indisputable. Before abandoning the subject, however, we may mention a still more recent explanation, to the effect that the glacial cold was due to a decrease in the thickness and density of the earth's atmosphere, owing to a reduction of the number of meteorites falling into it from space, and contributing their triturated substance to it. Perhaps also the refining of the earth's original atmosphere from diffused gases, such as carbonic acid and water vapour, through the absorption of the crust and its living denizens, or its diminution in thickness, through the same cause aided by the desertion of particles into space, may have had something to do with the refrigeration in question.*

However the glacial cold may have been produced, it is in the deposits which follow the great Ice age that we discover the earlier traces of mankind. The fragments of his tools, his weapons, and utensils, as well as the rude pictures

* Such a speculation points the query whether the return of carbonic acid and other gases to the atmosphere, going on through the combustion of coal and other manufacturing processes, may not tend to elevate the terrestrial temperature now.

of his fancy, meet us with his broken bones amid the relics of those animals which flourished during the Glacial period, the mammoth, the rhinoceros, the reindeer, the hyena and the cave bear. These human vestiges have enabled anthropologists to divide the infancy of the race into three sections, namely, the Stone age, the Bronze age, and the Iron age. According as the heads of his spears and axes, or the blades of his knives were of iron, bronze, or stone, so does man appear to have been in a ruder and earlier condition of existence. The Stone age, however, embraces so long a lapse of time that the general surface of the country was modified, the climate altered, some animals became extinct, and man himself became far more skilful in fashioning his tools. Hence a subdivision of the Stone age has been adopted, and the older and rougher flint implements are now known as Paleolithic, while the neater and more finished ones are called Neolithic. These distinctions are more or less arbitrary, since paleolithic fossils are found along with neolithic ones, and these again with bronze and iron weapons, so that the Stone age extends even into the Iron age; but in the main they exhibit the true order of human antiquity.

In tunnels and caverns of limestone rocks, buried deep under layers of river mud, or sealed in solid alabaster, the ancient fires and flint tools of paleolithic man are mingled with the teeth and bones of the elephant and mammoth, the cave-bear and hyena, the lion and buffalo, the wild boar and wolf. In the yellow loess of flood-loam of the Rhine human bones have been found eighty feet deep; and in the old river gravels of the Somme in France, ninety feet above the present level of the stream, flint weapons are associated with the skeletons of extinct mammalia, and with

recent land and fresh-water shells. There can therefore be no doubt that man lived on the earth along with these extinct mammals, long before many wide river valleys of to-day had been scooped out, and while yet the waning cold of the Glacial period gave to mid-Europe the severity of Labrador. The owner of these rude spear-heads and axes of chipped flint was a savage hunter and fisher, who slew the wild boar and the mammoth, split their bones for marrow, and dressed himself in skins like the Eskimo. It cannot be said, however, that this primeval man was of a lower type than any savage races now known to us. A skull taken from the Neanderthal cave is indeed ape-like, with massive brow ridges, but it has the capacity of a Hottentot head; and another skull taken from the Engis cave near Liege is in all respects well-formed; so that we may say, with Professor Huxley, that these ancient men "could have worn boots as we do." This fact does not prove, of course, that the first men were not of a lower type than the moderns; for these cave-dwellers of the Glacial epoch may have been but the descendants of other races which perished long before, and left no discoverable trace behind.

The remains of neolithic man are usually come upon in "lake dwellings," peat-bogs, alluvium, and artificial mounds, or tumuli. In some of the pile-built huts of the Swiss lakes, hatchets and knives of polished flint and jade are found beside the bones of deer, wild boars, and bulls. In others, the appearance of bronze axes and daggers proves the introduction of metals, and a farther advance in progress is evidenced by the bones of tamed sheep and goats, mixed with broken pieces of pottery, shreds of homespun cloth, and grains of charred corn. In the flower-peat bogs

of Denmark, along with the trunks of the Scotch fir, a tree now extinct in that country, are found many stone implements, while in the higher mosses, which once nourished the oak, are enclosed a variety of bronze utensils and weapons. Amid the refuse of the Danish shell-mounds, also, are buried numerous tools of stone, and horn, wood and bone, but none of metal, although traces of fire and fragments of pottery are frequent.

Although the Paleolithic and Neolithic ages are markedly distinct from each other, there is no sign of a gap between the more recent ages of stone and metal tools. But there may be noted a regular progress in the art of making tools, whatever the material. "The frequently found polished stone celts," says Professor Geikie,* "and the neatly trimmed arrow-heads of flint, show that the older and ruder stone weapons gave place to others of like material, but of far more cunning workmanship. It appears also that even after bronze came into use, stone continued to be employed, as being probably a less costly and more easily obtained material. We even find proofs that the stone tools were sometimes elaborately cut and polished, to imitate the form of those which were cut in bronze.

"The further tracing of the history of man," continues the professor, "belongs rather to a treatise on archæology than to a geological manual. In closing this outline it may not be inappropriate, however, to notice some of the proofs of geological changes which have been witnessed by man since he became an inhabitant of Britain. Reference has already been made to the evidence furnished by the ancient river-gravels and cave-earths regarding great vicissitudes which have passed over the surface of this country. We

* *Manual of Geology*, by Jukes and Geikie.

see how valleys have been deepened and widened, so as to alter the whole drainage of large districts; how the old rivers have left their terraces far above the limits of the present streams, and bear witness to a climate then much severer than that which we now enjoy, inasmuch as it was less removed from the Ice age which had preceded it; how the long extinct mammoth, rhinoceros, hippopotamus, and other lost mammals roamed over the country; how the caverns were haunted by extinct forms of hyena, lion, and bear; how of the forms of life which still survive, some, like the reindeer, elk, and musk-sheep, then abundant here, have now retreated to more northern latitudes, where they find that congenial climate which they formerly encountered in this country; how man, at first a savage, warring with rude implements of stone against the beasts around him,—then a more skilled hunter, with bow of horn and arrows tipped with flint,—then adding gradually to his comfort by gaining a knowledge of the use of metals, of the cultivation of corn, of the domestication of animals, and of the fabrication of woven textures, advanced step by step in civilization, now helped, perhaps, and now thrown back by the migration of other rude human tribes from what is now the mainland of Europe, until, at last, he comes within the pale of history, and is brought face to face, first with the civilization of Rome, and then with the humanizing and elevating influences of Christianity."

Since neolithic times there has been little change in the appearance of the continents, except what man has done in the cultivation of the soil and the erection of great cities, aqueducts and roadways. Here and there a slight rise and fall of the sea-level has taken place; a lake has dried or filled up; a great flood, like that of Noah, and

due, perhaps, to the melting of glacial ice or the sudden sinking of a whole region, has deluged immense areas; volcanoes have burst up from the sea-bed, or vomited their molten rock and cinders over the plains; earthquakes have riven the solid crust into yawning chasms, and overthrown the towers and temples of man; coral polypes have reared their marble tombs over buried continents, building new islets upon old mountains; and all the while, the slow, secret, silent waste of rain and wind, of frost and snow, has been wearing down the hills, and stormy tides have been gnawing at the edges of the land. These actions are still going on around. Rocks are being formed by chemical union or animal growth, and destroyed by fire or water; strata are being ruptured or displaced by molten lavas, and raised or sunk over great areas by unknown forces, even now as they have ever been, in their degree since geological history began.

* * * * * *

In the foregoing outlines of stratigraphical geology we have seen that it is the custom to class the Triassic or New Red Sandstone formation as one of the first Neozoic series. In seeking for the counterpart of the fourth Mosaic day we shall find it best to adopt this plan, and include the New Red with the Permian formation, that is, with the last of the Paleozoic series. The Permian and New Red beds are, as we have already said, distinguished, both from the Carboniferous, which precede, and the Cretaceous, which follow them, by a paucity of new types. If we agree, then, to class the New Red with the Permian as corresponding to the day in which the heavenly bodies attained to nearly their present configuration, we must look for the fifth day in the Oolitic and Cretaceous eras. The earth herself tells

us that this was a period of prodigious sea-monsters and winged dragons; and if by these we may interpret the words "whales" and "winged fowls" of Scripture, we cannot but wonder at the general accord of the two testimonies. Birds, or true fowls, do not appear to have been plentiful, however, during these middle ages, if we may judge by the scanty remnants of them which are to be found. Nevertheless they did exist at that time, and peopled the air along with huge bats and pterodactyles.

The terrestrial ages which properly fulfil the fifth Mosaic day were ages of egg-bearing animals—lizards, crocodiles, and dragons; snakes, birds, and insects. Ere the close of the Cretaceous period, however, some small marsupial mammals had appeared to herald the advent of higher forms. These were ushered in with the Eocene, Miocene, and Pliocene eras of the Tertiary period, when the "beasts of the earth," and other "creeping things" of the sixth Mosaic day, were represented by the mastodon, mammoth, lion, tiger, and other large quadrupeds.

From the earlier geological times until near the close of the Pliocene era there appears to have been a striking uniformity among the plants and animals inhabiting the various regions of the earth. With the approach of the glacial cold, however, this balance seems to have been disturbed, and well-marked zones of climate girdled the earth, causing a wide divergence of its flora and fauna.

The Glacial period seems to have caused a great change in those land animals restricted to comparatively slow locomotion. The fishes and birds of that time are now to be found in the arctic regions; but all the mammals are now extinct, although they have bequeathed to us some living representatives. The wild cattle, goats, and sheep, useful

to man, appear to have come into being in post-glacial times, about the epoch when man himself was born.*

All estimates of the actual length of the Neozoic period are necessarily a kind of rational guess-work, but the value chosen by Mr. Reade, from a study of the various strata and the time required to form them, is two hundred thousand years, dating from the beginning of the Jurassic to the end of the Pleistocene era. From that era to the present time, or, in other words, the period since the birth of man, is estimated by Professor Mudge, from certain American strata, to be also two hundred thousand years.

The world was now well stocked with tenants of earth, air, and sea, mammals and reptiles, birds and insects, fishes and molluscs; a luxuriant garden, ready for the creature who should rule the whole, and introduce order where all was yet strife.

"Now heav'n in all her glory shone, and roll'd
Her motions, as the great First Mover's hand
First wheel'd their course: earth in her rich attire
Consummate lovely smiled; air, water, earth,
By fowl, fish, beast, was flown, was swum, was walk'd
Frequent: and of the sixth day yet remain'd:
There wanted yet the master work, the end
Of all yet done; a creature, who, not prone
And brute as other creatures, but indued
With sanctity of reason, might erect
His stature, and upright with front serene
Govern the rest, self-knowing; and from thence
Magnanimous to correspond with heaven."

* Since Book I. was written, evidence of a Miocene (or pre-glacial) man has appeared. Compare p. 76.

CHAPTER IV.

THE CREATION.

Where wast thou when I laid the foundations of the earth? declare, if thou hast understanding.

Who hath laid the measures thereof, if thou knowest? or who hath stretched the line upon it?

Whereupon are the foundations thereof fastened? or who laid the corner stone thereof?

When the morning stars sang together, and all the sons of God shouted for joy.—JOB xxxviii. 4–7.

BEFORE summing up the evidence for or against the truth of the Mosaic cosmogony, let us briefly review the past history of the earth as revealed to us by the facts of science and the spirit of evolution. In the beginning, we picture to ourselves a nebulous fiery haze brooding in the vast abyss of space, an embryon world, formless as yet and void of life; but fervent with creative forces. After æons of time, these warring atoms range into order, and unite into a concrete globe, the harmony which underlay their primitive strife discovering itself at first in symmetry of shape. This glowing ingot of slag, this miniature sun, wrought on the invisible anvil of God, contained in its red-hot entrails all the lovely flowers and crystals, all the classic groves and temples which have adorned the later continents: and,

according to the materialist, the commingled elements of all animal life, the beauty of mankind, the soul of Plato, the genius of Shakespeare, and the heart of Jesus.

As the molten mass parted with its heat, it became covered with a solid crust of vitrified rock and ore. Upon this the wind blew and the rain fell till it crumbled into soil fit for the nourishment of life. Algoid films then began to stain the warm primeval pools; humid fungi rose out of the mould, like vapours, and mosses cast their verdure over the clods. A glossy green and wildly luxuriant vegetation battened on the rich red earth and steaming air, from the tropics to the pole. Fishes thronged the waters of the lakes, and crocodiles wallowed in the slime. The life which had originally sprung into existence gradually developed into higher and more diverse forms, so that every region which the earth offered, be it ocean, land, or air, was peopled. The sea-floor became the seat of strange weeds, fragile corals, and enamelled shells, whose loveliness of tint and delicacy of architecture increased as time went on. The forests harboured innumerable kinds of animals, first reptiles, then mammals: the air was filled with insects, flying dragons, and then birds. Earthquakes, volcanic eruptions, floods and storms devastated the surface of the ripening planet; but their effects were ever local and transient. Races of animals were born of other races, to flourish for a while, and perish when the conditions which had called them forth had passed away. The climate, too, changed as millions of years went by; and the polar areas became so cold that the tropical jungle which once ran riot there gave place to wastes of ice and snow, and a variety of weather came into play. At length man himself appeared to crown the fabric of terrestrial life, and complete the grand scheme of terrestrial

growth. The passionate childhood and the crude youth of the world now culminated in its reasonable prime.

How long that golden prime will last we know not, but it cannot endure for ever. As surely as the earth had a period of youth so will she fall into a period of old age; as surely as she was once a luminous sun, so will she yet become a desolate moon, unless, indeed, some unforeseen event, perchance collision with a comet, should check the ordinary course of nature. The sun is gradually cooling, and therefore the climate of the earth must inevitably get colder. This process will, however, be very slow, and perhaps retarded by a compensating approach of the earth to the sun. There will be time for new varieties of creature to develop into harmony with altered circumstances; and who knows but the novel animal tribes which will inherit the world in its decline may be as multifarious as those which flourished in its youth?

Whether or not man will survive his fellow-creatures on the planet is, perhaps, an idle speculation; and whether or not a higher being than man will yet succeed him is equally of little moment to us now. It is certain that new centres of civilization will arise and old ones vanish, as the resources of different portions of the earth are utilized or exhausted. The polar snows will insensibly steal southward, lessening by degrees the habitable zones, until at last every particle of water will assume the form of ice, and the very oceans will be frozen to their depths. Even the air may solidify and fall in crystals on the rocks and glaciers. Long ere the advent of this dread epoch, all mortal life will perish from the surface of the planet; and every monument of man will crumble into dust.

Begun in a diffuse chaotic cloud, the world will end its

days as an inert mass, a rigid corpse, rolling stark and bare through the blank fields of ether, its fires extinguished, its beautiful fabrics decayed, its noblest piles in ruin, its raw materials wasted, and its fund of energy outspent :—

"I had a dream which was not all a dream,
The bright sun was extinguished, and the stars
Did wander darkling in the eternal space,
Rayless and pathless, and the icy earth
Swung blind and blackening in the moonless air ;
The world was void,
The populous and the powerful was a lump :
Seasonless, herbless, treeless, manless, lifeless—
A lump of death—a chaos of hard clay.
The rivers, lakes, and oceans, all stood still
And nothing stirred within their silent depths ;
Ships sailorless lay rolling on the sea,
And their masts fell down piecemeal ; as they dropp'd
They slept on the abyss without a surge—
The waves were dead : the tides were in their grave ;
The moon, their mistress, had expired before ;
The winds were withered in the stagnant air
And the clouds perished ! Darkness had no need
Of aid from them—She was the Universe ! *

Our retrospect of the history of the earth takes us no farther than the primitive nebula. But this glowing nebulous haze, this fiery spawn of worlds floating in the dark womb of space, whence is it engendered ?

The experiments of Lockyer tend to prove that as the temperature of the discrete atoms forming a nebula or mist of matter visible or invisible is diminished, they meet in ever-growing clusters, and finally group themselves into solar masses. The primitive nebula may be formed therefore of a single primitive substance at a very high temperature, or in other words, having its atoms in a state of fervent vibration. But from whence does this primitive matter come ? Is it created there and then by God, and have we at length

* Byron : *Darkness.*

found out His working-place? Is it developed out of an unseen universe, according to some recent thinkers? Are there mines of matter and fountains of force on the confines of the visible? Is there a legion of physical demons busily engaged in shaping vortex rings from the matter of another nature? Or is it the ruin of former worlds, the dust and wreck which bestrews the Cosmos, burned over again that a new creation may arise from out its ashes like the phœnix? To such questions as these, positive science cannot give a definite reply; but, nevertheless, she favours the latter theory, and conceives that worlds and systems come into collision with each other, and thereby generate heat enough to dissipate their particles anew into a gaseous nebula. Indeed, the star in Cygnus which recently changed from a sun into a nebula, would seem to be an example of this renovating action. The doctrine of the Conservation of Energy denies that either matter or force is ever added to the stock already in the visible universe.

The Thomsonian theory of the Dissipation of Energy teaches that in process of time the whole visible universe will come to a standstill, like a clock run down, or an engine whose fires have gone out. Mechanical work can only be obtained from heat by means of an engine when the temperature of the boiler is higher than the temperature of the condenser; and only a portion of the whole available heat of the boiler can be transmuted into work unless the condenser be at the "absolute zero" of temperature, or 274° below the freezing point, a totally unrealizable condition. Hence it is that, although a given amount of mechanical work can yield its full equivalent of heat, heat cannot be made to restore again the original sum of work from which it was generated. The action is not

strictly reversible; and whenever work is transformed into heat in nature, there is a waste of power, "a degradation of energy" to the form of heat which cannot be reclaimed. It would follow, then, that only time is wanting to reduce the whole visible universe to an inert and uniformly heated lump of matter.

On this hypothesis we may compare the solar system to a heat-engine, with the central sun for its furnace, and the encircling planets for its condenser. The sunshine poured upon the cooler earth gives birth to a thousand forms of mechanical work, in each of which it is in part degraded to a state from which it can never rise again. As the sun burns out the activity, the planet will become feebler, just as an engine goes slower when the fire is low; but it is probable that the friction of each planet against the ether in its orbital motion tends to slacken its speed and drive it into the sun. The energy of collision between the solar mass and a planet would thus be converted into heat, thereby restoring his expiring radiation. By consuming his own satellite as fuel, the sun would thus remain a source of heat for an indefinite period; but at the last he, too, would blacken into a cinder star of vast dimensions.

He might then either blossom into a magnificent planet revolving round a greater star of the sidereal maze, or, rolling dark in space, crash into a similar defunct sun and breed another nebula from which new worlds would spring.

According to the Thomsonian theory, a process like this, although requiring enormous æons of time, must finally lead to a state of things in which all the matter of the universe is rolled into one tremendous mass, from which all motion has departed. Every new system that burst from the ruins of the old would, in its turn, be ephemeral, and only

for a time delay the approach of that last day in which a universal Death would reign.

There is something revolting to our minds in the contemplation of such a state of cosmic inanition; and we may well ask if it is not a mere spectre of the imagination. Can it be possible that the sublime creation which we see around us, blooming with beauty and throbbing with intensest life, is not eternal, and must inevitably shrink into a hideous material corpse? We are fain to think not. Humboldt believed in a revival of the universe; and later thinkers, shocked by the Thomsonian conclusion, have sought for an avenue of escape from it. "Cannot the dead universe bury its dead?" ask the authors of the *Unseen Universe*, and then proceed to argue from the very principle of continuity which indicates the universal deadlock, that just as in the beginning the visible universe grew out of the unseen, so in the end the visible will lapse again into the unseen. "In fine," say they, "we do not hesitate to assert that the visible universe cannot comprehend the whole works of God, because it had its beginning in time and will also come to an end. Perhaps, indeed, it forms only an infinitesimal portion of that stupendous whole which is alone entitled to be called the Unseen Universe."

It seems to us, however, that the writers of that remarkable book are somewhat prone to banish God in order to save their principle of continuity. They prefer to reject a living Creator rather than part with an abstract law; and in order to avoid the simple idea that God made the heavens and the earth in the beginning, they take refuge in an endless vista of unseen universes of their own invention. After all, they must have a Creator at the far end of their gloomy prospect, and looking a good deal smaller

perhaps for the perspective. Their principle of continuity, too, is merely a human concept; and may apply only to the course of nature, such as we know it, from its beginning to its end in time.

Nevertheless, it is our duty to discover, if we can, whether or not the universe is eternal, and can renew itself without a new act of creation. If it be, the process will take place in one of two modes: either the dead frame of the old heavens will dissolve asunder, and take on a new shape, or the boundless cosmos will remain alive as a whole, though all its parts are ever changing from quick to dead, and from dead to quick. In the one case we should have cycles on cycles of universes; in the other, cycles on cycles of worlds. A young but profound thinker, Mr. S. Tolver Preston, has recently been arguing powerfully in favour of the latter view; and likening the universe to a gas which is in equilibrium as a whole, although there may be a great diversity of conditions in its portions. In truth, we cannot tell what will be the ultimate end of all things, and how the universal mechanism is contrived to work. We only see it for a moment as it were, and can but gauge its action for a day. Who knows what hidden springs may lurk within it, to stop or start its motion?

Some day mayhap we shall know. We are learning to open our eyes and see. To the mediæval monk, the world was a large plain, enclosed by mountains which supported a crystal canopy fretted with golden points: to us, it is a planet in its prime, one satellite of an enormous sun, which is but a small member of the starry system. To the monk, the earth was the head and centre of the creation: to us, it is a mere gilded mote, floating on the bosom of immensity. But if our estimate of the earth's place in nature is infinitely

smaller than the monk's, our conception of the grandeur of the universe is infinitely greater. We know that we are surrounded by limitless space filled with innumerable living suns and planets; and whether we look backward or forward, we can be sure of no absolute end to time and nature. The present earth, it is true, began in an embryon, but from whence did it come? An egg is the product of a line of progenitors; and who shall say that the terrestrial egg is not the offspring of other and stranger parent worlds? All that we can be certain of is the existence of change, and that the universe is for ever falling into new forms of beauty like the gorgeous clouds of evening.

In all ages and under all climes man has craved to know how and from whence he came to be, and so we find that every race has its traditional cosmogony, or history of the origin of the world. Amid a great deal of mythical dross in these accounts, we meet with some remarkable grains of truth, which make us wonder if they are not the product of a natural revelation.

For example, the Chinese version of creation begins with the Tai-khit, or primitive eternal substance, the absolute and last extreme. "It holds that all matter is contained in the Tai-khit, under the two species of Yang and Yin; that Yang is the active mobile male principle, or primitive force; that Yin is the passive immobile female principle, or primitive matter; and finally, that the elements of which the universe is formed are the result of the particles Yang and the particles Yin, which have issued from the Tai-khit and combined together. In the depths of the Chaotic period a divine trinity brought about the separation of heaven and earth by its creative will." *

* *Japan and the Japanese*, by the Abbé Humbert (translated by Mrs. Cashel Hoey).

The rest of the story is a beautiful but childish legend of celestial dynasties and genii. Shento-ism, or the old religion of Japan, also teaches that in the beginning there was neither heaven nor earth, the male and female principles not yet being divorced from one another. "The elements of all things formed a liquid, troubled mass, like that which is contained in the embryo egg, where the yellow and the white are still mingled. In the infinite space filled by the chaos a god uprose, a god called the supreme being whose throne is in the middle of the heavens. Afterwards came the creator god, raised high above creation; then the creator god, who is the holy spirit. Each of these three primitive gods had its own existence, but they were not yet revealed outside the spiritual nature. Then by degrees the work of creation was wrought in chaos. Subtle atoms rolling away in different directions, formed the heavens; solid atoms, attracting and adhering to each other, produced the earth. The subtle atoms rapidly constituted the rounded celestial vault above our heads. The solid atoms aggregated themselves more slowly into a compact body: the earth was not made until long after the heavens." * Here, again, the story degenerates as it proceeds. Gods and goddesses, typifying the virtues of water, fire, wood, metal, etc., arose, and the Archipelago of Japan was created by one of these in plunging the diamond point of his javelin into the waters of the earth, as he sat with his spouse one day on the bridge of heaven. The vegetation of the islands was produced by millions of genii who swooped down upon them for the purpose; and men were the children of the god and his celestial wife.

In the ancient Vedic hymns of India, which date back

* Ibid.

for thousands of years before Christ, we likewise find some curious allusions to the primal fluid and the embryo of the world. Thus, in the hymn to Visvakarmau, maker and ruler of all things, there is the sadly beautiful passage: "The waters bore that first germ, in which all gods came together. That *one* thing, in which all creatures rested, was placed in the lap of the unborn (Visvakarmau). You will never know, however, who created these things: something else stands between you and him. Enveloped in mist, and with faltering voice, the poets walk along, rejoicing in life."* Again, in a hymn to the god Pragapati, the lord of creatures, he is called the Hiranyagarbha, the golden germ or golden egg, who arose in the beginning and established the earth and sky. "When the great waters went everywhere, holding the seed and generating the fire, thence arose he who is the sole life of the gods. Who is the god to whom we shall offer our sacrifice? He who by his might looked even over the waters which held power, and generated the sacrificial fire—he who alone is God above all gods."

The cosmogony of Brahma teaches that there are ten worlds, in tiers one over another, the earth being the eighth of the series. Each is like a lily leaf in shape, and contains oceans of salt and sweet water, cane juice, rum, butter, and curds, while a hoop of gold is said to encircle all. Every four million years Brahma, the supreme soul, goes to sleep, and the universe is destroyed by a deluge. Then the god awakes, and builds a new pile of worlds.

The system of Buddha is, on the whole, a more rational one, though its details are manifestly erroneous. It does not attempt to account for the ultimate origin of the

* Max Müller's *Origin of Religion.*

Cosmos, but confines itself to the fact of a material world with conscious beings living in it, and holds that *everything is subject to the law of cause and effect, and is constantly though imperceptibly changing.* It asserts the existence of innumerable separate systems of worlds scattered through space. Each system consists of three circular worlds exactly similar to our own; that is, in the form of discs, in the centre of which rises an enormous mountain, surrounded by seven concentric zones of rock. Above the mountain are the twenty-four heavens, and beneath it the eight great hills. Between the mountain and outermost system of rocks the sun, moon, and stars revolve. Each of these worlds is periodically destroyed by fire, water, or wind, but the sum of the *demerits* of the beings (man, animals, and angels) who have lived within it produces each time a new world, which is in turn destroyed.*

The Hebrew narrative of the creation is the only sacred cosmogony which will yet bear a serious examination; and we have now to see if it can stand the crucial test of modern science. It is still cherished by many millions of the human race in association with the Christian faith, and we cannot lightly cast it aside as a mere cosmic myth unworthy of our grave study. "The student of science," says Professor Huxley, "will no longer trouble himself with these theologies;" but the student of religion may be pardoned for refusing to forsake them as promptly.

Since God does not withhold from us a physical revelation of the creation, we may well ask why a spiritual one should ever have been made? Since we can find out for ourselves how the world came to be made by exerting our powers in the interpretation of nature, is it likely that He

* See *Encyclopedia Britannica*, 9th ed., art. "Buddha."

would reveal the secret to us by direct inspiration, and save us labour which is good for us, and trouble we are framed to take? To this it might be answered that, in order to satisfy the yearning of man's heart to know these mysteries, until he is able to discover them for himself, God may have vouchsafed a partial revelation, a simple tale, such as a father pleases his child with for the time. There would not be, however, in this tale, anything at variance with final truth.

The epic of the creation contained in the opening of Genesis is thought by scholars to be the work of at least two different writers. The second version begins at the fourth verse of the second chapter; and as it is manifestly inferior in purity and truth to the first, we will confine our criticism entirely to the latter. Who was the author of that sublime production, or on what it is based, we cannot yet tell, but it is commonly attributed to Moses, and we have continued for the nonce to call it by his name, although it may only have been preserved by him from earlier times.

The preceding chapters of this book have shown us that the Mosaic narrative cannot, in a literal sense, be true. How then are we to regard it? Shall we take it as a simple allegory vouchsafed by God, and miraculously preserved, to the children of men, until experience should give them fuller knowledge? Is it a vision disclosed to the imagination of a Hebrew seer, or a cunning scheme, or a profound divination? For ignorant conception it cannot be. Though deemed at first sight an idle dream, it will be found on closer scrutiny to exhibit a remarkable method.

The keynote of the whole is struck in the first verse, which implies "a beginning" and a Creator. Now, positive science likewise points to a beginning for the visible universe at least, and a Power which made all things. In

his admirable essay on "Molecules," Professor Clerk Maxwell says that "none of the processes of nature, since the time when nature began, have produced the slightest difference in any molecule. . . . 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 character of a manufactured article, and precludes the idea of its being self-eternal and self-existent." Although Professor Maxwell can only speak from our limited observation of molecules, under chemical processes, and in the spectroscope, and although we cannot tell what may happen to atoms under extremes of heat or cold, any more than an Indian of the Amazon woods could tell that rain would turn into snow, still we must abide by our knowledge such as it is; and in the stability of the fundamental atoms we seem to have sure ground amid the shifting and evanescent forms which are constructed out of them.

Again, the authors of the *Unseen Universe* inform us that, "What the principle of continuity demands is an endless development of the conditioned. We claim it as the heritage of intelligence that there shall be an endless vista, reaching from eternity to eternity, in each link of which we shall be led only from one form of the conditioned to another, never from the conditioned to the unconditioned or absolute, which would be no better than an impenetrable intellectual barrier. It has also been seen that in this endless chain of conditioned existence we cannot be satisfied with a make-believe universe, or one consisting only of dead matter, but prefer a living intelligent universe, in other words, one fully conditioned. Finally, our argument has led us to regard the production of the visible universe as brought about by an intelligent agency residing in the unseen."

Whatever may be thought of this "endless chain" of universes developing one from the other, atom out of atom to infinity, this Mumbo Jumbo of structural complexity which these authors have imagined in order to satisfy their notions of continuity, it is refreshing to find them protesting against materialism, and asserting the existence of a Creator. Their God is further from us than the God of Genesis; His voice is lost in a maze of metaphysical jargon, and His form is hid in infinite recesses of atomic framework; but it is something, in these days, to know that He is still somewhere.

Whether or not, the visible universe began in time and will come to an end in time, or will endure to all eternity in cycles of change, we are forced to recognize the existence of an Originator, an Uncreated from which the created sprang.

Evolution, according to the spirit, if not the letter, of modern science, is the process of this creation, the mode in which the Creator works. The "laws of nature," as we term them, are formulæ expressing the invariable relation between certain conditions taken as a cause, and the effect which follows as a consequence. The illustrious Danish philosopher, Oersted, has named them the thoughts of God: but they are rather man's imperfect record of the thoughts of God. Evolution means the resultant co-operation of these laws, in the production of natural phenomena; and by evolution all things in the world, inorganic, vital, sentient, and rational, have, we are instructed, developed out of each other by the simple process of cause and effect. The strict evolutionist sees the rational, sentient, and vital dwelling potentially in the material; and the more moderate Darwinism regards them as interacting naturally with the

material, if not inherent in it. In either case the process has been a slow and gradual one, without any break in the line of continuity.

Creation by evolution is plainly incompatible with the Creation by fits and starts understood in Genesis. We could only harmonize the two by a trick of the fancy, in cramping the æons of time during which the world grew into a single moment, so that protracted development would become instant creation, and man indeed appear to start up from the dust. But this device, however interesting in a metaphysical sense, is hardly allowable for our present purpose. The Miltonic interpretation of the Mosaic cosmogony must therefore be abandoned :—

> "Out of the ground uprose,
> As from his lair, the wild beast, where he wons
> In forest wild, in thicket, brake or den;
> Among the trees in pairs they rose, they walk'd;
> The cattle in the fields and meadows green:
> Those rare and solitary, these in flocks
> Pasturing at once, and in broad herds upsprung.
> The grassy clods now calved; now half appear'd
> The tawny lion, pawing to get free
> His hinder parts, then springs as broke from bonds,
> And rampant shakes his brinded mane; the ounce,
> The libbard, and the tiger, as the mole
> Rising, the crumbled earth above them threw
> In hillocks; the swift stag from underground
> Bore up his branching head; scarce from his mould
> Behemoth, biggest born of earth, upheaved
> His vastness."

Read by the superior light of evolution, this sudden birth of entire animals out of the ground provokes a smile on the lips of men of science; but, after all, it is not so far wrong, and as a poetic epitome of development it is for ever beautiful. The fable which once was held for literal truth, will still survive as imagery.

But the Mosaic account implies more than a Creator and a beginning, it implies a sequence of events; and what is more remarkable, this sequence agrees fairly well on the whole with the main clauses of the imperfect geological record. In strictness Moses (?) does not enunciate processes, but relates complete results. Every statement of his declares a culminating fact of the world's growth, and includes a period of time, whose length is not absolutely fixed, for the Mosaic "day" may not mean a literal twenty-four hours.

First he describes the formless condition of the embryo planet, then the creation of "good" or perfect light, the darkening of the world, the cleansing of its atmosphere from virulent fumes, and the attainment of a pure expanse of air, followed by the separation of sea and land. After this he records the formation of vegetable life, of the sun and moon, of living creatures that swim in water, and fly in air, and, lastly, of living creatures that walk or "creep" on the dry land.

In reality the division of the waters may have gone on, in part at least, simultaneously with the purging of the atmosphere, and animal life may have grown up side by side with vegetable life; but few will doubt that the purification of the atmosphere was completed before the general balance of land and sea was effected, or that the earth's flora reached a climax of development long before its fauna did.

In the interests of clearness and order, Moses would therefore be right in separating the different phases of the world's preparatory life. With the instinct of an artist, he has shaped the history of creation into scenes, each depicting a great act of the world's growth, and rendering in a dramatic form some great end of evolution.

None of the old cosmogonies can for a moment be compared to that of Genesis in purity and grandeur; and none embody so little error as to stand, like it, for a poetic version of development. While other nations looked for God in the blue sky, the sun, in rivers or mountains, the Hebrew faith asserted each and all of these to be the work of one God; and even told the order of Creation in a simple but sublime manner. Its freedom from human error and vagrant fancies is indeed remarkable; and when we think of all the strange fantastic things its author might have said, we are lost in wonder that he wrote as he has done. Like every great writer, too, his silence is most eloquent.

The great and immortal merit of the cosmogony of Genesis lies, however, in its religious beauty, and spiritual insight into the divine meaning of the world and human life. We cannot accept it as a rigid scientific treatise, else our faith and knowledge will inevitably conflict. As a testimony of the world's origin it has served its day; and satisfied the youth of mankind until the larger revelation of positive science was achieved. The hypothesis of evolution, loyally worked out by man himself, in a manner acceptable to the Creator, is a further revelation which may in turn give place to a fuller and more perfect one. The ultimate truth comprehends what is true in all speculations, and excludes only what is false.

Though it may have given rise to an erroneous notion of sudden creation, there is perhaps nothing strictly false in the Mosaic cosmogony; but if evolution be true, it does not express the whole truth, as we now know it. It requires to be supplemented by an ampler interpretation of the Maker's method. The new science presents a grander theme to the imagination than the ancient tale, whose simple pictures we

may well exchange for the splendid pageants of life and endless avenues of time which evolution opens to our view.

Nor need we totally abandon the Mosaic story, since it would seem to be correct so far as it goes. Like a story, which the child trusts, and the man sees in its true character, it may yet be read with profit alike for its truth and beauty. There is no deception in the process by which experience takes the place of allegory. The Mosaic cosmogony was suited to the world's youth; it proclaimed those general truths which were important for the times, and there was no call to charge it with specific details, which would be discovered in the future by dint of thought and toil.

It is always painful to have to put aside an article of faith endeared to us by a thousand associations, and bred into our very souls by the teaching of childhood. Happily, therefore, the Mosaic cosmogony need neither be rejected as a lie, nor held up as a laughing-stock; but may possess our memories and claim our reverence, as a sublime and sacred poem of creation.

CHAPTER V.

EVOLUTION.

My substance was not hid from thee, when I was made in secret, and curiously wrought in the lowest parts of the earth.

Thine eyes did see my substance, yet being imperfect; and in thy book all my members were written, which in continuance were fashioned, when as yet there was none of them.—PSALM CXXXIX. 15, 16.

THE more we study the supposed antagonism of the new truth and the old faith, it is seen to resolve itself more clearly into the bearing of the doctrine of evolution on the canons of our creed. This doctrine is so plausible, so widely accepted, and, indeed, so rational, that although complete proof of it is still wanting, and ever may be wanting, it behoves us to assume its accuracy, and to consider how it touches the vital parts of our religion.

Evolution seems to be a general principle, or mode of working in all kinds of existence, material, vital, spiritual, and the old idea of progress is merely an expression of its outcome. The Creator is the cause, evolution the process, and progress the issue.

The moderate evolutionist does not demand spontaneous generation of life from dead matter; but contents himself with a primal germ as the source of all the variety of living beings which have lived, and still live, upon the earth.

There has always been, according to him, a perfect adaptation of the type to its habitat; but as time went on, there was an increasing specialization of function. The earlier animals were both more complex and simpler than those of the present: complexer, inasmuch as they contained the potentialities of details which were developed in later tribes; and simpler, because they had no refined special organs.

It is curious to note that evolution was foreshadowed long before it came to be a theory of naturalists. The famous Agassiz early observed that the Old Red Sandstone fishes, the only vertebrates then existing in the world, were "invested with the characters of a higher order, embodying as it were a prospective view of a higher development in another class which was introduced as a distinct type only at a later period;" and from the time that this new form appeared, the older fishes gradually returned to their more permanent shape, which is in striking contrast to that of the reptiles. Paleontology, in fact, shows us fossil forms, waxing big with a higher type; and it is remarkable that when once the new comer is delivered into the world, a like birth is never repeated, and the original stock wanes again, soon to widen the gulf between it and its offspring. When the parents of a species are moulded, as Sir Charles Lyell has well said, Nature breaks the die in which they were cast.

Skilled naturalists recognize these pregnant waves of life among the broken fossils of the past, and tell us that the forecast of mammals is very plain in the cartilaginous fishes of the Old Red Sandstone era, and still plainer in the reptiles of the New Red Sandstone age. These reptilian forefathers brought down all the materials meet for the

framing of a mammal, cartilages from the Old Red fishes, with bones from the ganoids of the carboniferous lakes, and united them into a new and nobler structure, destined to be the progenitor of still loftier creatures.

But it is not merely on this meagre evidence that the doctrine of evolution rests. Specific variations of diatoms have been actually seen to take place under the microscope; and some common rabbits, left by a Spanish ship, 460 years ago, on the island of Porto Santo, are now so altered by the influences of climate and soil as not to pair with the same European breed from which they sprung. The Mexican axolotl has been artificially nursed from a water dweller to a true land salamander, its gills developing into air-breathing lungs. Certain animals, too, are found to have imperfect and rudimentary organs, which indicate their passage from one form to another. Thus the eyes of the unborn mole are as perfect as those of a young mouse until the skull closes on them and shuts off the brain, when they shrivel up. The dugong has a horny plate covering up its teeth, and uses it instead of the latter; the wisdom teeth of man himself are really superfluous and gradually being absorbed. Some of these imperfect features are growing, others are dwindling, while a third class have settled into permanent features, and now serve rather for show than use. The growth of the young animal in the womb is also felt to be a silent argument in favour of evolution. A human fœtus from the embryo to babyhood passes through several phases of lower life, and exhibits in epitome the life-history of its race. As for those missing links in the chain of descent which have been clung to so tenaciously by people who were fain to keep their old faith in the biblical account of man's origin, they are slowly being one by one

discovered. Already the pedigree of the horse is fully made out, we are told; and recently, in America, they exhumed a fossil bird with teeth—a relic which helps to fill the gap remaining between birds and reptiles.

The doctrine of evolution is, of course, chiefly important to us in tracing the descent of man from the lower animals. We are asked to believe that, just as the batrachians were the progeny of the earlier ganoid and selachian fishes, and became the progenitor of the apes, so in turn the apes became the parents of mankind. It has been shown by Professor Mivart that man is related almost equally to the orang-outang, chimpanzee, gorilla, and gibbon; hence, by the evolution hypothesis, he is not descended from any one of these, but from an extinct and as yet missing type, which must have branched off at a very early date from the common stock. Apes allied to these are found in Miocene rocks, so that in all probability the line leading up to man separated from the general ancestry at a still earlier period, perhaps the Eocene.

It appears to the writer that this great epoch in the world's history—the birthday of man—was probably coincident with the break-up of the terrestrial climates. A uniform and warm temperature could not be conducive to the development of a creature like man, and the rigours of the Glacial period may have given a powerful impetus to his faculties. It is somewhat remarkable that, although many missing links in the genealogy of lower animals have been found, no relic of this anthropoid founder of our race has yet been laid bare. It may be that the world is not sufficiently explored yet, and that the recesses of some African forest or Indian jungle contain at this moment the sacred vestiges of our simian sire. One day, perhaps, an

Owen will be able to reconstruct our reverend forefather, and paint for us the sad but interesting visage, "all sicklied o'er with the pale cast of thought," and shaded by the hoary hairs of our much-abused and long-lost relative. On the other hand, it is highly probable that the first man speedily gave proof of his superiority, and displayed a characteristic trait of human nature by exterminating all his poor relations, and thus obliterating every trace of his low origin. A third and more agreeable explanation of the dearth of these remains lies, however, in the probable relapse of the ape line pregnant with man back again to the ordinary anthropoid form as soon as the new type was thrown off.

Whatever his immediate genesis, whether by slow evolution from a widely spread ape, or by a freak of nature from a narrow branch which ripened rapidly with his form, it is likely that, under the higher influences to which the intelligence of man subjected him, his progress was much faster than that of the beings which had hitherto shared the world; and, while his ancestors possibly retrograded, he had advanced until the gulf between their capacities and his became immense. If we compare his most material part, the calcic skeleton, with the same framework of the monkey, we shall not indeed observe much difference between them; but in the mould of form, and still more in the sphere of spirit, the comparison can only provoke a sense of sacrilege or a smile.

It would be either ludicrous or pitiful to compare Pongo with the Apollo Belvidere, ludicrous for the daring naturalist who should do it, and pitiful for poor Pongo. But it would be more absurd to place the petty antics of an ape and the bestial comforts of his lair beside the towered cities, the splendid palaces, and innumerable works of human art.

Though there is no absolute proof of evolution, it must be admitted that the accumulative evidence gives it a high degree of probability. But if we take it for granted that evolution is a living process on the earth, we have still to discover the several agents in the process, in how far they operate or have operated, and if they are competent to account alone for the past and present state of things.

Evolution, broadly defined, is the interaction of the living organism and its environment, aided by heredity; but the elements of this interaction and heredity require to be known, and there would seem to be a diversity of opinion about them among men of science. Darwin at first suggested that the origin of species took place solely by natural selection, or the influence of external nature on the organism leading to the survival of the fittest. But there are weak points in this hypothesis; for example, men cannot by artificial selection produce animals having the specific difference of infertile hybrid offspring, and it would therefore seem too much to claim that a natural selection could accomplish this. Mr. Darwin now, however, supplements natural selection by sexual selection, a term expressing the mating of animals through mystical admiration. He has been driven to this adoption in order to account for the male and female decorations of birds and other creatures, such as the iridescent tail of the peacock and the blazing breasts of humming-birds. The sexual taste, which is the motive of this selection, is in our present ignorance put down to caprice; and this caprice is believed to check and undo the rigid law of natural selection. But whence comes this caprice?

Mr. Clarence King, an American geologist of repute, who has studied the tertiary formations of the Far West,

from which the missing links in the descent of the horse have been dug up, differs from the Darwinians on that subject. Professors Huxley and Marsh assert that the American genealogy of the horse is the most perfect demonstrative proof of derivative genesis ever presented; but Mr. King thinks that between the two successive forms of horse there was a catastrophe which seriously altered the climate and configuration of the whole region in which these animals lived and modified themselves. His opinion, therefore, is that the "evolution of environment" has been the major cause of the evolution of life; that a mere Malthusian struggle for existence is not the sole cause, but that powers of development by change were also bestowed on animals, so that epochs of catastrophe became moments of creation, "when out of the plastic organism something nearer and nobler" was called into life. According to this theory, plasticity is the principle of salvation; but it seems to us that the Darwinian theory also implies some amount of plasticity on the part of the animal, if not so much, else how could it survive any change in its habitat at all? That theory mainly, however, relies on slight modifications of the organism, propagated by heredity, through countless uniform ages, whereas King's theory involves important changes in the organism during disturbed periods. Darwin's theory reckons the animal as a mere machine with feeble powers of adjustment, King's implies a strong inherent capacity for adapting itself to new physical conditions suddenly enforced. It should be added that Professor Cope rejects the theory of Mr. King, and ascribes the appearance of altered types, after a catastrophe has taken place, to immigration from other regions. But it is just possible that all three hypothesis are tenable; and there is room enough and to spare for them in Evolution.

The inadequacy of the Darwinian theory, even when eked out by sexual selection, is becoming more and more manifest on closer scrutiny. On this theory, Heredity or Descent is the vehicle by which the lessons of experience, impressed on the parent by means of the struggle for existence, are transmitted to the offspring. This is undoubtedly a factor in evolution. But besides heredity, there are certain tendencies to minor variations which take effect in what are called "freaks of nature." The function of Natural Selection is to sift these minor variations, or "sports" of life, checking those which are out of place, but perpetuating and accumulating those which are advantageous to the creature.

This great controlling agency, or arbiter of existence, the law of natural selection, is regarded by Darwin and Wallace as the main cause or means by which the origin of species has been brought about. Yet it may well be asked if these high authorities are not claiming too great an importance for the influence of natural selection in evolution. Are they not giving to that portion of the process which, although clearly expressed by Patrick Matthew in 1831, was first fully worked out by them, an altogether undue prominence? Until we can explain these tendencies to minor variations, which natural selection operates upon, we cannot surely call the latter the "means" by which evolution of species has been effected. To do so would be to ignore the living force, in favour of the mechanical check; to exalt discipline at the expense of nature. Whatever organic life may be, it is a world distinct from the inorganic, possessing its own potentialities. The inorganic world may limit and select these, but we doubt if it can breed them. Are we to believe, for instance,

that the dead forces of matter, heat, cold, earth, wind, and rain, by merely acting upon them for ages, could raise the lizard or the ape into a Shakespeare? Or are we to acknowledge that there was an inherent tendency toward the human type in the lower forms of animal life, and that external nature but revealed the secret pattern of mankind inwoven in the tissue of the ape and lizard.

There are signs that a mysterious potency of life, independent of the course of external nature, will yet be fully recognized and studied. It is true that the organic part of the planet is designed to interact with the inorganic part, and to keep in harmony with it, hence the need of an adjusting check such as the survival of the fittest; but although animate and inanimate things modify one another, they each obey their own peculiar laws, and though they meet yet they are separate. What are these tendencies to minor variations with which natural selection deals? Are they not signs of an intrinsic vital power seeking to grow in a particular way? And until we have gauged this power on an ample scale, and traced it to its derivation, can we certainly affirm the survival of the fittest to be the main cause of development? Professor Hoffmann, a German naturalist, after twenty years of labour in modifying plants by interference with their external conditions, has come to the conclusion that the cause of the evolution of new species lies not, as Darwin supposes, in outward influences, but in internal organic laws at present concealed. Of late the outer mechanical influences have been put prominently forward and investigated; but ere long we may hope to see the inner vital impulses done justice to. It may ultimately be shown that there has been a constant, and perhaps inexplicable, tendency to minor variations in the direction

of higher types of animal; and that "jumps" * in development, corresponding to certain "missing" links, have duly taken place. Genius, which is the spiritual evolution of a new type of mind, is itself an instance of this kind; for although we may range men from the genius to the fool, so as to get a gradual variation between them, yet this would not be the order of actual variation, since a genius is sometimes born of weak-minded parents.

Biologists now talk of waves of "morphological force," in which the current of life seems to have swelled with a new being, and to have sunk again after the birth was over, into a period of quiet; just as we sometimes see a family advance until it produces a great man, then recede to mediocrity again.

The great gaps between living and dead matter, between living and feeling creatures, between rational man and the lower animals, are still themes for a great deal of speculation among evolutionists, who are by no means of one opinion on the subject. Some believe that further research will bring to light proofs which will completely bridge over them, while others regard them as the portals of so many avenues leading to the "unseen universe." But, after all, it may turn out that the true nexus will be found in the virtual potency with which life is endowed.

Another argument against the adequacy of the Darwinian theory is furnished by Sir William Thomson's estimate of the time which has elapsed since the earth became cool enough to support life. "The limitation of geological periods imposed by science," says that great physicist, "cannot, of course, disprove the hypothesis of

* *Strides*, or jumps, as an agent in development, were suggested by the authors of the *Vestiges of Creation* (1844).

transmutation of species. But it does seem sufficient to disprove the doctrine that transmutation has taken place through descent, with modification by natural selection." * On the other hand, however, we must add that Mr. Reade considers his value of six hundred million years for the age of the sedimentary strata as being ample time for the operation of the Darwinian process.

It would appear then that the doctrine of evolution by natural selection is admittedly incomplete, and that Mr. Darwin himself, while still deeming it the principal means of modification of species, does not consider it the exclusive one.

What these other means are we can only conjecture; the higher the animal, the more complex they become. When that great naturalist first expounded his scheme to the world some twenty-one years ago, it looked as if the whole machinery of development had been laid bare by his keen intellect, and men shrank from the pitiless facts to which he had awakened them. A sense of disillusion ran through the human race, and a spirit of rebellion succeeded to the first misgiving of their hearts. They who believed themselves the sons of God, the image of the Creator, rejected that hard logic which substantiated their descent from brutes, perhaps even from the worm on which they tread, and put to scorn the statistics which attributed their origin to the working of a cruel mechanical law. They grieved to see their loving Father set aside, and a huge Moloch of wheels and moving beams, a monstrous engine of destruction, put in His place. They yearned for mystery in which was a gentle faith, rather than for knowledge in which was a harsh truth. Perhaps their instinct was right after all? Perhaps there is mystery

* *Geological Dynamics.*

still in their origin, and the tender care of a beneficent Creator. We have more to learn. "It is a pity," said the aged Darwin recently, to a stranger who visited him—"it is a pity to leave the world while there are so many more things to be done. As I advance in the study of nature, I discover vaster horizons, and I feel that I shall not have time to reach them."

The doctrine of natural selection shocks us by striking a blow at the root of design in nature. For since only the fittest things survive, it follows that we exist only because the hostile forces of nature could not kill us, and it is perhaps an accident that some other being did not live to usurp the place of man. The fall of a nut from the forest tree which cradled the first new-born babe might, indeed, have nipped the bud of the whole human race, and delivered up the world for ever to the sovereignty of apes and tigers. The Creator, too, is struck out from His own universe, which presents itself to the mind as a blank concourse of atoms. There is no longer any trust in a kind Providence, for even if there be a God, he cares nothing for the individual, if indeed he cares for the tribe. Love becomes a mere animal instinct, beaten into men by inexorable Nature for her own prudent ends. Our hearts are paralysed and desolated by such thoughts as these, and a havoc made of our finest sentiments. We feel abandoned on the earth when we realize that our origin is due to the hap-hazard play of a soulless mechanism, and not to the Creator's strict intent; our souls sicken under the ghastly fear that we are bastards of Chance, not heirs of God.

Is there, then, no room for Design in Evolution? Rather, we should say that Evolution is itself one great Design, so great that it seems at first sight to be chance. It seems to

us that if we fully reflect upon this subject, we shall be forced to admit that Evolution is God's mode of working, according to His own infinite Design. Natural selection explains a part of this divine process; sexual selection expresses another part: but who planted the caprice, desire, or impulse in the male or female? What is the mysterious tendency to minor variations from the special type in individual animals—what but the inherent and God-given propensity of the organism to strike out a new form, or to adjust itself to its environment? Together with selection it constitutes the governing device which enables life to gear well with matter, in their parallel development, so as to prevent a rigid species from perishing by its own inertia in a surrounding world of change.

The history of evolution can be accurately deciphered only by a joint study of globe and life development; for there is a correlation of their growth. Life and matter are framed to suit each other, but though they interact, they are manifestly distinct, and obey different laws. The solid globe has its phases of development, and so also should the plastic life which dwells upon it. Is it not therefore a proof of design that we find life to have such phases? Dead matter moulds life and checks its growth, but God created both and placed them in adjustment to each other. To say that matter regulates life like an insensate machine, and that there is no Divine providence, is like saying that the governor of a steam-engine controls the work, and that there was never such a being as James Watt. Until man appeared, all animal life was guided by instinct, therefore there could not be any chance action, if the lower animals are automata. The development of the early organic world would be as strictly according to law as the development of

the inorganic, and a tree or a bird would grow in the same sense as a cloud or a crystal. Hence there need be no interference with original design so far. It is only when man comes on the scene with his faculty of free-will that we may begin to question the absolute reign of law. He came when the living world had passed through its preparatory stages and reached its prime. Till then it had been kept in leading strings, growing and learning by stern experience.

In this large view of the evolution of the world there is nothing to destroy our faith in Design. It only shifts the original plan further back, and dates the Creator's invention from the era of the primordial nebula, or, mayhap, from all eternity. It only reveals to our dull vision the shape hid in the marble, the mystic lines of life permeating the deeps of the formless egg, the secret pattern of all things imprinted on the flaming winds of chaos. If, then, we are told that the fervent haze of atoms composing the primitive nebula must have contained the "promise and potency" of all terrestrial life; and that the hand of the Creator has not manifested itself in any of the phases of the planet's growth; we are still face to face with a vast design: and even if we are asked to believe that the red-hot earth was but a spark from the wreck of prior suns and planets, we can only marvel the more at the vaster plan which takes in the whole of the universe, and bids the seed of new worlds to issue from the ruin of the old. There is room enough for such a process in infinite space, time enough in infinite time, and power enough in the Almighty.

It is the great task of the evolutionists of the future to trace out the development of life on the earth, and show how it extended its empire through water, land, and air in

every clime and habitable region. At present the evidence collected is so fragmentary, uncertain, and eked out by guesses that an attempt to do so would draw largely on the imagination.

Let us look, however, a little closer at some of the main traits of design in the framing of the world, to see if we can discover in them any clue to a Divine beneficence.

The four great stages of being in the history of the world are the inorganic, the vital, the sentient, and the rational, and these succeed each other in the order given. First, there was a time when no life existed on the earth, for no life was possible, owing to the material tumult prevailing there while the habitable crust was forming. The earliest life was a vegetable growth, having no powers of feeling; a fact which may argue the Creator's clemency, for it would have been needless cruelty to have endowed creatures living in the midst of storms, earthquakes, and all manner of volcanic outburst, with keen organs of sense. As these physical catastrophes became fewer and the surface of the earth more tranquil, still higher kinds of life made their appearance, the organic development proceeding hand in hand with the inorganic in what seems to be a pre-arranged harmony. The newly introduced flora fed on the inorganic world and purified the foul atmosphere; while a fauna came after, to feed, in its turn, on the vegetation, and breathe the purer air. Plants inhale carbonic acid from the air and exhale oxygen, animals inhale oxygen from the air and exhale carbonic acid; plants build up minerals into protoplasm, animals consume protoplasm and reduce it again to mineral matter: thus the two divisions of the organic world tend to balance one another in their action on the inorganic world; and each might not now exist without the other, for plants

alone would in course of time extract all the carbon necessary for their existence from the air, and animals alone would charge it too heavily with carbonic acid.

The sea appears to have been the place first thronged with animal forms; nor is this to be wondered at, when we reflect that it was the safest medium in the disturbed state of the early world. The water would act as a kind of cushion to beings living in its depths, and its temperature would be kept generally equable. Next to the sea, the atmosphere would perhaps be the safest abode, and herein flying creatures would develop, possessing powers of rapid locomotion. The land would, for a long period, be the most hazardous place of all to inhabit, especially for slow-moving quadrupeds, which lived entirely upon it, and sought refuge in the water, or in burrows underground; hence it is that the larger true mammalia, with their helpless young, inherited the earth long after the amphibious reptiles, the pouch-bearing marsupials, and the smaller mammals.

At last, after the rough and ready energies of the planet were beginning to be spent, man himself entered upon the scene. Such a being could only be happy under conditions practically stable, or changing only by imperceptible degrees. Only then would his knowledge and experience be of use to him, for were sudden cataclysms of nature too rife around him, his fine faculties would become blunted, his thoughts of God blackened, and his invention hopelessly thwarted.

Man is capable of living both on the flora and the fauna which preceded him; and it is remarkable that the family of grasses, which yield him his bread; the Rosaceæ, to which his common fruit trees, the apple, pear, plum, and

peach, belong; the Labiatæ, which furnish him with such fragrant and medicinal herbs as lavender, mint, rosemary, and marjoram; the forest trees, which provide him with timber; the tribe of codfishes, of goats, oxen, and sheep, only preceded man on the earth by a comparatively short geological interval.

We see, then, that there has been a kind and orderly progress in the development of terrestrial life, from the first germ of vitality to the appearance of man, the free moral agent, and fellow-worker of God. The world had been slowly matured into a garden, a Paradise, for him. He was the crowning result of a long series of intermediate forms which, while they lived for themselves, were yet so many experiments leading up to him, as the final and permanent shape. His mission is to utilize the products of the past, and the potentialities of nature with as little waste as possible, to understand her laws, and obey them, to enjoy her beauty, to revere and obey her Creator. By his mental powers, he can unlock the latent energies of matter and organic life, invent new engines, and extirpate cruelty and ugliness, figure ideal types, and foster love and beauty. He can put plants and animals in tracts suited to them, or modify them to his uses by artificial selection. As regent of God and ruler of the planet, subduing and replenishing it, according to His will; as constructor of things and agent of processes resembling His work, well might the sacred poet declare that man was created in the likeness of his Maker.

The descent of man from the lower animals is at first a repulsive idea to our human instincts; but after a while we gradually become accustomed to it, and entertain it without aversion. In some, this mental state is the result of apathy, or calm abstention from probing into the subject;

in others, it is due to the mystery veiling the process of descent, or to a recognition that, after all, evolution is but the Divine mode of working. It is probable, then, that though the new doctrine may cause great travail of spirit, and the ruin of many individuals, it will not permanently affect our relations to each other, even if it should ultimately come to be accepted by everybody. Our race has now come of age, and the family secret has been confided to us, not however until a long and severe discipline has strengthened our nature, and firmly established our position on the planet, so that our self-respect will not be fatally wounded. The gulf between us and the lower animals has become a wide and impassable one, ever growing wider; and we have, to begin with at least, been spared the shock of an actual sight of our simian progenitor. The real link is thus far missing, and can only be seen in the dim light of the imagination. To know the process of our birth cannot of itself alter our intrinsic worth for good or evil, although it may temporarily put our pride to shame, and shake our faith in ancient creeds.

In seeking for some palliative of this bitter truth, we shall find it in the thought that what is termed the descent of man from the lower animals is in reality the ascent of the lower animals to man; that the germ of man lay in animal life from the beginning, awaiting its development; and that the lower creatures, however fit and beautiful in themselves, are but the cruder and mediate phases of a rising lineage whose full perfection was attained in man. Man may be regarded as the end and aim of evolution, not its chance product. The animal world is a connected whole, crowned by man, each type of creature in the human pedigree sufficing for itself and adapted to its own sphere,

but, at the same time, the unconscious ancestor of a more complex being, with nobler faculties and a vaster field. Is not this a grander and more natural view of the creation than the sudden upstart of a set of isolated masterpieces? Indeed, when the mind is once familiarized with the loftier side of genesis by descent, it repudiates the need of separate origin and interference with the order of evolution. If a body suitable for men could be inherited from a lower animal, why create a fresh one? if the human brain could develop out of an ape's, why mould it out of raw clay? Evolution, as God's mode of working, should be sacred to us, whatever the means employed. Who are we, that we should be ashamed of how the Almighty wrought? Surely, He knows His business best. And if this idea of evolution seems to put God far from us, we have only to remember that time and space are nought to Him. Whether we sprang in a single moment from the dust, or in "continuance were fashioned" through long æons of time, it matters not so far as He is concerned, for millions of years are but as a moment to Him. We are not surely any cheaper in His sight because of our sorry pedigree. Does a man value his dog less because he knows it is descended from a wolf, and thinks of all the iron training which has gone to soften that gentle eye and tame that fierce strength? By a long wrestle with circumstances we have been shaped as we are; every fibre in our frame has stood the test of a stern but beneficent law, which condemns all that is weak and unfitting to die out. The form and texture of a human muscle, the thickness of a human bone, have been slowly perfected in pain and travail through a thousand pioneer beings—fish, reptile, and beast—by the inexorable strokes of doom. Verily, it is a stupendous thought that all the

prior conditions of the universe have combined to mould and make us what we are!

"I am the child of earth and air and sea!
My lullaby by hoarse Silurian storms
Was chanted; and, through endless changing forms
Of plant and bird and beast, unceasingly
The toiling ages wrought to fashion me.
Lo, these large ancestors have left a breath
Of their strong souls in mine, defying death
And change. I grow and blossom as the tree,
And ever feel deep-delving, earthy roots
Binding me daily to the common clay.
But with its airy impulse upwards shoots
My life into the realms of light and day;
And thou, O Sea, stern mother of my soul,
Thy tempests sing in me, thy billows roll."

HJALMAR HJORTH BOYESEN.

The doctrine of evolution knits us closer to the lower animals, for it teaches us that they are our own kin and that we are of the same blood. Ought we not, therefore, to take a higher view of them than we are apt to do, and to treat them with greater kindness and sympathy than is our wont? It is a keen blow to our pride to learn that we belong to the same family tree as those dumb creatures we have hitherto despised; but the lesson will not be in vain if it teach us to be gentle and loving to these less-favoured relatives of ours, whose forefathers bore the dints of time and matter which helped to build up Man.

It seems to the writer, then, that evolution does not preclude Design in the structure of the world, but only makes it vaster and more marvellous. Neither does it banish faith in the Creator's goodness; and although it would appear as though He cared nothing for the individual if the race is spared, it will be found that the good of the race can only be secured through the good of the individual. The opponents of Design may say that, had a thing not

been fitted for its environment, it would not have survived, and that there may be fossil martyrs to a premature existence; but we have a right to retort that the very means whereby this law of survival was effected constituted the Design we maintain. Geologists affirm that all the known fossils, even the trilobites and stone lilies of the Silurian period, though of simpler form than those of later strata, are marvels of means to end, and so perfectly fitted in keeping with the laws of construction and strength of materials as to excite the admiration of the ablest engineers. And it is rational to conclude that all that harmony was produced, in the past as it is in the present, slowly and regularly by law, not by accident.

What the inner process is by which things were developed is not fully known to us yet. The evidences of it are all about us, the products of the art are revealed on every side, and we even see them growing to completion before our eyes; but the divine Artist himself is ever hid. Where does He reside? Is it in the opening bud or the varying race? That is still an "open" secret.

Evolution leads us to take an infinitely grander though more visionary view of the universe than Genesis reveals. Instead of a series of separate pictures, it presents us with a continuous panorama of creation. It shows us Nature as an intimate union of beauty and fitness, a pageant to the sense, a mechanism to the intellect; and in striving to survey this mighty plan the imagination seems to get a glimpse of the sublime truth that Cosmos realizes the poetic dream, the transitory Art of God.

BOOK II.

WHAT?

Who throve and branch'd from clime to clime,
The herald of a higher race,
And of himself in higher place,
If so he type this work of time

Within himself, from more to more;
Or crown'd with attributes of woe
Like glories, move his course, and show
That life is not as idle ore,

But iron dug from central gloom,
And heated hot with burning fears,
And dipt in baths of hissing tears,
And batter'd with the shocks of doom

To shape and use. Arise and fly
The reeling Faun, the sensual feast;
Move upward, working out the beast,
And let the ape and tiger die.

TENNYSON, *In Memoriam.*

CHAPTER I.

MAN AND HIS HOME.

The mad primeval discord is hushed; the rudely-jumbled conflicting elements bind themselves into separate firmaments; deep silent rock foundations are built beneath; and the skyey vault with its everlasting luminaries above; instead of a dark, wasteful chaos, we have a blooming, fertile, heaven-encompassed world.—CARLYLE, *Sartor Resartus.*

What a piece of work is a man! How noble in reason! how infinite in faculties! in form and moving, how express and admirable! in action, how like an angel! in apprehension, how like a god! the beauty of the world! the paragon of animals!—*Hamlet.*

BEFORE considering the nature of man himself, let us hear what science has to tell us of the earth, that planet which has been assigned to him as his dwelling-place.

The earth is known to be a great ball of solid or partly solid matter, some 8000 miles in diameter, spinning rapidly round its own axis, and at the same time pursuing an oval course round the sun.

The sun is a single star of the sidereal system, somewhat aloof from the rest, and moving with its retinue of planets towards a certain point in space. He is the central fire and lamp of the planets which revolve around him. They bask in the flood of light and heat which issues from his fervent mass and illumines the surrounding fields of space, turning themselves gently in his rays, so as to be warmed on every side, as they advance in their orbits.

If we look at one of these planets through a telescope,

we see one half of it gilded with his beams, the other being lost in shadow; and we know that over the visible crescent it is day, while over the dark portion it is night. Day, then, is the direct glare of the sun on that part of the world turned to the sun; night is the shadow of the world, and reigns over regions opposite to those enjoying day.

The sun is not situated in the centre of the oval orbit which the earth describes in her motion round him, and therefore it happens that the earth is sometimes further off the sun than at other times during her yearly round. Again, the earth slowly rocks or oscillates in her whirling motion, so as to sway her poles to and from the sun; hence the share of sunlight which each portion of the earth, except the equatorial belt, receives is caused to vary during the year, and hence the climate of northerly and southerly regions is divided into seasons. When the northern pole is bent towards the sun it is summer with us, and when it is bent away from the sun, it is our winter; and the severity of our Christmas is probably mitigated by the fact that winter takes place when the earth is in *perihelion*, that is, when she is in that part of her orbit nearest to the sun.

The earth is the third planet from the sun, which is about ninety-three millions of miles distant.

She belongs to the *inferior* group of planets, consisting of Venus, Mercury, the Earth, and Mars. These are small bodies compared to the superior planets, Jupiter, Saturn, Uranus, Neptune, which are further away from the sun; Neptune being the outer member of the system and nearly three trillion miles from the central luminary. The inferior and superior planets are separated from each other by a zone of asteroids, or petty planets, which can be numbered by thousands, and are believed by some astronomers to be

the ruins of larger masses. Certain of the superior planets, such as Jupiter and Saturn, still appear to be smouldering hot cinder suns muffled in dense vapours, and not yet cool enough for the support of high and varied forms of life. The inferior planets, on the other hand, seem to be well advanced in age, the dappled blue and ruddy surface of Mars, with its polar snow-caps, proclaiming it in twin condition to the earth, now in her golden prime.

All these planets have their own conditions of movement, day, night, and seasons. Like the earth, they are probably great globular magnets, surrounded by magnetic and electric forces; but though tied together by the impalpable bonds of gravitation into one system with the sun, they are practically isolated from each other by the ether of space, which permits the waves of light and heat or the wandering meteorite to traverse it, but neither sound nor living thing. The roar of vast conflagrations, the boom of stupendous explosions on sun or stars, never comes across the silent ether to startle the inhabitants of the world; and each planet, though dependent on the sun for energy, and assisting to balance the others in the great frame of the universe, is, for the rest, left isolated and self-sufficient.

The earth consists of a solid core of rocks and metals, partially overlaid with a liquid covering of water, and wholly wrapped in a gaseous envelope of air. It is known that the earth has cooled down from a red-hot state, and it was formerly thought to be merely a hard thin shell holding a molten fluid inside, but the eminent mathematician Hopkins showed that the crust had need to be at least one thousand miles thick; and latterly, Sir William Thomson has proved the entire globe to be solid, or nearly so, throughout, and more rigid than glass or even steel.

The solid core, then, is probably a globe of chilled ores, chiefly iron, for its magnetic qualities would also warrant the existence of large masses of iron, and as it cooled the weightier materials would sink towards the centre, whereas the lighter would rise to the surface. Shrinkage from loss of temperature, outbursts of gas and steam imprisoned in hot cavities, elastic tides caused by the combined attractions of the sun and moon on the yielding semiplastic mass, would rend, twist, upheave, and wrinkle the incipient crust, producing rupture and displacement of the strata, mountain chains, river valleys, and ocean-beds.

The crust of the earth is composed of about seventy elements in all, but by far the greater portion is made up of six of these, namely, oxygen, hydrogen, nitrogen, carbon, sulphur, and phosphorus. The elements are rarely found in a pure state, however, being generally in combination with each other, forming a marvellous variety of mineral and organic bodies. Oxygen especially is very prevalent. It occurs in air, water, and the solid earth in such quantities as to make up nearly half the weight of the planet. The crystals of the deepest volcanic rocks contain a large proportion of oxygen, and it unites with silicon, calcium, and aluminum, to form the quartz, lime, and clay of the surface. Veins of gold, silver, iron, copper, lead, and tin permeate the ancient molten slags: and beds of coal, marble, and slate inlay the upper deposits; encircling the earth with mines of material which man can turn to his advantage.

Water is to be found everywhere on the earth. It diffuses itself in the atmosphere, soaks through the soil, and permeates even the densest rock. It consists chemically of hydrogen and oxygen, but it is rarely or never met with in its purity, being always tainted with gas or mineral

solutions. The ocean, indeed, is but a great brine vat, or receptacle for the saline washings of the land; and rivers are the drains which discharge themselves into it. This vast reservoir is kept fresh by currents, winds, and tide, stirring it up and exposing it in waves to the oxidizing action of the air. The tides, as is well-known, are caused by the joint attraction of the sun and moon, but mainly by that of the moon, which is far more serviceable to the earth as a tide-maker than a light-giver.

The sea may be regarded as the earth's womb, for it was very likely there that life first originated; and, moreover, the chief function of water is to fertilize the soil, and sustain organic life.

The atmosphere surrounding the whole globe is composed of air, and a small proportion of water vapour, carbonic acid gas, and ammonia. Air consists of a mechanical mixture of oxygen and nitrogen. Oxygen is a substance eager to unite with other elements, such as the metals, and reduce them to rust; while nitrogen is very inert, and when it does combine with other atoms it forms very unstable compounds. The nitrogen of air is not incorporated by animals or plants in breathing, and it is probable, therefore, that it is diluted with the oxygen to weaken the oxydizing power of the latter. Oxygen is inhaled by animals in order that it may oxydize their blood and renovate it; while carbonic acid (CO_2), a compound of carbon and oxygen, is exhaled. On the other hand, plants absorb carbonic acid into their leaves, which are vegetable lungs, and give back oxygen, while retaining carbon to build up their tissues. It is apparently the ammonia (NH_3) of the atmosphere which supplies the vegetable kingdom with the nitrogen it requires to form its fruit and flowers.

The atmosphere is kept in a pure condition by the silent diffusion of its gases for ever going on; by winds which blend it, rains which filter it, and lightnings which condense its oxygen to nascent ozone, a quick destroyer of all corruption. The gaseous ocean, at the bottom of which we live and move, is an aerial veil which wraps the earth, and softens the severity of space. It diffuses the direct beams of the sun into a soft general radiance, and shades the earth with clouds. Were the atmosphere taken away, there would be no luminous blue sky, flecked with snowy clouds, but only a dark vault, irradiated with the flaming disks of suns and stars. Moreover, it protects us like a cushion from the bombardment of countless meteoric stones, which pour in torrents across the planetary orbits. The friction of their passage through the air dissipates them into vapour, and only one or two of them ever strike the ground. Its principal use, however, as a terrestrial member is to temper climes, to deal out fertilizing showers, to mould the contour of the earth, and furnish breath to living creatures.

The air and water of the earth are continually undergoing a cycle of change. The sun darts his burning rays full on the tropical zone of the earth all the year round, and currents of heated air, laden with the vapour of the ocean, rise into the upper regions of the atmosphere. To supply the place of this rarer air, a cool draught sets in from the frozen poles towards the hot equator, and a perpetual circulation of the atmosphere is thereby set up, the equatorial winds carrying heat in the direction of the poles, and the polar winds carrying cold towards the tropics. The moisture which is lifted from the tropical seas, and borne northward or southward by the warm upper winds, is condensed in colder regions and falls to the surface in the form of rain or

snow. Finally, it streams over the land in a thousand channels, and returns to its parent ocean, where it is pressed by the cold polar undercurrent back towards the equator.

The circulation of air and water is intimately connected with another cycle of change affecting the land itself, for the land is almost as unstable as the sea:—

> "The hills are shadows, and they flow
> From form to form, and nothing stands;
> They melt like mist, the solid lands,
> Like clouds they shape themselves and go."

Every raindrop which soaks into the clods, every runnel which trickles through the soil, every brook which leaps over its rocky channel, every river which flows through its wide banks to the ocean, is burdened with the ruin of plain and mountain. Every shower leaves the continents with a new face and form. Water is a great distributor of the solid matter of the earth. The cliffs of the shore are incessantly gnawed by the surf which breaks upon them, and rivers transport the crumbling sand and mud of the higher levels to spread it out in deltas, mingled with the buried wrecks of animals and plants, on the bottom of the ocean.

The demolition of dry land effected by this aqueous denudation, is, however, repaired by the secular elevation of wide areas which is known to be going on, whatever may be the cause; and on a smaller scale by volcanic eruptions. The secretion of coral from the calcareous brine of the ocean by coral polypes, and the accumulation of thick sheets of globigerina ooze over wide areas of the sea floor, are also important compensating processes, due to the agency of animal life. Nor must we forget the part which vegetation plays, in creating extensive beds of coal and

lignite. For it is the duty of organisms to render to the land the solid matter which has been pilfered from it by the air and water.

The unspeakable beauty of the world is manifest to all who have eyes to see, in the rare gems and sparkling ores of the crags, in the delicate shells and sea-weeds of the strand, in the lovely flowers and brilliant birds which haunt the forests, in the rainbows which embellish the clouds and cataracts, in the remote vistas of mountain, lake and ocean, in the evanescent hues of the aurora borealis, in the blue day with its glorious sunsets, lulling the mind to repose and instilling into it a strange sense of the infinite; and, last of all, in the dark vault of night, radiant with the golden fire of distant spheres.

The whole world is steeped in colours borrowed from the sun. For as soon as the pure radiance of the central luminary falls on the prismatic surface of the earth, her dark fabric is seen to glow with a thousand tints.* This wondrous alchemy of light gives us a glance behind the mask of sense, and teaches us that nature is, in a physical sense, a dark and silent piece of mechanism, of which some movements are translated by the eye and ear to light and sound. That which seems to be at rest, proves to be in ceaseless activity; that which we mistake for peace, is constant war: and we may truly say that the entire bulk of the planet is thrilling with molecular tremors, due to its inherent temperature and the ether-energy derived from the sun.

Such, then, is the home of man,—a great cavernous crystal, its flowery rock-rind, adorned with lovely beings

* Solar radiance is, physically speaking, a mode of motion, set up in the ether by the molecular vibrations of the sun.

and decorated with "innumerable tenements of beauty," sailing majestically onward through the sun-illumined fields of ether, an islet of order and beauty amid the stony streams and hurtling wreck of space, an oasis blooming in the dust of chaos. A splendid heritage is this masterpiece of Divine art, overcanopied by azure curtains, and lapped in a liquid mantle of sapphire sea, its crystalline framework studded with gems, its genial surface seamed with ore and teaming with varied life,—the heritage of man, which had been slowly fashioned for him through the countless æons, and on which he entered when it was prepared.

And what is Man? Man, says the physicist, is a machine. A machine is defined as a material system which transforms or changes the form of energy. A steam-engine is a machine, for it is an arrangement of parts whereby the heat of the furnace is transmuted into the bodily motion of certain of the parts; the solar system is a machine because it makes the radiant energy of the sun drive winds and streams, or support life on the planets. A timepiece is a machine, for in it the force of gravity acting on the weights or the stored power of the spring is manifested in the rotation of the hands. The solar system, a steam-engine, and a timepiece, are examples of machines dealing in a safe and steady manner with the stable forces of nature.

There is, however, a second class of machines, whose function it is to transmute the unstable energies of matter. A loaded cannon is an excellent illustration of this class. Here the chemical energies of the gunpowder are in a state of touch and go, and a spark from the fuse is sufficient to free them from their bondage, and launch them forth upon the world of sense with the greatest violence. The latent powers are so vast and so finely adjusted that a minute

expenditure of energy is capable of producing prodigious results.

It is in this category of machines that a live animal is placed by the physicist. The food which it eats, like the fuel of an engine, or the gunpowder of a cannon, is the immediate source of the energy to be transformed by it into vital heat and work. This work is of a far more complex character than can be done by any lifeless automaton, however ingenious, and the higher the animal the more complex it is. No person, for instance, could measure the moral and physical consequences of a thought in the brain of Newton or Napoleon.

The organs of animals, or the apparatus by which the transformation of energy is effected, are also infinitely more complex than the parts of an engine. The particles of their substance are delicately poised in an unstable combination, like the elements of an explosive, and those structures which perform the noblest and most exquisite duties are the first to perish after death. There is a perpetual decay and renovation going on in them.

The food of plants is mere mineral matter, but the fuel of animals must be dead protoplasm, for animals have not the power of assimilating the chemical elements direct, and are dependent upon the plants which stand between them and the inanimate world.

Protoplasm is, according to the physiologist, the physical basis of life, the fundamental tissue out of which all the organs of a living creature are shaped. It is a clear, colourless, gummy stuff,* which the chemist can resolve into oxygen,

* The composition of the human body is as follows: Oxygen, 72 parts; hydrogen, 9·1; carbon, 13·5; nitrogen, 2·5; lime and phosphorus, 1 plus a fraction more; and a trace of other elements, making up the total of 100 parts.

hydrogen, nitrogen, and carbon, with traces of other elements, and like all the inorganic compounds of nitrogen, is extremely unstable and easily decomposed. Every living being, plant, or animal is at first a tiny lump of protoplasm; which rises into the mature form by a process of budding, or, in other words, by outgrowth and separation. And it is the standing miracle of life that out of two specks of this inscrutable stuff, in which the microscope can detect no difference, a living man, a butterfly, or a flower may spring.

This mystic fact is proof in itself that there must be a propound dissimilarity between various kinds of protoplasm, according to its origin, although they may seem alike to the senses. Analysis, indeed, shows that the proportion by weight of the four chemical elements which go to make it are very various. The derivatives of protoplasm are of two sorts, one containing nitrogen and the other not. Yolk of egg, blood fibrin, gelatine, and gluten (the tough ingredient of wheat and macaroni) are examples of the first kind, which is mainly found in animal organisms; and fat, oil, sugar, starch, and cellulose, the woody part of plants, are examples of the second, which is common among vegetables. But in any part of animal or plant, two or more of these derivatives are usually co-existent.*

Living beings are distinguished from inanimate things in several respects. A particle of protoplasm has certain powers which are not to be found in inorganic nature; it has a spontaneous power of expansion and contraction, and there are definite currents circulating in its mass; it can produce heat by chemical change in a more gentle and continuous way than combustion, and it can enlarge itself or grow by uniting its constituent elements into material like

* St. George Mivart.

itself and then incorporating them into its own substance. Every inorganic compound has a fixed and invariable chemical constitution, but protoplasm is subject to variations in the quality and quantity of its elements. But an organism differs from a mineral in form and growth, as well as in structure. A spar or crystal has plane facets, and grows by having layers of new matter deposited upon its outer surface. Even crystal groves, like the frost foliage of a window pane, though they may vie in graceful beauty with the plumes of the ostrich, or the fronds of New Zealand ferns, do nevertheless build up their jewelled branches by the accretion of tiny crystal upon crystal. An embryon cell, on the other hand, has a curving contour, and grows by receiving fresh matter into its own substance as a piece of jelly swells by taking in water. Moreover, the single cell becomes a full-blown plant or a mature animal, not by the attachment of strange cells to it from without, but by the growth and division of itself, and of the younger cells which are thus formed from it.

The most important distinction between living and not living bodies is, however, the recurring series or cycle of changes through which the former pass. A crystal can only be generated in a solution of its own kind of substance; but a plant rises from a seed to flower and fruit by feeding, under sunlight, upon the mineral salts in the air, water, and soil around it, and an animal passes through all its phases of childhood, youth, and parentage, in consuming the protoplasm manufactured for it by vital agency. Plants and animals alike spring from an embryon germ, and in turn bear other germs from which a similar being will come into existence

Besides the striking differences between animate and

inanimate beings, there are others equally striking between plants and animals. Plants, as a rule, have not the power of spontaneous movement, and they do not feel; besides, there is great latitude allowed them in size and shape, and they can propagate themselves by buds and slips, as well as by fruit. Animals as a rule possess great freedom of movement in their limbs and locomotion, they conform more closely to the typical pattern, they feel, and they multiply by means of embryon cells containing an "image" resembling themselves. More nitrogen enters into the composition of animals than of plants, and animals contain neither cellulose nor starch.

It is true that there is a class of organisms termed Radiolaria, which seem to link the animal and vegetable kingdoms together; that sensitive plants move spontaneously; that sea-anemones are rooted to the rock, although they have a stomach and catch their food like an animal; and that certain fungi are as rich in nitrogen as any animal: but still the above distinctions hold good in the main; and the most significant of all is, perhaps, the power of locomotion. The functional distinctions are, however, less questionable. Plants live purely upon minerals, and transmute the liquid and gaseous matter which they draw from the surrounding atmosphere and soil into the protein materials, and fat, sugar, cellulose, and starch, which compose their own bodies; thus, for a time, reclaiming solids decomposed by the action of fire and water. Animals, again, consume the protein materials which have been produced by plants or other animals, and merely assimilate them into their own body. "An animal," says Professor Huxley, "cannot live on a watery solution of ammoniacal and mineral salts, however much fresh air and sunshine may be added to this

diet. It has no power of manufacturing the protein compounds, or the fatty or saccharine matter of its bodies, out of simpler substances; but directly or indirectly it is dependent upon plants for all the most important constituents of its bodies." * To maintain its powers of spontaneous movement, and the operation of its brain and senses, it transforms the latent or potential energies of its food into active or kinetic energy. This it does by dissolving the unstable elements of the food into the blood, and oxydizing them in the nascent lungs by means of oxygen derived from the air in the process of breathing. "The animal is in fact a machine, fed by the materials it derives from the vegetable world, as a steam-engine is fed with fuel. Like the steam-engine it derives its motor power from combustion; and, as in the case of the steam-engine, the products of the combustion are incessantly removed from the machine. The smoke and ashes of the animal are the carbonic acid evolved in expiration, and the fæcal and urinary excreta. The latter are returned to the earth in a more or less fluid, or at any rate, soluble form: the former is diffused through the air." †

But what do all these facts amount to in solving the mystery of life and the greater mystery of soul? The chemist, indeed, can tell us what kind of atoms compose the living frame; the physiologist can point out the formal differences between animals, plants, and minerals; the physicist can draw a close analogy between animals and machines: but yet it must be confessed that each and all of them treat only the outer shell of the matter and not the inner core. The earnest student of this great problem wishes to know what Life is, and what Soul is, but he can find no answer in these poor fragments of research.

* Huxley's *Physiography*. † Ibid.

Life is a particular form of energy, and soul its last refinement, says one thinker; life is a balance of various forms of energy produced by the complex apparatus of the body, suggests a second; life may denote a peculiarity of structure rising from the lowest depths of the visible universe, conjectures a third; life is the continuous adjustment of internal relations to external relations, enunciates a fourth; and a fifth declares that all kinds of matter have their motions, accompanied by simple sensations, and are in some occult sense alive. But all these are mere speculations, and the last, indeed, is perhaps the wildest notion that ever emanated from a bewildered materialist. The real essence of life, the true nature of the mind, still escape the vivisector's knife and the prying of the physicist.

We must not blame the physicist for asserting that man is a machine, especially if it be not done too positively. Their whole training teaches them to look at the objective side of things, and to explain everything as a phenomenon of matter. Probably no individual so closely resembles a thinking mechanism as a typical man of science. His life labours tend to reduce him to a mere logic-mill and calculating machine; hence it is little wonder that the steam-engine analogy should be ground out of such a quarter. There is danger, however, of this rigid figure hardening into scientific cant, the most pernicious cant of all.

A few years ago it was the custom for people to talk of cucumbers as bottled sunshine, and of the heat which warms our hearth as the radiance of primeval days, which had been stored up in coal for thousands of years. No one now, who knows the direction of scientific thought, can entertain these ideas literally, though cucumbers and coals were doubtless built up under the influence of the past solar heat. The

weakness of this materialistic analogy consists in this, that man may be a machine and something else to boot. It is assumed that a machine is a material system which transforms energy; and because it is found that man transforms energy he is classed as a machine. Truly, if we have regard only to his material body, he may be classed as a machine under so broad a definition. But he is not a machine in the proper sense of the term, and it is stretching analogy too far to say so. Does a machine grow in shape and live in every particle? does it freely regulate its own movements? does it repair its worn or broken parts, and give birth to copies of itself? The moving wheels of an engine make a seeming show of life, but it is a false vitality. The human eye is a mere lens, they say, but can a lens darken with hate, or beam with love?

Even the body is not so much one machine as a congeries of machines; and, moreover, though it holds for all machines that where a certain amount of heat disappears a definite amount of work is done, it is not yet proven that the law strictly holds for man. The presence of consciousness in man, is the principal fact which renders the mechanical analogy very imperfect.

No combination of wood and metal, however ingenious, can think or feel like the lowliest worm, yet man in his whole nature is immeasurably exalted above the higher apes. His self-consciousness of itself divides him infinitely from the lower animals. Owen styles him the "ideal exemplar" of the vertebrate animals, forecast by the vertebrates which preceded him, and which were, doubtless, making for him. To Oken he is the "sum total of all the animals, and God manifest in the flesh." In him the world became self-conscious, and thus attained the highest reach

of development of which it was capable. The lower animals are not, it would seem, given to asking what and where they are; and a planet, tenanted only by creatures, blind to their place in nature and to their Maker, is, at best, an unfinished piece of work.

A being gifted with self-consciousness, with memory to retain experience, understanding to know the causes of things and harmonies of nature, genius to create new forms of beauty and engines of power, faith to revere its Creator, and conscience to discern His eternal decrees, is, so to say, a necessary outcome of a world like ours. Such a being is virtually endowed with a share of God's all-seeing vision; he is, as it were, enlightened by a ray of the Divine spirit, for God has been pleased to initiate him into the secrets of His art, and order him to execute His will. Not without reason did the Apostle proclaim the human body to be the temple of the living God.

To the imagination this life of man is, indeed, a strange affair. Himself a spark of intelligence in the dust, kept alive by a breath, with his instinct of immortal life on the verge of death, his dreams of everlasting bliss in the last agonies, his hope of resurrection in the act of dissolution; isolated on a flying ball hung in the wide realms of light and space, he crawls about its surface, studies its materials, and gauges its size and motions; all the while building temples to a Being he never saw or heard, and yet believes somewhere to exist. Surely he does these things by virtue of the ordained powers granted to him for the purpose? Why does he decorate the whole planet with temples if there be no God? and why does he squander the earth's most precious energies and materials on a delusion and a snare?

The true meaning of human life is frequently a puzzle

to old as well as young men. It is quite clear, however, that man's work on earth largely consists in utilizing the latent stores of energy which are locked in the materials to which he can find access. The living creatures which have preceded him on the globe have collected many diffused minerals into masses ready for his use. Such are the coal seams, beds of shell and coral, chalk pits, and quarries of fossil ivory, which enrich the ancient crust of the earth. Thus the dead remains of a lower order of world-inhabitants in the past are turned to account by a higher creature introduced at a later period. Nor does man probe the rocks and dig up their treasures for a mere practical purpose; he has an aim still higher than that, namely, to restore in imagination the past life of the planet from its mutilated vestiges, to explain its origin, and even to forecast its future.

But this utilitarian view of the purpose of life is plainly too material and one-sided. Man is surely more than a piece of apparatus cunningly devised to perform certain acts in the economy of nature without breaking down under the strain. He was not created to be a mere tool for working in matter, but also to enjoy his life, and to make use of matter in sustaining and adorning it. The greater part of human efforts and hardships arise from earning the means wherewith to live: they are the tax we pay for the Divine privilege of living; they are not the penalty of a prisoner or a slave, but the interest rendered unto the Lord for the trust which He has put into the hands of His chief steward.

When we think upon the countless worlds around us, we see that the All-Giver does not require our existence or exact anything from us, not even our adoration. The world is as a speck in the midst of immensity, and its loss would

scarcely be missed. What needs it matter to Him although a comet shattered it into dust to-morrow? For our own sakes, then, we were created: and our life is manifestly a great gift from him. Out of Divine love He has made, and keeps us; and it is surely meet for us to render Him our reverence and gratitude. Our chief end is to glorify God.

The tenure of man's life demands the exertion of all his faculties. He is permitted to see and enjoy a corner of God's great universe at the one price of his toil and service in it. The tie which binds him to earth is as frail and fleeting as a breath, and the terms of his existence are hard but beneficent. He must not squander the potency of nature at his disposal: but utilize it with as little waste as possible. Hence, inventors and other men of genius, whose minds resemble the class of machines which by an exquisite touch set free an incalculable fund of energy, are honoured because they introduce economies, and open up fresh sources of power, or fabricate new objects of beauty. People often say in these days of startling contrivances, that the world will soon come to an end; but it is rather an assurance of a long futurity that such material triumphs give, for they disclose unexpected possibilities of achievement. As man accumulates knowledge and rises in the scale of civilization, he discovers vaster arenas of effort, and deeper molecular properties which the lower animals or himself in a lower state were entirely ignorant of. At first he hunts the wild animal crossing his path, then herds it on the grass; then tills the surface soil; then digs up coal and metals from the bowels of the earth; and, at last, when these palpable sources begin to fail his hand and sense, he looks into the secret store-room of matter with the eye of intellect, and finds a new stock of force even richer than the old.

There are those who repudiate civilization and applaud the days of simple shepherd life; but civilization is a necessity, if the full capabilities of the earth are to be exhausted. It is impossible to predict when this condition of things will happen, but when it does man's task will be accomplished; for it is very doubtful if a higher being than man will succeed him on the earth. Such a higher being might indeed be able to flourish in wastes where man would perish, and make use of potentialities in nature of which he never dreamed; but is not man enough for the planet? Is he not the climax of its development?

That he is gifted with indefinite capacities for improvement is a powerful argument in favour of his lasting pre-eminence on the earth. When we reflect on how much man has done in the world, how he has thoroughly explored it, sounding its seas, and mapping its continents, determining its position in the universe, and availing himself of its atomic resources—how he has mastered it, in short, and also how much he has it in his power yet to do, the probability of his giving place to a superior animal evolved from him grows very small. It is more likely that, during his lease of earth, he will make the most of his possession, and that the faculties of his mind will gradually become nobler, so that the coming race may be our "loftier brothers," but yet "one in blood."

Science has shown us that the human form is not quite perfect. The wisdom teeth of an adult, for example, are superfluous, and gradually disappearing from the jaws. The colour sense of man, too, is often faulty, and there are signs that it is still developing; so that the future man may delight in hues which our eyes cannot now distinguish in nature. These colours are already present, if we could only

see them; for God did not make the world beautiful that we might enjoy it, but rather He constructed us so that we could see and appreciate the beauty of the world. The old paleozoic shells still gleam with traces of iridescent hues, and the pearly lustre of ancient fishes can yet be seen on their fossil scales, proving that living things were beautiful in the past, though man did not exist to take pleasure in their sight. It is even possible that new senses, such as a sense for detecting the excess of electricity in the atmosphere, may be specialized in the human body.

Together with the development of man's faculties of mind and body his scientific knowledge will go on increasing, and the printing press has rendered it almost impossible for an art henceforth to become lost. It is surprising how young our physical science is, and how little we really know, in spite of recent great discoveries. It is only about a century * since we learned to know what the air we breathe is, and less than that since we found out the constitution of the water we drink. Our knowledge of the ocean and its inhabitants has almost all been gained since the first submarine cable was laid, twenty-six years ago. We have measured the framework of the solar system, and, to a great extent, the composition of its bodies; but we do not know what the elements are, or the arrangement of the stars. At present, however, our physicists are busy striving to elucidate the molecular apparatus, and to uncover the well-springs of energy. Every lightning flash, indeed, is a rift in the seeming show which hems us in, revealing to the philosopher a glimpse of the hidden mechanism of the universe. But it is doubtful if they will ever succeed in probing the mystery of matter and force. God has pro-

* 1777.

bably wrapped His secret processes as well as Himself from the reach of sense, and only intends us to find out what is for our welfare.

The properties of matter and energy will doubtless be fully investigated in the future, even if their essence should for ever remain a mystery. Within the last eleven years chemists have taught themselves to build up in the laboratory substances such as indigo dye and alcohol, which it was believed could only be produced by the agency of life; and it is within the bounds of possibility that they may ultimately be able to construct living or dead protoplasm itself. The last few years have given us, in the telephone, a means of wafting the human voice far beyond the reach of eye or ear; in the microphone, of magnifying inaudible sounds till they come within the range of the ear; and in the phonograph, even of sealing the living speech on brazen tablets.

But these marvellous inventions, which aid the ear in the same manner as the telescope, the microscope, and photograph aid the eye, will probably be totally eclipsed in the future. The stores of coal in the earth's crust will in time become spent; but sunlight, or electricity, or perhaps some other unknown power, will take their place in driving our mills and warming our homes. The very moon will be put into harness, and the waves made to light our streets. Personal flight through the atmosphere is one of the highest practical achievements of the future. To this end man needs no bodily wings, for he is endowed by nature with a rarer faculty—the wings of mind. Preventative medicine will largely take the place of curative; and, if Dr. Richardson is to be believed, our chemists will prepare our food from vegetables in such a way that it will become as nutritious

as blood and tissue, without the need of being transformed by animals. This superior food, according to that physician, will produce a finer race of men, free from those diseases which must always prevail so long as men, unlike their first parent Adam, continue to feed on the bodies of other animals. But although pain may be minimized and many diseases eradicated from the flesh, it would be going too far to say that there is a time coming when all sickness or pain shall cease, for the world, like the rest of all nature, is in a state of change, which is ever imposing new conditions on its inhabitants, and demanding a sympathetic change in them, so that an absolutely perfect adjustment of the living being to its environment will probably never be attained.

The moral perfection of mankind is also a hope of the future, but a hope which may not prove so vain as the dream of his physical perfection. The insight which man has into nature teaches him the laws which govern her actions, and his faculty of memory enables him to keep them before him. His inherited instincts are a bundle of tendencies bequeathed to him by his fathers, and hence the necessity of free-will to judge between the prompting of these instincts and the word of the law inscribed in his memory. His duty is to subdue those instincts which are hostile to the law or the declared will of God. Every time he acts by willing according to God's will he is purifying his original nature, and his reward is the deep happiness which follows duty done. By this elevating course of conduct man's wishes gradually tend to become one with his duty, a result which marks the goal of moral perfection on earth. This fair goal, like the rainbow which children chase through the storm, is ever receding as we appear to approach it, for our earthly state is ever changing; but it

may be that, during the long and steady planetary phase on which the world is probably entering, the phase of full maturity, the constancy of external conditions will be such that the inward harmony of the human soul will be practically complete, and the kingdom of Jesus Christ will have come.

How long this millennium, or golden age, of the future will last it is, of course, impossible to say; but science does not guarantee that it will endure for ever. The life of the planet is doomed to decline naturally, even as it uprose, unless, indeed, it meet with some unknown cosmic mishap; the human race will die, and the rest of the organic creation then alive will slowly taper off through novel forms to lifeless matter again, and finally disappear from the terrestrial scene. The sun himself will wax dim with age and the earth will roll her frozen orb through the black abyss of night. At length, even her atoms may decay for lack of heat, and the dead world complete the cycle of its existence and finish its course by rushing to its grave in the ashes of the sun.

CHAPTER II.

FREE-WILL.

Shall man, whose soul is set in the royalty of discernment and resolve, deny his rank and say, "I am an onlooker; ask no choice or purpose of me"? That is the blasphemy of the time. . . . The divine principle of our race is action, choice, resolved memory.—GEORGE ELIOT, *Daniel Deronda.*

As far as we can learn, men have laid claim to freedom of will in all times and countries. They have had an innate sense that their wills were free, a feeling which is now expressed by saying that free-will is a fact of consciousness. In this age of doubt, speculation, and material quest, however, there are many men of science who deny the truth of free-will. To them a man is merely a more complex automaton than the brute—a living marionette, contrived to fret and caper on the world's stage by cords of force and subtle springs of thought. They have proved to their satisfaction that the volition of the lower animals is not free, and they cannot see their way to admitting that man, the probable offspring of the lower animals, is endowed with free-will.

It is certain that our will is either free or not free. It cannot be both free and bond, whatever hazy theologians may say. If bond, it seems to us our sense of freedom is a deceit, our punishments are cruelty, our pangs of con-

science needless, our prayers futile, our nobility a mockery and the last judgment a farce. If free, even though restricted in its freedom, our faith and life has a meaning, prayer is reasonable, sin is real, and salvation just. If there be no free-will for men, all sin and meanness must be charged to God, and the penalty of evil is but the torture of the innocent. Without free-will, God alone is responsible for all that happens in the world. With it, He is not entirely so; for man, as far as his free-will operates, takes his share of the responsibility.

In a famous address "On Science and Man," delivered at Birmingham, Dr. Tyndall discussed the question of Free-will with all his usual lucidity of thought and happiness of diction. "What is meant by free-will?" he asks. "Does it imply the power of producing events without antecedents?—of starting, as it were, upon a creative tour of occurrences without any impulse from within or without? Let us consider the point. If there be absolutely or relatively no reason why a tree should fall, it will not fall; and if there be absolutely or relatively no reason why a man should act, he will not act. It is true that the united voice of this assembly could not persuade me that I have not, at this moment, the power to lift my arm if I wished to do so. Within this range the conscious freedom of my will cannot be questioned. But what about the origin of the 'wish'? Are we or are we not complete masters of the circumstances which create our wishes, motives, and tendencies to action? Adequate reflection will, I think, prove that we are not."

But is Dr. Tyndall not misapprehending free-will here? He seems to think it synonymous with *wishing*, and speaks of his power to raise his arm if he *wished* to do so, when he should really say, if he *chose* to do so. A man may *wish*

to do a thing and not *choose* to do it. Therein is the whole secret of the matter. It is the choice between wish and duty which constitutes free-willing. My wish is a production of my inherited body and my past discipline; my duty is the knowledge of what I ought to do. If wish and duty merely outweighed each other, will would not be necessary, for its function is to step in, decide, and tip the balance to one side or the other.

The Ego sits as judge between two opposing counsels. Dr. Tyndall does not doubt man's freedom of will to raise or lower his arm: he cannot surely deny a man's power to banish a thought? Grant free-willing in the one operation, and there is no reason why it should not be granted in the other.

Freedom of will, indeed, would seem to be necessary to a creature gifted as man is with reason, memory, and imagination, and placed upon a planet governed by fixed laws which he can understand, remember, and utilize. Endowed with powers to know the harmonies of nature, he should also possess the will to set himself in accord with them; capable of forming an ideal, he should be able to fashion himself into its likeness. "God made man free," says St. Augustine, "that he might serve Him better."

At first the world was under the rigid rule of law, just as a youth is under tutelage during his minority; but when man, the supreme inmate, came to it, the destiny of the planet was manifest, and a certain amount of freedom was allotted to him. Ignorant of the laws of nature, the lower animals were "bound fast in fate," for free-will would have been superfluous to them.

To make our ideas still clearer, we may regard nature as God's will written on matter, the pure animal feelings

as His will written in the flesh, and human knowledge as His will written on the brain. The life of the lower animal is a resultant of the interaction of the animal feelings and the environment of nature; it is a combination of the flesh and matter records. Like two meeting streams, these two elements follow their natural impulses, and may clash together or blend, the animal being fettered by its ignorance, and as automatic as the sequence of nature. But, in addition to God's laws bound up within his flesh, man has them jotted on the tablets of his understanding. Thus far he has a dual existence. The flesh writ is faulty, but the brain writ is sure, and serves to correct and check the other. His duty is to follow the brain commandment, whatever the temptations of the brutish impulse; and for this purpose he must needs have a certain freedom of action to follow one or the other course. Free-will is the faculty which determines the choice, and it completes the triple existence of man.

In cases where the flesh and matter would clash together, the brain and will are able to steer clear; thus liberty of volition allows of a greater scope for achievement on the part of man as compared with the lower animals. It even allows him to commit self-annihilation when he may think fit.

Every sane man possesses the power of free-will, and exercises it for the better or worse. He can employ it to decide in favour of his duty and against his impulse; he may decide in favour of his impulse; or he may fail to exercise it consciously at all, and thus resign himself to chance or instinct,—in which case he is abandoning his high prerogative, for, being gifted with free-will, it is obvious that he should make use of it. Some persons' "will" is weaker

relatively to the "wish" than others, and hence no man can rightly judge the conduct of another. But every triumph of the will over the wish weakens the relative power of wish, and renders duty easier in future. The development of man proceeds by an increase of the brain register, and a curbing of the animal propensities more and more into conformity with it.

Whether or not free-will is essential to man, it is certainly a fact of consciousness: we *feel* it to be a real thing, and may therefore seriously doubt if it can be a mere delusion. But, though it be no delusion, we can only claim for it a limited action, like that of a tethered animal which can only frisk, or graze, or lie down within the range of the restraining rope. So hampered is it by personal feelings and capacity, by want and accident, that individual efforts probably hasten or retard very little the natural course of evolution. For the same reason, too, error can only be transient and local in its effects.

There are evolutionists who found an argument against free-will on the hypothesis that man developed from the lower animals, which are acknowledged automata. They cannot see where the line is to be drawn between the volition of man and his inferior ancestors—how his will should be free when theirs is bond. But though free-will and the manner of its production is inconceivable to them, that is no reason for its non-existence. When a primal nebula breaks up into discrete planets, or the first protoplasm cell grows out of the primordial atoms, or the perfect eye out of the blind flesh, there is apparently a gap in evolution which cannot be spanned over; and, similarly, we can understand that the bond volition of the lower animals may be differentiated or set free in man.

The doctrine of the conservation of energy has also been by some supposed to militate against the possibility of free-will. If, as this doctrine postulates, there is only a certain constant amount of energy in the universe, never more nor less, whatever the protean shapes it may assume, it is not easy at first glance to see how there can be such a thing as free volition. Force of will would seem to be part and parcel of this stock of energy, like light, electricity, or other so-called force, and to act by law like any of these. But a deeper consideration shows us that necessity of conduct—in other words, bondage of will—may not be implied in the conservation theory; for it is a principle of dynamics that a force can act on a moving body so as to change the direction of its motion without "doing work" upon it; that is, communicating energy to it. The force has a directive but not an accelerative effect on the mass in motion; and in some such way may the will operate, quite unfettered by any exchange, or requiring any creation of energy.

Another analogy of free-will has been offered in the "sorting demon" of the late Professor Clerk Maxwell. This imaginary imp is a mathematical spectre dwelling in the gloomy reign of molecules, and doomed to perform the dismal task of selecting the swift atoms from the slow. This he can do without imparting any energy of his own to them. He acts simply as a controlling power, moving his arms and limbs so as to direct the molecules in their motions, but not to alter their velocity. But one is tempted to ask where the energy comes from which enables this lively sprite to move about and ply his labour; for, if it be not drawn from the general stock of nature, it must perforce be created, a condition which the theory in question disallows.

Both the figure of a force acting at right angles and the "sorting demon" are obviously imperfect attempts to solve the mystery of free-will. No trace of such a demon can be found among matter, and the force of volition has never yet been measured. "The dynamical theory of a conservative material system," * says Clerk Maxwell, "shows us, however, that, *in general*, the present configuration and motion determines the whole course of the system, exceptions to this rule occurring only at the instants when the system passes through certain isolated and singular phases, at which a strictly infinitesimal force may determine the course of the system to any one of a finite number of equally possible paths, as the pointsman at a railway junction directs the train to one set of rails or another." And this is all the light that exact science can throw upon the subject. Our will is like this—a strictly infinitesimal force which acts on the material system as it passes through certain isolated and singular phases, and directs the application of energy in the system without interfering with its amount.

Science, therefore, may doubt the existence of free-will, or she may try to explain how it is possible; but in either case, the truth is at present beyond her grasp, and, for anything we can see now, may ever thus remain. For in the region of the soul we deal with actions which, as Dr. Tyndall himself says, "refuse the yoke of physical laws."

Our best proof of the existence of free-will is, after all, our feeling that it is a reality. The scientific thinker is, doubtless, shy of what he cannot comprehend, and therefore inclined to regard this feeling as a mere deception. He is afraid to admit the freedom of will, though he cannot

* *Nature*, Dec. 19, 1878.

deny it. But the natural sense of men less accustomed to subtleties plainly feels and instinctively believes it to be a fact.

The certainty that our wills were not free would not, however, render all moral teaching useless. Dr. Tyndall is careful to say that the last words of the preacher go for something in making up the mind. They would still do so by aiding our better wishes and stimulating our highest motives. If the wish were known to be all-powerful, the true aim of discipline would be to elevate the wish, so that it would incline of itself toward virtue. But does anyone dream that this education would be as rapid and practicable if men knew themselves to be automata as it is now, when they believe themselves to be free moral agents? If wish is to be the arbiter of destiny, and not duty, who can doubt that, in the present state of human nature, there would soon be a backsliding towards barbarism? If a man be not responsible for his acts, and not *justly* subject to any reward or penalty for his good or evil conduct, what is there to prevent him from following his own desires? Fear of punishment, answers the materialist. Although the man cannot be blamed for his actions, seeing he is not a free agent, the good of society requires that he should be chained up and kept from the chance of committing further harm to his fellows. Therefore the dread of this imprisonment, or of violent extinction in the case of grave offences, will operate as a moral check and keep him back from crime. Moreover, we are told that there are some men and women who are perfectly incorrigible, and these it would be absolutely necessary to pen up all their lives without hope of ever being "free" again.

This prompt and effective plan of dealing with "incor-

rigibles" has rather a hard ring in it, not infrequently heard in the new-fangled gospel of materialists, and caused, perhaps, by the scientific habit of looking upon an erring fellow-mortal objectively as a piece of clock-work hopelessly out of gear. Experimental physicists and closet naturalists are often singularly unfit to publish the moralities. Not having as a rule lived an emotional and spiritual life, they can hardly know the sentimental capacities of the human heart. The story goes that Mr. Darwin, in his voyage round the world, pronounced the savage natives of Terra del Fuego as utterly incapable of civilization; and yet, a few years ago, he found himself unwittingly alongside some of them in dress clothes on a public platform. Christian missionaries had effected a total reformation in their lives, and the renowned philosopher had the satisfaction of giving a handsome donation to their mission fund.

If, as Dr. Tyndall says, the last word of the preacher goes for something, how can it be that some men are absolutely incorrigible? Who is to decide on their incorrigibleness? The power of thought is infinitely complex, and man is altogether too intricate a subject to be measured by a rigid formula, like some galvanic battery or steam-engine. A single thought has power to calm him into peace, to excite him into rage, or even change the whole subsequent tenor of his life. And, whilst there is a chance for such a thought to take root in his soul, it would surely be unsafe to say that any man is quite incorrigible.

The restrictions of a narrow materialism tend to stunt the free development of the soul, which must ever feel itself free to open out to all noble influences; and religion, as the highest means of evoking the best emotions, is the prime instrument of moral culture and reform. It is a libel on

human nature to base all impulses to good conduct on the fear of punishment. "Pardon," says Pittacus, one of the seven sages of Greece, "is often a more effectual check on crime than penalty."

But if the selfish hope of reward, and still more the fear of punishment, are powerful influences with all men in determining the will—with lower types of mind perhaps the chief influence,—how much more potent must be the consciousness that man possesses true freedom of will, and is, so to speak, master in his own house. Then there is a noble pleasure in sacrificing selfish inclination to duty, a sublime happiness in voluntarily settling against the wish in favour of the law.

Until we know for certain that we are automata it is better for us to take advantage of the doubt and to believe we have the faculty of free-will. When a man has a conviction of possessing free-will, he is the more likely to exercise it. Weaken the conviction, and you sap his power of self-control and resistance to temptation. The firm faith that his will is in his own keeping, and that he is more or less responsible for his conduct, is the sheet-anchor of his moral life. "I am lord of this moment's change, and will change it with my soul," * is a maxim surely which no man ever should forget.

We are degraded from the dignity of our nature by the doctrine that we are merely the slaves of mysterious forces duped into a belief that we are masters. We have prided ourselves upon our authority over the powers of nature; but our vaunted dominion becomes ridiculous when we learn that we are wholly the product of these powers, and helplessly shackled by them body and soul. Freedom of will is

* *Daniel Deronda.*

indeed man's noblest attribute and chiefest glory. It is his highest prerogative to feel that he himself makes destiny, that his mind is the subtle loom whereon the threads of fate are centred, and his will the swift-gliding shuttle which weaves the mesh. His true dignity consists in this, that his intellect can know the mysterious powers of nature, can trace the fibres of the web, and that his energy and will are at liberty to govern them. The lower animals live by law, unconscious of law; but man is able to discern law, and to will himself into conformity with it or deliberately to break it. Therein lies the distinction which marks him as a higher kind of being. Take away the freedom of his will either to *obey* or *disobey* the laws which his understanding acquaints him with, and you lower him to the rank of the brutes, and render his superior intellect as dangerous as an edge-tool in a child's hand.

By the old faith man is regarded as the intelligent agent of God on earth, and from that view we have seen no cause as yet to turn aside. A man becomes elevated in his own esteem when he knows that God expects him to carry out His great designs on earth, and that his duty is to fulfil God's wishes manifested to him by motive feelings within and experiences without. He is inspired to do this duty by the elevating thought that God puts trust in him and leaves His work in human hands. From God he gets a certain endowment of body and mind, and is planted in a tiny corner of the universe. This is the sphere of his labour, these his implements. Man is His servant, and it is right that he should do God's will; but the Divine wisdom and goodness is manifested in the condition that, in doing so, man shall find his highest earthly pleasure.

The mystery of free-will and the sense of responsibility

which it entails on man have been a source of awe and wonder to many people. Can it be possible that the Creator would grant to one of His creatures a degree of freedom and independence of Himself which might even result in open defiance? The old faith would answer yes; for it represents man as being a little lower than the angels, who were quite free to rebel against His power; and Milton pictures the Divinity as holding converse with man. There must be more interest for the Author of all in a being to whom He has allotted a certain independence of Himself and gifted with great powers to serve Him; whom He has emancipated, in short, from the bondage of the lower animals, and lifted to the sacred position of a friend and helpmate. In man apparently the world breaks forth at length from chaos into light, from blind, soulless matter, ignorant of its origin, to self-knowledge and communion with its Maker. And surely, between such a being and the Creator, there must be mutual love—love on God's part because we are His children, and on man's part in return for the Divine goodness. But obviously the love of man for his Creator must be accorded freely, or else it can have no value in God's sight. A forced love without free willing, instead of being a grateful offering from man, would only be a tyranny of God.

The gift of free-will confers, it is true, a great privilege upon man, since it raises him into fellowship with God; but it does not therefore derogate from the Divine majesty. Nor can the freedom of the human will be said to endanger the Divine plans and sovereignty on earth, for we are so fettered by fate and punished for our misdeeds that our liberty is, in practice, very limited.

The future perfecting of mankind will, as we have

already hinted, consist in developing what we call the conscience, or sense of duty, and purifying the heart until the wish and duty harmonize. The free-will of the parent influences the destiny of the child, and on the acts of each generation will depend, to a very large extent, the joys and sorrows of posterity. By the structure of our being, knowledge gained passes somehow into feeling, and voluntarily guidance becomes instinctive impulse. Hence it follows that, according as our knowledge is true and our voluntary conduct right, so our development will be noble and our race improved.

CHAPTER III.

EVIL.

And the Lord God said unto the woman, What is this that thou hast done? And the woman said, The serpent beguiled me, and I did eat.

And the Lord God said unto the serpent, Because thou hast done this, thou art cursed above all cattle, and above every beast of the field; upon thy belly shalt thou go, and dust shalt thou eat all the days of thy life:

And I will put enmity between thee and the woman, and between thy seed and her seed; it shall bruise thy head, and thou shalt bruise his heel.

Unto the woman he said, I will greatly multiply thy sorrow and thy conception; in sorrow shalt thou bring forth children; and thy desire shall be to thy husband, and he shall rule over thee.

And unto Adam he said, Because thou hast hearkened unto the voice of thy wife, and hast eaten of the tree, of which I commanded thee, saying, Thou shalt not eat of it: cursed is the ground for thy sake; in sorrow shalt thou eat of it all the days of thy life;

Thorns also and thistles shall it bring forth to thee; and thou shalt eat the herb of the field.

In the sweat of thy face shalt thou eat bread, till thou return into the ground; for out of it wast thou taken: for dust thou art and unto dust shalt thou return.—GENESIS iii. 13–19.

A VERY few years ago it was generally believed that physical death and evil were introduced into the world by the fall of Adam and Eve from a state of innocence through eating of the forbidden fruit in the Garden of Eden. But the recent researches of geologists have put it beyond a doubt that death at any rate had taken place in the world long before man was created at all. Numerous fossils of crushed carcases, many of which must have

perished in flocks and herds by wholesale violence, were disinterred from rocks deposited hundreds of thousands of years before those in which the slightest relics of mankind have yet been found. And it should be remembered that the surviving vestiges of these defunct animals are very few compared with those which have entirely disappeared and mingled with the elements of earth and sea. They bear witness to a waste of life in the past at least as lavish and seeming pitiless as that going on at present in the savage wildernesses of the earth; and unless those earlier organisms had duller powers of feeling than their existing representatives and offspring, it is evident that they must have suffered bodily pain, mutilation, and premature decease.

If, then, we define evil in the scientific sense as an imperfection or derangement in the working of nature, of which mutilation, disease, and sudden murder are examples, we must confess that physical evil as well as natural death were rife enough before the advent of man.

It is moral evil and spiritual death, however, which are now believed to constitute the penalty of Adam's fall. By moral evil is meant sin. St. Augustine, the celebrated Father of the Christian Church, defines iniquity or evil to be "not a substance, but a perversion of the will, bent aside from Thee, O God, the supreme Substance, towards these lower things," and thence argues that God could not be the origin of evil, though He made all substance.

The scriptural idea of evil is, therefore, more restricted than the scientific or even popular one, for disease and bodily injury are included in the latter. Sin may be defined as a *moral* imperfection or derangement in the working of nature, and as it can only exist in a free moral

agent such as man, there could necessarily be no sin until man came into the world. Physical evil, on the other hand, did exist in the world while it was still inhabited by will-less automata incapable of sin; and since God made both these and their dwelling place, it follows that, unless we admit the interference of a spirit of evil, the enemy of God, in creation, we are bound in reason to refer the origin of physical evil to God.

Positive scientists repudiate the existence of such a personage as the devil, and regard him as the childish myth of a superstitious age. Some, indeed, in their sardonic ridicule of Satan would not disgrace that mocking character himself. Perhaps the devil is but a concrete idea, a convenient image or figure, emblematic of the evil flaws in nature, and engraved on the imagination by words and pictures till it acquires the vividness of an actual presence.* Still it is in the personal form of a devil that evil takes a living hold upon the mind, and hate of it is keener in this form than if it presented itself as an abstraction like the scientific concept. The mass of mankind must have distinct images to enable their minds to grasp and keep an idea, and since our chief notion of evil is derived from depraved men, it is natural we should typify it by a human likeness. Therefore, though science may have slain the real personality of the Evil One, by giving us a better knowledge of our own nature and circumstances, she has not succeeded in laying the ideal ghost of Satan. As the old Greek gods yet live within the memories of men, receiving their homage, and to a certain extent swaying their lives, though they have been for ever driven from their

* Not knowing the secrets of the unseen, science cannot be absolutely certain there is no evil spirit. An author of evil may co-exist with God.

Olympian thrones, so the old mediæval Prince of Darkness will doubtless continue his gloomy reign in the human heart long, although the Ithuriel spear of modern research identify him with the inherited vileness of the beast, as represented by the toad and serpent.

Before entering more fully on the question of physical evil, let us first consider the case of sin, or moral evil. Sin is disobedience to the Word or Law of God, and the Bible tells us that it first began when Adam and Eve ate the fruit of the tree of knowledge of good and evil growing in the midst of the garden of Eden, which God had commanded them not to taste. Eve was tempted to eat of the fruit, against the Divine injunction, by the serpent which appeared to her, and she in turn persuaded Adam to share her sin. The forbidden tree was a Divine test of the human character, and both the man and his wife failed under it; hence they fell from their perfection and happiness into a state of sin and misery, which has been shared by all their posterity. Every human being born into the world is supposed, according to this account, to derive his original sin from the fall of Adam his first parent, who, by a single act of disobedience, under enticing temptation, ruined a world, and delivered his innumerable descendants into sorrow and death.

The story of the Fall is literally inconsistent with the development theory. According to the latter, original sin is the strain of antecedent beasts remaining in our blood. It is derived not from the defection of a being suddenly created perfect, but by inheritance from a line of brutal ancestors. Evolution indicates that man is striving to be better than his origin, and to elevate himself higher than his first human parent, while Scripture teaches us that he

has sunk for ever from the high condition of his birth. There is apparently an irreconcilable difference here, and as it is our method in this work to assume, rightly or wrongly, the truth of the development theory, in order to see how it will square with the old faith, we cannot, in the letter, accept the biblical account of the Fall.

It is perhaps a sacred allegory of some ancient Semitic poet, founded on the idea of man's original perfection, seemingly implied in the narrative of the Creation preceding it, in Genesis, chapter first; and as it simply and beautifully symbolizes the perpetual ordeal of man's earthly lot, his duty to obey the will of God and refrain from sin, despite the allurements of desire and promptings of ambition, it forms a fundamental part of Holy Writ.

Whether evolution be true or not the Darwinian doctrine of the Struggle for Existence has opened the eyes of naturalists to the terrible amount of physical evil which exists on the earth; and created a corresponding pessimism in the minds of many feeling-hearted men. There are some writers, indeed, who would deduce pessimism from a flea-bite; but it is not to be wondered at that men of science, engaged in the study of animal existence by the light of this cruel idea, should give way to utter despair in the beneficent order of the world. They tell us that nature is conspiring to kill us, and that we only live because as yet we have proved stronger than the myriad agents of death which lie in wait for us at every corner and dog our steps. The food we eat, the water we drink, the very air we breathe, is teeming with the germs of disease.

In the howling wilderness the struggle gains its height; there every creature is at war with every other one, and a furtive existence is only to be conquered by taxing to their

utmost the powers of selfishness and brute force. Even in districts subject to human cultivation, spoil rather than bounty, strife and not peace are the rule of life. An eloquent writer in a recent number of the *Journal of Science* imagines to himself a man unversed in the recent discoveries of natural history, but educated and thoughtful, rambling in the rural pleasaunces of the New Forest or the ferny coombs of Devon.

"He fancies himself," says this elegant writer, "in a sphere where boundless resources are dispensed with a liberality equally boundless. The heavens are full of light and warmth, and the earth is clad in rich and varied hues. Perfume breathes from every spray. On all sides is life, animal and vegetable, unworn by toil and unshadowed by care and anxiety. To the butterfly hovering over the blossoms, to the blackbird warbling on the spray, the world seems not as to man, the task-yard of a workhouse, but the banqueting-hall of a palace. The observer, even whilst he envies the insects and flowers, who 'toil not, neither do they spin,' feels soothed and refreshed by the mere reflection of their supposed felicity.

"Plenty requires peace as its natural complement, and our wanderer believes that he finds this boon also in the woodlands and the heaths. Indeed, how should it be otherwise? Where there is superabundant plenty, where every demand is more than satisfied, how should there be the thrusting, and pushing, and jostling, outward visible signs of that internecine war of each against all, and of all against each, which the 'friends of peace' worship under the name of competition? The observer cannot, indeed, forget that in his realms of concord and repose, pain and death are present. He knows that at any given moment hundreds of flies must be struggling in the snares of spiders; that caterpillars innumerable are being gradually devoured by internal parasites; that many a song-bird is falling a prey to the hawk or the weasel. But, as was the case half a century ago, even with eminent naturalists, he scarcely apprehends the full meaning of all this suffering and massacre. Such facts as we have enumerated seem to him mere 'rude exceptions to the general joy,' departures from the order of Nature, casual, even though numerous, rather than as they really are, part and parcel of its very essence. Our friend in his ramble, and in his necessarily hasty survey, fails to perceive that not only does one-half the animal kingdom live only in virtue of the death of the other half, but that the herbivorous creature is as much a life-destroyer as the beast of prey, extirpating other animals by depriving them of food, and plants by consuming their seed or their seedlings. He overlooks the silent, quiet, but not the less deadly war waged by plants among themselves, each seeking to monopolize to itself soil, air, and light, and to crowd out, starve,

or smother its competitors. In short, in his optimistic contemplations, he entirely forgets that struggle for existence which—whether or not we regard it as a main factor in the development of animal and vegetable forms—we are bound to accept as perhaps the greatest, and assuredly the saddest, feature of the organic world. Who, after reading the third chapter of the 'Origin of Species,' can fail to be reminded of those words of St. Paul, 'For we know that the whole creation groaneth and travaileth in pain together until now;' or of the sadder exclamation of one who, having no faith in the ultimate solution of this dark riddle, cries out in agony, 'Creation is murder!'"

The author of this dark picture is finally brought to the serious conclusion that if a maximum of earthly enjoyment and the minimization of earthly suffering had been the objects of the Creator, the world would have assuredly been constituted very different from what it is.

Without disputing the ghastliness of the struggle for existence as thus disclosed, it is probable that the cultured person whom the writer initiates into the horrors of organic life, would take a view of things not quite so morbid as himself. It is easy for an exclusive student of some gloomy subject to become possessed of a fixed idea, which blights his happiness and haunts his mind with the spectres of despair. Freer living and change of intellectual scene would perhaps dispose the imaginary spectator to seek ideas which would alleviate the hard conditions of life imposed by the struggle for existence. He might reflect, for example, that after all, death if sharp is a short event, and the period of immunity from trouble is usually long compared with times of suffering; that there is evidently keen pleasure in the excitement of the very strife which animals wage; and that the pains of extinction may not be so severe as one is apt to think. Again, the lower animals have no knowledge of death to sadden them, and when it does come it is usually of a sudden kind. Nor should he forget that in many of them, especially those of lowly habits and organization, the

capacity to feel pain may be very small. Power of sensation evidently rises with the scale of being; and acute perception of pain would hardly be given to creatures little able to escape from danger or to remedy their hurts.

It is true that races of animals are ruthlessly exterminated by others, man being the greatest exterminator of all; and countless individuals are constantly swept to destruction by the blind forces of nature—like the butterflies of the Lombard plains, which are blown by the high winds up the Alps to perish in thousands among the snow. But we should not forget that the process of animal extermination or modification by pain and murder is on the whole a slow and gradual one. It is a stern law which consigns an organism to death unless it is fit to bear the hardships laid upon it, and mercilessly sifts the weak from the strong; but having regard to the incessant change of conditions of the physical universe, it is also a beneficent one. The material environment of living beings is constantly changing, and they must necessarily change too. It is right that those which best adapt themselves to the change should have the best chance of survival. The most active, alert, and strong members of a race, they who keep up their powers by exertion, and whose frames have stood the searching tests of experience, are worthiest to live on and perpetuate their good qualities in posterity. Pain is clearly a beneficent design, paradoxical as it may appear to say so, for pain is in the main a signal of danger, a punishment for carelessness, and a lesson for the future. We are warned by irksomeness or feeble pangs to desist from some dangerous course; and when they take the form of a penalty for some injury we have received, they incline us to be more prudent thereafter. Without the system of

nervous fibres which when unduly strained give rise to the disagreeable sensation we term pain, there would be no suffering among organic beings, but wholesale slaughter and mutilation would probably become so common that animal life would speedily break up and perish. As a recompense for pain we have pleasure, and together they ameliorate the rude struggle for existence.

Death, too, is part of the scheme of evolution; for it is a means of keeping the harmony between the organism and its changing environment more perfect. During its short tale of years each animal undergoes a modification which it entails to its offspring. Each life-time is so brief that, unless some catastrophe occurs, the corresponding change of environment will be small, and thus the animal powers of alteration will not be too severely taxed; hence there is a genial purpose apparent here also, if it could only be carried out properly.

A deathless creature, or even one capable of living for æons of years, would be impossible on the earth under its present unstable conditions, unless it were formed of some unknown substance, other than flesh and blood. If there were no change and all things were perfect, pain and death would indeed be unnecessary; but it is admitted that the world is not absolutely perfect, and hence the necessity of these agents in the process of evolution which is going on.

That natural death is painless, is another proof that things are ordered for the best rather than for the worst; and we ought not to overlook the wonderful recuperative powers of vitality, or the fact that hereditary diseases, which are generally the result, directly or indirectly, of sin or folly, are in course of time purged out of the system. Why it is that Nature, according to our view, is to a certain extent imper-

fect,—that magnitude, rather than perfection, seems to have been the aim of the Creator,—or that evolution should be the order of Nature, it is beyond our power to tell. But perhaps the poet is right, and in that unseen universe where science and religion are at one, we may learn some day—

> "That nothing walks with aimless feet;
> That not one life shall be destroyed,
> Or cast on rubbish to the void,
> When God hath made the pile complete;
>
> That not a worm is cloven in vain;
> That not a moth, with vain desire,
> Is shrivelled in a fruitless fire,
> Or but subserves another's gain."

Pessimistic naturalists, of the Darwinian school, looking as they do only to the inferior creation, are too apt to forget that the struggle for existence belongs to an incomplete stage of the world's existence; and that a sublimer law is in force for man, namely the law of lovingkindness and self-sacrifice. The lower animals who held the planet until man appeared, had at best a mere surface possession. They were ephemeral tenants, who paved the way for the master form yet to come. They did not utilize the energies of matter around them as he does; but rather served to lay up stocks of material for his later purposes. They developed, however, in harmony with the globe development which went on simultaneously, and attained to higher types as their environment permitted it. Charged from the beginning with the sacred burden of a nobler being who should become their lord, they could only deliver themselves of it at the appointed hour.

During all those æons of unconscious ministry they were put upon their mettle by the struggle for existence. Blind force ruled the earth; and though to us that seems a cruel dispensation, it is because we have finer capacities and

greater knowledge than the brutes. To them, who were ignorant of their fate, and filled with savage fury, might could be the only right. For us a gentler and a higher law is justice.

In this preparatory stress and interaction of blind forces, the wondrous frame of man was wrought. Every organ bequeathed to him by the lower animals had been beaten into shape by the shocks of that hard training, and tested for its fitness through countless ages of shifting circumstance. In that tough material body, the heritage of man from all the earlier stages of the world—from the womb of chaos, the infancy of cosmos, the youth of passion and strife,—there was incorporated a sublime spirit, from which a gentler order emanated.

Amid a crowd of warring beasts, tearing each other in selfish hate, and rioting in sensuality, man stood forth like Daniel in the den of lions, quelling the uproar and confusion, and bringing in his hands the arts of peace, and in his heart the glow of friendship.

In man the world at length woke to consciousness and saw both itself and its Creator. Unlike the animals beneath him, mere puppets of a grim decree, he was put upon his good behaviour. The vice-god of the earth, it is for him to do away as far as possible the actual cruelty of nature, and to return good for evil.

To say that life is all for the best, is, on the other hand, to charter sin and sanction vice. If whatever is be right, then there is no such thing as wrong, and the wanton tortures of a dumb animal, the horrors of war, and the agonies of a broken heart are blessings in disguise. Life is neither all for the best nor for the worst; and it lies greatly with ourselves what it may be made. *We are*

manifestly here to make the best of our circumstances by intelligent understanding of nature's laws, and voluntary obedience to them. In doing this we find our truest happiness.

The overthrow of our faith in the original perfection of man is not so severe a blow to the feelings as it might be, did evolution not proffer to us the hope that we are ascending towards perfection. The perfect state, if it is no more behind us, as a regret of the past, yet lies before us as a goal of the future, and our plain duty is to climb towards it.

To aid us on this upward path there has been implanted in us a love of all that is beautiful and good. The charm of goodness is above all others; and character is more esteemed than talent. Beauty without goodness may excite our admiration; but goodness without beauty can win our hearts. If wisdom is far above rubies, virtue is far above graces; indeed the only true nobility in man is virtue. However cultivated a person may be, if he is addicted to vice, he is to that extent ignoble, and the bestial taint defiles him still.

Man is degraded lower than the animals by committing vice, which cannot be said to exist for them; for though the act in both cases may be the same, an animal merely follows its blind instincts, whereas a man knows that he is doing wrong and abusing nature. Laws and ideas are human checks higher than those material ones which control animals. It is useless for certain neo-pagan writers to point to the lower animals in illustration of the error of virtue, and depreciate the idea as mere human invention. As well tell us to imitate the flowers and vegetate, as to live a free animal life. We are not mere animals now

(whatever we may have been once), any more than we are germ-cells, and hence the laws of animal life do not exclusively hold for us. Apes and tigers do not produce bibles and marble Apollos, nor would they be likely to respect these objects if presented to them; yet bibles and Apollos, like the idea of virtue, are, in one sense, human products.

A scientific habit of thought exhibits old evils in a new light. War, for example, presents itself as a monstrous instance of misdirected energies, and wasteful destruction. To use a mechanical analogy, it may be compared to a conflict in a workshop, wherein one half of the machines are arrayed against the other half, and proceed to smash each other. It is far worse than the struggle for existence among the lower animals, for in that the stronger individuals prevail and live, while the weaker perish; but war is indiscriminate slaughter, and the bullet fells alike the noble and the vile. To be sure it has redeeming features, for while it lets loose some of the most brutal qualities of our nature, it calls forth some of the very highest, such as patriotism, valour, fortitude, and self-sacrifice.

Falsehood is clearly seen to be a despicable and futile act when we consider that every physical event occurring is the result of unalterable laws. Since the universe works around us, works like a great machine, it is folly to deny its movements. Truthfulness is perforce our rational adjustment to it, and falsehood or pretence must necessarily be productive of harm.

Error is a dangerous thing, but its existence is only temporary; and as it often employs the best powers of our nature in an honourable, though vain pursuit, it is not an unmitigated evil, since it leads to healthy exertion. Folly is a much more fatal fault, and a blunder is often attended

by a train of consequences as dire as those of sin itself. The cultivation of the understanding and judgment is therefore of the utmost importance. The brain is an exquisite piece of apparatus, whose tiniest action may unlock mighty stores of energy, and direct far flowing issues; hence the urgent need of keeping it in good order, and using it with skill as far as possible. For it is not wholly in our power, it appears, to maintain the mind and body in the best condition. "There is," says Mr. Huxley, "a vast and increasing mass of evidence that birth, death, health, and disease, are as much part of the ordinary streams of events as the rising and setting of the sun, or the change of the moon; and that the living body is a mechanism, the proper working of which we term health; its disturbance, disease; its stoppage, death. The activity of the mechanism is dependent on many and complicated conditions, some of which are hopelessly beyond our control, while others are readily accessible, and are capable of being indefinitely modified by our own actions." It is these modifiable conditions that we must investigate and select to the end that we may improve our own constitutions, and transmit hale ones to posterity.

We should never forget that the consequences of sin not only affect ourselves or our contemporaries, but go down to generations yet unborn. Our body is really a lease from time given into our trust. We inherit it from our ancestors, who helped to make it, each in his turn, and the welfare of our posterity depends upon our treatment of it. Man is not designed to be an isolated creature, living a selfish life, and coming to an end at death. He is a link in the chain of animated being; if he is weak the chain is weak; and a taint of disease, or an evil thought, is a poison infused into the common blood.

If sin, or disobedience to the word of God, is heinous in His sight, surely evil and disease are very hateful to Him, who knows their full significance. Their very fate shows that they exist under the ban of His displeasure. Obedience and disobedience, nature deteriorated or improved, are states as different to Him as heaven from hell. Man is the end of God's creative dream, whom He has formed with infinite care. Whensoever we debase ourselves by sin and folly, we blemish His handiwork; whensoever we mar our souls or mutilate our bodies, we destroy its perfection and beauty. It is our duty, therefore, to attend with care to our health and conduct, not only because it is for the good of self to do so; but for the higher reason, that it is the will and pleasure of God.

CHAPTER IV.

GOD.

Behold! God the Lord passed by! And a mighty wind rent the mountains around, brake in pieces the rocks, brake them before the Lord; but yet the Lord was not in the tempest. Behold, God the Lord passed by; And the sea was upheaved and the earth was shaken; but yet the Lord was not in the earthquake. And after the earthquake there came a fire: but yet the Lord was not in the fire. And after the fire there came a still small voice; and in that still small voice, onward came the Lord.—1 KINGS xix. 11, 12.

O the depth of the riches both of the wisdom and knowledge of God! how unsearchable are his judgments, and his ways past finding out!

For who hath known the mind of the Lord? or who hath been his counsellor?

Or who hath first given to him, and it shall be recompensed unto him again?

For of him, and through him, and to him, are all things: to whom be glory for ever. Amen.—ROMANS xi. 33–36.

THE idea of a living God seems to have been held by the earliest historic, if not prehistoric, tribes of mankind, and at present it is extremely doubtful if there is any variety of men, however savage, who are utterly without some notion of a higher power. "As young birds gape with their mouths for food, so all men crave for the gods," says Homer; and this indwelling thought of Deity in the human race, throughout all ages, is a great spiritual fact, tending to show that He exists. Considering its universality, the belief in a God is evidently no accident, but part of the plan of

the world, like the sense of colour or the feeling of warmth; and we may surely assume that it presupposes the existence of a Deity.

The *form* of the idea has indeed changed very much in course of time, and among different peoples, according to their nature and progress; but the great point is that they have always possessed the notion of a supreme Being. Even in these days of positive science only a few ultra-materialists, bewildered in the dark labyrinth of matter, have lost sight of the Creator in the mazes of His mighty handiwork, and given way to the insane dream that there is no God.

The human soul is chilled at the contemplation of a universe bereft of God; and the mechanical forces of nature inspire a kind of fear. The roaring of the winds, the dashing of storm waves, the awful thunder-peal seem to be cruel remorseless enemies. We go about as one walking among hidden pitfalls; and lose all sympathy with Nature, in the harsh belief that she is bent on killing us if she can. We should even be in danger of sinking into gross superstition and fetishism, did we not also know that we can investigate her powers and conquer them, that mind is greater than matter.

How pleasant, on the other hand, is the faith in an ever-present Ruler. Even if His order be established from all eternity, we are glad to think that He is near and that we are not lonely or abandoned. To rob the world of God is to eclipse its moral sunshine.

The desire to honour God has called forth the highest efforts of the human mind; wealth and fame have been but sorry motives as compared with religion. The flame-shaped obelisks of rosy granite erected to the Egyptian

Sun-God, the cedar-ribbed temple of Solomon, the sculptured Parthenon at Athens, St. Peter's at Rome, Westminster Abbey, the paintings of Michael Angelo, the psalms of David, the poems of Dante and Milton,—these are some of the supreme creations which the world owes to the instinct of divine worship.

According to the old faith, our knowledge of God has been communicated to us by a Divine revelation from without; and there are some who regard it as the internal revelation of spiritual instincts implanted in us. But the evolutionist in religion seeks to explain its origin in a less mysterious way. He requires nothing more than the common sense and feelings of mankind. Faith to him is no exceptional faculty of the soul; it is merely our "ordinary consciousness, so developed and modified as to enable us to take cognizance of religious objects:" * and the first prehistoric impulse to all religion is the perception of the infinite. To create this impulse, all that was necessary were the bodily senses and the reason. Wherever the prehistoric man went he always discovered a *beyond*, and hence, we are told, a perception of something other than the finite, a belief in beings which he could not find, grew up within him.

Perhaps the idea of God did arise in the human heart by this process, or, what is still more likely, perhaps it arose from the natural question which a sane man, face to face with the wonderful world, would ask himself, How did it come there? Who made it? It is, at any rate, something to know that the prehistoric man had his conception of a God, and that even in his fetish worship and idolatry he did not bow down to stocks and stones or graven

* Max Müller, in the *History of Religion*.

images for their own sake, but only because they were to him the symbol of a living Spirit.

The development of religion from its first germ onwards has been to a certain extent different among the Aryan, Semitic, and Turanian races. In all these, however, there have been many changes of creed, and old gods have given place to new ones. Professor Max Müller has made a study of the origin and progress of religion among our ancient Aryan forefathers who settled in India, the Land of the Seven Rivers, we cannot say how many thousand years ago; and he tells us that they sought the God which they imagined, first, perhaps, in tangible things, such as stocks and stones; next, in the semi-tangible things, which cannot be wholly seen or handled, such as mountains, trees, and rivers; then in the intangible things, which are entirely beyond reach, such as the wind and lightning, the moon, the sun, the sky. They called these deities collectively *azuras,* or living things; *devas,* or bright things; *amaryta,* immortals; and singly they named them the Thunderer, Bringer of Light, Giver of Rain, Bestower of Life, and so on. Afterwards they came to speak of God as Maker, Ruler, Preserver, King, Father, Lord of Lords, God of Gods, and Cause of Causes.

From henotheism, or belief in a number of gods of equal dignity, they changed to polytheism, or belief in one Supreme God, presiding over other lesser powers; and then to monotheism, or faith in one sole Divinity. Then came the denial of the devas,* or atheism; and after a transition period of doubt and despair, they abandoned the altars of the old gods and built them new ones to the Unknown, the Unknowable, so that the last hymns of the vedas were

* *i.e.* "bright things;" L. *Deus.*

sung to the glory of the Eternal Self, the One without a Second. "The Self which is free from sin, free from old age, from death and grief, from hunger and thirst, which desires nothing but what it ought to desire, and imagines nothing but what it ought to imagine, that it is which we must search out, that it is which we must try to understand. He who has searched out that Self, and understands it, obtains all worlds and all desires." * Thus runs the creed of the forest sages, those Brahman hermits who spent the last years of their lives in the contemplation of their God.

If we try to put ourselves in the place of these early men we shall see that their crude notions of God were very natural. Let us imagine that we open our eyes on the world, as they did, without knowing of what it was composed, or any of the secrets of growth and physical change which science has revealed to us. In short, let us view the earth with the wondering eyes of a child. At first, everything we look upon will appear miraculous and divine; then, by degrees, as we become familiar with wood, stone, and metal, and use them as tools, they will lose their mystery; but the plants which silently grow upon our sight from day to day, and unfold their blossoms or mature their fruit,—the streams of water which revive every living thing upon their banks, even the mountains from which they seem to be born,—the splendid sky from which refreshing showers descend,—and the radiant sun, bringer of life and light, who rolls his glorious course each day from east to west —all these would still seem to possess an inscrutable inner life and virtue which might be that of the Being which we were seeking. By-and-by, as we learned that trees were

* Max Müller's *The Origin of Religion.*

less mystic things than we ourselves, that mountains were stupendous rocks and did not contain the sources of rivers, that the sky was a congregation of vapours, and the sun a prodigious fire, we would begin to separate the Work from its Maker, and finally might rise to the conception of a heavenly Father.*

It seems to the writer, however, that this explanation of the origin of religion as given by the evolutionist is incomplete, and does not take sufficiently into account the influence of inspired minds on the faiths of men. It banishes that external revelation which is supposed to be breathed into the spirit of man direct from Heaven, much in the same way as a sunbeam strikes upon the world; but it also ignores the internal revelation which wells up in the soul of certain men of a sacred genius, who from time to time make their appearance in the world as if they had been divinely sent. Genius of any kind is little understood, and that which produces holy issues least of all; therefore we cannot tell how its effects are brought about: but we must not overlook the fact that new faiths, like momentous ideas, usually emanate from some great teacher, and become the common property of the world. There is in the development of the human spirit, as in the development of living bodies, a progress by sudden leaps, as well as by slow and steady steps; and but for the occasional advent of extraordinary men, it is well known that the race at large would still be sunk in barbarism. There is a spiritual mystery here, just as there is a physical mystery in the development of life.

Like the ancient Aryans, the other pagan peoples worshipped inanimate and animate objects before they

* Aryan, *Dyaus Pitar*; L. *Jupiter*.

awoke to an abstract conception of God. The Persians adored the winds, fire, the earth, the moon, and the sun. The Keblah Arabs bowed down to the stars, and the mystic stone, a black meteorite kept at the holy city of Mecca. The early Egyptians and Greeks worshipped the elements which were useful to mankind, such as bread (Demeter), wine (Dionysius), and water (Poseidon). The old Goths worshipped the sun and moon; they personified the visible workings of nature, and had their frost giant, Thyrm (Rime), and their Jotün, or demon Flame. Their chief god was Odin, the Thunderer, a deified hero who invented rhymes and poetry; but they had, besides, a rich and beautiful mythology.

All these idols, whether of matter or idea, were, however, mere symbols for an Invisible Power, which they were groping for, and in their helplessness believed that they had found.

It is curious to find withal, that the decay of the deities is predicted both in the Scandinavian Eddas and in the Aryan Vedas. These prophetic misgivings are the doubtful strains in the pagan religions; and they have been amply fulfilled. The ancient Hindoo has come to regard his time-honoured devas, Indra, Agni, and Varina as mere names, and now professes the reformed creed of Buddha; the Arab and the Egyptian prostrates himself before the one God of Mahomet; the marble temples of the Greek have been despoiled of their divine emblems; and the warlike Teuton has forsaken wrathful Odin for the Prince of Peace.

Well may we ask, therefore, if positive science will not in turn sweep away the faith of Buddha, Mahomet, and even of Christ.

The Christian conception of a Triune God is one which

science cannot very well assail, even if it does not offer any supporting evidence. Most men of science agree in thinking that there is one God; but they differ in respect of His attributes. The study of nature points to one original energy and substance as the basis of all phenomena; and to one Creator, or at least to such harmony of action between the different persons of the Godhead, as makes them practically one. Thus far the new truth may be said to endorse the old faith.

Science declares that we cannot know God fully from the physical investigation of His universe; and revelation also tells us that His works do not manifest Him completely. Nor should this surprise us, for no human invention reveals the whole man who made it. Here we can see only in part; matter is His handiwork, and motion His design; but these, or any result of these, are not Him. The human intellect is intended to deal with finite things, and cannot grasp the infinite. The beginning, middle, and end of God are inscrutable to science, which can only name Him the Infinite Cause.

The Scotch Presbyterian definition is perhaps the most perfect statement of the Christian idea of God. It lays down that "God is a Spirit, infinite, eternal, and unchangeable in His wisdom, power, holiness, justice, goodness and truth." Now certain ancient, as well as modern materialists, have not been able to reconcile the facts of the world with infinite power and goodness on the part of its Maker. Lucretius affirmed that we could be sure from the defects in the working of atoms, that these were not made by an Almighty Agent. Hume and J. S. Mill were in favour of a limited conception of the Creator; and argued that if we allowed Him to possess infinite power, we ought to deny

Him infinite goodness, or that if we granted the latter we must withhold the former attribute.

It would certainly seem as if the Divine Architect had aimed at magnitude rather than perfection, and the good of the greatest number rather than the good of all. It would seem that His great problem was the utilization of energy for the support of immense multitudes of successive beings in a state of partial happiness, amid never-ending change; and this He has accomplished by the machinery of evolution and death. Why He has chosen this plan and process is a mystery as yet, perhaps because it was the more engaging to Himself.* In any case the Christian believes it to be the design of infinite wisdom and goodness; and it is not for us, isolated as we are in a remote corner of His creation, and catching but a momentary glimpse of it through the dark glasses of sense, to venture judgment on His character.

The anthropomorphic picture of God which presents Him as a kind of benevolent giant in human form, is put quite out of date by the results of science; and must be relegated to that limbo of childish things in which the sheepskin firmament of the monkish geography has long been treasured. We use the word "treasured," for relics like these are neither to be ridiculed nor destroyed. They are vestiges of the intellectual development of man, and should be far more precious to us than the fossil skeletons of mammoths, or the stone and metal weapons of the prehistoric ages.

The immensity of the universe in space and time, which astronomy and geology have opened our eyes to, have effectually disposed of the man-like personality of the

* See Rev. iv. 11.

Creator. "Religious feeling," says Dr. Tyndall, "is as much a verity as any other part of human consciousness; and against it, on its subjective side, the waves of science beat in vain. It is against the mythologic scenery, if I may use the term, rather than against the life and substance of religion that Science enters her protest. Sooner or later among thinking people that scenery will be taken for what it is worth—as an effort on the part of man to bring the mystery of life and nature within the range of his capacities; as a temporary and essentially fluxional rendering in terms of knowledge of that which transcends all knowledge, and admits only of ideal approach."* Science has indeed struck a fatal blow at pagan nature-worship, and "mythologic scenery" in all its forms; but in proclaiming that nature is a mechanism and personal gods a delusion, does she not rob us, for a while at least, of the old reverence for nature, and the loving sense of Divine care?

Every Christian child is taught that God is everywhere, in every blade of grass, and every twinkling star; and science does not falsify the doctrine. "We are obliged," says Herbert Spencer, "to regard every phenomenon as a manifestation of some Power by which we are acted on; though omnipresence is unthinkable, yet, as experience discloses no bounds to the diffusion of phenomena, we are unable to think of limits to the presence of this Power; while the criticism of science teaches us that this power is Incomprehensible." God is, in all probability, within us and without us, knowing all and seeing all. We see Him not, though He is ever near us on the earth; but we may note the presence of His hand in the ceaseless changes ever

* *Fragments of Science.*

taking place in His work, and the train of vestiges they leave behind them.

The omniscience of God follows from His omnipresence, if we grant to Him an insight into all physical process, as we must perforce do. We do not know by what sense or senses He apprehends matter, but we may suppose that He sees it undisguised, and comprehends it by infinite reason.* Time is probably a figment of man's organization, to give him a notion of the succession of events; and we may imagine that to God the past, present, and (in general) the future, are spread out like a scroll. Even if the past and present were not so openly displayed, since the present is the fruit of the past, and the seed of the future, it might suffice for His infinite reason to know the present in order to infer from it alike the future and the past.

The only knots in this line of argument arise from the admission of free-will. If there be such a thing as free-will, rendering men to a certain extent independent of God's control, and able to act after their own judgment, in spite of Him, we confess we cannot see how the future can be absolutely revealed to God in its uttermost detail. We can understand that He sees all that does take place, and remembers all that has taken place: we can also understand that with a limited free-will on the part of man, God is able to divine the gross results, and as nearly as He wishes, perhaps, to know the entire future in fine; but if free-will be free in fact, as it is in name, we fail to discern how even infinite reason can deduce any other than a general product from the problem of things into which such an indeterminate factor enters.

It might seem at first sight that this limitation of God's

* Newton termed infinite space "the sensorium of the Godhead."

prevision detracted from His glory and power; but on reflection it will be found rather to increase the dignity of man, to whom the Creator has not scrupled to give a noble freedom, in order that he might serve Him, not as a slave, but as a grateful child.

Whether the Divine foreknowledge be infinite or not, and whether the Divine power be infinite likewise, they are to all intents and purposes infinite with respect to us; nor need we have any doubts about the omnipresence of God, and His full acquaintance with the present and the past. Being infinite-eyed, He sees all that is passing; and even if all that has occurred be not permanently inscribed in His essence, it is sufficient that He occupies all space and is all-seeing in order that He may know whatever has transpired.

For let us suppose that the Divine substance is beset with myriad eyes,* through the whole of space, and to fix the ideas consider only two of these, namely one at the earth's surface over London, and the other placed on the remote confines of the sidereal system. Then, at any given moment, owing to the time light takes to travel, the near eye would perceive London only, and all that took place in it at the time being; while the far eye would only see the spot on which the great city stands as it appeared millions of years before when the earth was still a blazing sun. A range of intermediate eyes along the line joining these two extreme ones would thus observe the whole history of that portion of the earth from its red-hot period to the present time; and if, instead of a single line, we imagine an infinite sphere set with eyes along every radius and filling all space, we shall see how it is possible for the supreme Being to

* See R. A. Proctor's *Stars and Earth* for an account of the ingenious device of a collapsing myriad-eyed sphere.

know the past history, not only of the whole surface of the earth, but of all the bodies in the universe.

There are some who with Goethe and Carlyle, regard the universe as a visible fringe of the garment of God, Himself. The more patent conception is, however, to regard it as His workmanship; but we need not therefore banish the Creator from it, as if it were a clock which the maker had finished, sold, and done with. The omnipresence of God is a comforting thought which science is too apt to make us forget—a thought which restores the old reverence to our vision when we look upon the world, for there we see it not as an abandoned mechanism, but a vital frame animated by the living God. It is, besides, an antidote to the callous spirit born of materialism, and the hard ring of the doctrine of survival; in short it is a check on cruelty and evil-doing, and an incitement to help the needy, from man downwards to the worm.

The rigid laws of nature are perhaps His unchangeable mode of working; and if this be so, when a man errs he runs counter, not to a dead machine, but to a silent instructor. Shame, failure, and pain teach him pitilessly that he is wrong; but the compassionate spirit of the Father may be behind it all. God is the teacher, though He is invisible, and His lesson is invariable, for only then could it become true experience and of use to men.

It was a favourite idea of Charles Kingsley that the Creator takes pleasure in His works; and we may even go so far as to surmise that in granting a measure of free-will to men (if He really has done so) He may have intended a greater variety of interesting and pleasing results from it. For without free-will, evolution, however varied and long continued, can only produce that which God had strictly

ordered beforehand, and ordained to come to pass. In man, however, He may have created a being ("a little lower than the angels") who, by virtue of his understanding, invention, and volition, could, as it were, create new forms, which did not even strictly enter into the original design of the supreme Author. And inasmuch as these works are in conformity to the Divine principles of beauty, truth, and virtue, we believe they will find favour in His sight.

Science tells us that the universe is a great cloud floating in the void, a ceaseless commotion of matter in all stages of aggregation, a tremendous maze of vibrating particles, careering masses, and whirling atom-streams, utterly dark, eternally silent. The eye translates this lightless, soundless mechanism of jarring molecules into a scene of beauty. But there is a harmony of motion as well as colour, nay, the only true harmony is that of motion. To the uninitiated the stars are a labyrinth, and the movements of matter, could they be seen by us, would appear as an awful chaos. But to the intelligence of a Uriel, the planets are balanced in their paths, and move harmoniously, while the atoms dance in time. He who made the eye can doubtless see as the eye sees,* and may take delight in an outer view of His creatures; but in His sight is also visioned that inner music of the unseen universe which is hidden now from us, but yet may be revealed.

> "Look how the floor of heaven
> Is thick inlaid with patines of bright gold.
> There's not the smallest orb that thou behold'st—
> But in his motion like an angel sings,
> Still quiring to the young-eyed cherubins;
> But whilst this muddy vesture of decay
> Doth grossly close it in, we cannot hear it."

* "He that planted the ear, shall he not hear; he that formed the eye, shall he not see."—PSALMS xciv. 9, 10.

Once upon a time the priest anathematized the philosopher and insisted that revelation should bar all progress in physical science; but the tables have since been turned, and it is now the privilege of the philosopher to repudiate all efforts in theology. Science tolerates all religions with the same pitying equanimity, for it regards them as all equally vain. A dogmatic attitude is, however, as bad on the part of the philosopher as it is on the part of the priest; and it is idle to tell us that we ought to give up the search for God. What though there have been and are a thousand different *forms* of religion, and may be a thousand more; what though we cannot comprehend the Infinite (as who can), the heart of man feels the need of worshipping, and worshipping the Highest and Best it can conceive.

The idea of progress has long been accepted by divines in the affairs of the world; yet they have jealously clung to what they believed to be divinely inspired truths, and passionately rejected discoveries which seemed to conflict with revelation. But modern research has come to distinguish an "evolution," which is the process resulting in progress, not only in all nature but even in religion; and the more advanced theologians have become converts to this novel view. If it be so, theology and science ought to go hand in hand, each correcting and aiding the other; the comparative method of study will be applied to religion, and all kinds of creed will take their places together as so many parts of the whole spiritual truth to which mankind have attained. Not one of these will be too mean for our respect; and the best will be that which contains the greatest share of truth.

All nations have had their prophets and sacred books, revealing portions of spiritual truth suited to their con-

ditions. The God of the Jew is a jealous God, named "I am," who loveth righteousness, and visiteth the iniquities of the father upon the children, unto the third and fourth generation. He is, therefore, the Divinity which a pious naturalist would imagine, from the study of external nature, and the struggle for existence. The God of the Christian, on the other hand, is a loving Father, such a God as our inner nature craves. The Hebrew conception is true to a certain point; but the Christian idea is the higher and more human revelation. Taken together, they exhibit two aspects of the Divinity more patently than each does alone. The life and teaching of Christ and all Christlike men and women shows Him to be a merciful Father; while the inexorable decrees of nature declare Him to be a stern and just God.

Other religions particularly express certain allied ideas. For example, Hindooism inculcates a profound disbelief in this life, and an unhesitating faith in another; Buddhism recognizes the reign of eternal law, and Mohammedanism enjoins the strictest sobriety of conduct. Thus all religions have their good points, and may be said to supplement each other.

Why, then, should we lose faith in religion because it is found to grow, and assume different shapes: since the root of each is some conception of God, however poor, which is good for man to possess? It matters not where we seek Him—in tree, river, mount, air, sky, or beyond material things,—He is everywhere. It matters not by what name we call to Him—Jehovah, Father, Allah, Brahma, Indra or Varuna,—the Creator exists for us in feeling; and in the emotions of the savage, kneeling to his fetish, the Greek offering wine to his marble Jupiter, the Goth sacrificing

his garlanded bull to Odin, or the Christian bowing at the name of Jesus, there is the same core of humble fear and sacred aspiration. Can we doubt that all these endeavours after God are in some degree pleasing to Him, or that what is highest, dearest, and best to us, is likewise best in His esteem ?*

Professor Max Müller has pointed a lesson in toleration from the fact that in India the whole of the Aryan religion, from its first beginnings in the ancient vedic hymns, its middle phase in the Brahmana laws, and its latter end in the Upanishad hymns, even now survive together, and form part of the religious services of the Buddhists. Though they conflict at places, these three well-marked religions amicably exist together, the earliest vedic hymns serving for childhood, the Brahmanas for maturity, and the Upanishads for old age. But, indeed, we need not go so far away for an example of the same state of things, for in our own churches do we not read from the Old Testament as well as the New, and blend the Jehovah of the Hebrew with the Heavenly Father of the Christian.

There can be no doubt that science, by extending our observation of nature, has enlarged our ideas of the power of God, and increased our wonder at the immensity of His works. It has given to our imagination a mightier artist, a clearer knowledge of His art, and a safer, because a better understood, tenure of life. Like purblind children in dread of ghosts, men were groping about in the material world,

* "Not every one that saith unto me, Lord, Lord, shall enter into the kingdom of heaven; but he that doeth the will of my Father which is in heaven."—Matt. vii. 21.

"Then Peter opened his mouth, and said, Of a truth I perceive that God is no respecter of persons: But in every nation he that feareth him, and worketh righteousness, is accepted with him."—Acts x. 34, 35.

misled by superstition, till science came and purged their eye-sight.

But although the study of matter can inform us on the power, and perhaps also the wisdom, of the Creator, it can tell us little about His goodness. The utterly incomprehensible God of science is almost as bad as no God at all. It is a fetish of the intellect, and as poor a substitute for a loving Father as the Jumby of a savage. It is not in nature, regarded objectively, that the dearer part of God is to be sought; but in the human soul, where He is felt to have established an agency. Neither scale nor crucible will find out Him, who dwells for us in the human heart, and the teaching of His apostles. We look out from our earthly home upon the shining stars, and see them wheel their bright eternal courses, and it is natural that we should consider the celestial sphere as the abode of God and all his hosts; yet if we roamed to every star in turn we should fail in meeting Him, who is to be recognized, not by the bodily, but by the spiritual sense.

Men of science, overwhelmed by His inscrutable power, are, indeed, apt to lose their hold upon the Deity, and to despair of His existence. He eludes the grasp of their intellect; but as heart and intellect unite to form man, so should they unite to make the likeness of the living God. If science can give us nothing better than a blank canvas, it is for faith to limn upon it the form and feature of the Divinity.

Any one who has stood before an image of the virgin in a Catholic cathedral, or even a Greek statue of Minerva, must have felt the hold that such a fixed emblem takes on the imagination. It seems to focus the religious feeling till we almost fancy that the Deity is present, that the

image bows its head and will speak to us. To some people, especially the unenlightened and imaginative, this concrete embodiment must be far more impressive than an abstract idea, a vague, inconceivable essence. The evil of image worship consists, however, in the tendency to mistake the symbol for what it represents; or, at least, to contract our conceptions of the latter; and science will certainly countervail the spirit of idolatry.

The God of science is a Being whom it is sacrilege to imitate by any toy or material effigy of man. And the pure idea of Him may exalt our worship, and solemnize our song of praise, if we reflect upon the awful and mysterious attributes of His power. In indulging this abstraction, however, we had need be careful not to let it carry us too far, and lose us in the infinite mazes of the universe. Let us keep ourselves to home, where God surely is, and not forget the fuller and more potent concept of our souls.

The angels, like the devil, have suffered from the hostility of certain scientific writers; but although positive Science can find no trace of their existence among molecules, and has learned to replace them by physical law, she cannot absolutely deny that they, or their equivalent, *may* dwell in other spheres. At least they are symbols for a spirit which does exist in man, and doubtless also in God. Pure types of holiness, and ineffably precious creations of the spiritual imagination, the world is so much the richer for the idea of them, and would be so much the poorer for the lack of it. They come as tender friends, even as Jesus came, between us and the awful majesty of the Inscrutable. Science could never have given them to us, at the utmost she can only construct a mechanic "sorting demon" to pick the fast atoms from the slow; and it is

to be hoped that Science will never wholly take them from us.

Science brands the Christian's conception of God as being too anthropomorphic or manlike. But if God is infinite in His attributes, doth not the greater include the less? and if an anthropomorphic notion of God be only a partial one, it need not therefore be false. It is beyond us to fully comprehend the mysterious Power who framed the universe; but we may learn to know the face which He presents to us. We are surely right to choose as our living God the highest and best ideal of the Divine nature we can attain to; and what is this but our infinitized and perfect human spirit? Man, we believe, is in some sort an epitome of his Maker: he is the most godlike thing we know; and the Creator, consciously or unconsciously, assumes his form in our imagination.

Our plea, then, is for the personal God of the old faith, because it is good that we should have some definite and heartfelt conception of Him. Nor need this dear idea of Him as He shows Himself to men be incompatible with His infinite and inscrutable attributes as the Creator of the whole universe. We may know that His essence is past finding out, that His ways are not as our ways, and yet we may believe He is our loving Father. But our worship of Him should not therefore sink into a narrow anthropomorphic ceremony; and while we come before Him as His children, the consciousness of His unthinkable existence should purify and elevate our praise.

CHAPTER V.

PRAYER.

After this manner therefore pray ye:

Our Father which art in heaven, Hallowed be thy name. Thy kingdom come. Thy will be done in earth, as it is in heaven. Give us this day our daily bread. And forgive us our debts, as we forgive our debtors. And lead us not into temptation, but deliver us from evil: For thine is the kingdom, and the power, and the glory, for ever. Amen.—*The Lord's Prayer*, MATT. vi. 9-13.

THERE has been a great deal of controversy lately between writers on science and theologians respecting the efficacy of prayer. Taking their stand on the positive doctrine that all nature is governed by general laws which are never interfered with by the Deity, the apostles of the new truth have not hesitated to proclaim the utter futility of prayer; while, with a few exceptions, the clergy have warmly defended the immemorial practice. The feelings of the public have been rudely shocked, and much dogmatic spleen has been freely vented on both sides, but the question seems to remain very much where it was. Prayers for spiritual and material good, for fair weather and peace of mind, are still offered up in church and pious homes, despite all the trenchant logic of materialists, who are fain to solace themselves with a pitying smile for the harmless folly of a world which is yet so darkly benighted.

The old gospel has taught us to live in the happy assurance that every living thing is in the hands of God whether alive or dead, that every hair of our heads is numbered, and that not even a sparrow falls to the ground unmarked of Him. It has instructed us to draw near to God as our loving Father, to pour out all our joys and sorrows before Him, to ask His forgiveness for our sin, and to beseech His help in our distress. But the prophet of science ruthlessly destroys our fool's paradise, and urges a harsher faith upon us. He tells us that the great Juggernaut of nature rolls on heedless of whom it crushes, and eternally deaf to our most agonized entreaty; that our grief is absolutely hopeless, our trouble persecution, our struggles selfish, and our death violence.

To brood too much in solitude over the reign of law and its possible mishaps, the exclusion of all aid from special providence, and all chance of any response to prayer, is apt to breed a kind of fatalism which deadens the energies and overshadows the spirits of a man. His life in a manner becomes sunless and sad. Knowing that he is surrounded by a subtle mechanism, ready to kill him if he takes a single false step, and which sooner or later will kill him in spite of all his care, the world loses its poetry, and beauty, and gladness for him. On the other hand, he beholds the happiness of the unthinking crowd, the brightness, health, and goodness of those who do not fret themselves with such perplexing thoughts, but yield them up to the blissful dreams inspired by faith and the inward joy of their religious sense. How can he escape from his baleful mood, and recover the animating zeal of spirit which is so necessary for strenuous and cheerful endeavour in his work and life? "By a deep-founded trust in Providence," answers

the divine, a belief in the efficacy of prayer, and simple faith in a future state, of which this is only the threshold." Let us see what science has to say to it.

The strongest argument against the efficacy of prayer consists in the doctrine that, to the best of our knowledge, the material universe is governed by general laws, established in the Beginning, and depending upon the original constitution of nature. No trace of any hitch or mysterious freak in their operation, which could only be referred to supernatural agency, has ever been detected by the most delicate experiments. Indeed, miraculous interference with their working would only introduce a capricious element which would render exact science impossible and all experience untrustworthy. In other words, were the continuity of phenomena broken, the human intellect would be confounded.

This sweeping assertion would seem to exclude all hope of a special providence; though, of course, it still leaves room for a general providence acting since the creation of the universe. The belief in a special providence, which has been so prevalent among men, is easily accounted for. The astonishing variety of things and events in the world has masked the action of general laws, and the limited experience of men until the present century, combined with their egoistic feelings, has led them to deem themselves the special care of a presiding Guardian. But in these days of newspapers and mechanical appliances, of rapid travel and change, the mind is better prepared for the reception of a doctrine which strikes at the root of the efficacy of prayer. Boiler explosions, shipwrecks, railway collisions, and imprisoned miners, come to shock our serenity every other day, and read us the stern lesson that no amount

of praying will prop up rotten structures or set carelessness to rights.

In old times when a high wind overturned a house, or a lightning stroke felled a man to death, it was considered a special judgment of God which could not have been avoided. But very few educated persons think so now-a-days. The judgment, if judgment there be, can only be regarded as a warning to build stouter dwellings, and to beware of exposure to the electric discharge. Bengal floods, and Madras famines, earthquakes, and destructive tornadoes, by which millions of human beings miserably perish, are traced to great cosmical causes which render them inevitable and quite "past praying for."

Significant incidents are easily cited. Three years ago an excursion train, returning from a Moody and Sankey's prayer meeting in America, broke through a trestle bridge, and many lives were lost.

The fall of the Tay Bridge, while a train was passing on a Sunday evening last December, is still fresh in the memory, and Scottish ministers, with a strange lack of the national shrewdness and unmindful of the utterances of Christ anent the Tower of Siloam,* are even now preaching that the calamity was a judgment of the Lord on Sabbath travelling. Evangelists, on the contrary, can see in the event a mercy. The truth is that it was neither a mercy nor a judgment in the way these pious people mean. The downfall of the Tay Bridge was a purely physical phenomenon, a question of material stress and strain. The force of the gale was too strong for the bridge to bear, and had the Pope of Rome, or any other holy personage been on the train, we must consider that the structure would have

* Luke xiii. 4.

broken all the same. The victims met a cruel fate because they happened to be in the train, and not because they had deserved it. The judgment was a judgment on bad building, and the mercy was a mercy that no more bridges of the kind have been put up.

During the late Russo-Turkish war the victorious "Christian" armies of the Czar, marching on their career of slaughter, drove thousands of poor Turkish refugees, mostly women and children, destitute and naked before them; and mothers dropped their babes in the snow from sheer exhaustion, or cast them away that they might not die at their breasts. They took shelter in the Mosques of Constantinople, and daily exercises of prayer and praise were carried on in the midst of a crowd of the most helpless and wretched of God's creatures. Whether He interposed to aid them or not we cannot tell; but doubtless they felt a sublime emotional solace in the thought that Allah saw and pitied them.

When one reads of incidents like these, he cannot but feel that appearances are very much against the efficacy of prayer. Before the reign of law had been fully demonstrated it was always open to the clergy to account for occurrences of this kind by supposing that God knew best, and for some wise purpose had seen fit to let such things be. The seeming inefficacy of prayer, in short, was disguised under a trusting optimism. Now, however, the view is somewhat changed, and we are led to regard all physical catastrophies as the inexorable result of laws which are never changed at human entreaty.

Special providence has always resided in the mysterious; but the light of science is ever rolling further back the dark verge of the unknown, and things which a hundred years ago were believed to reveal the finger of God, are now seen

to be part of the ordinary course of nature. In our ignorance we referred whatever we could not explain to supernatural agency; but one mystery after another has disappeared before the scrutiny of research, and the tendency of modern thought is to bring all that happens under the domain of law.

In the affairs of common life we have never asked for a miracle to be done; but have naturally depended upon our own efforts. If a man breaks the leg of a chair, or sprains his wrist, he does not think of praying that the limb in either case should be made whole; but goes and gets the chair mended by a joiner, and the wrist bandaged by a doctor. Now, the aim of science is to render more and more things familiar to us, and as science progresses the occasion for prayer will consequently become more and more rare. The theologian would, perhaps, say that this circumstance does not deny the efficacy of prayer, but only proves that *need* for it will grow less the better we learn to act for ourselves; but the materialist would draw from it the conclusion that there is no use in praying at all.

From the operation of a general providence by means of general laws, instead of a special providence, acting directly it is often deduced that God does not care for the individual, but only for the race. Judging, however, by the thousands of races which have perished during the whole life of the planet, we may well ask if this be a just inference? Races, as well as individuals, have perished from the world, and we cannot therefore argue that God cares for the one and not for the other. Indeed, it seems to us that if He cares for one of these He must of necessity care for both; for a race is made up of individuals, and by the very process of development the good of the race depends upon the welfare

of the individual. A single creature may be less important than the whole family to which it belongs: but as a member of that family it influences the body corporate; and its strength or weakness is part of the total strength or weakness.

But the death of individuals and the wholesale destruction of races which have taken place in the past, and are even now going on, force upon us the serious question whether any care or pity is manifested in the course of things. Nature apparently acts with an inscrutable disregard to consequences; the thunderbolt will smite whatever lies in its track, be it church steeple, ship at sea, or little child gathering berries on the heath; nay, rather is it the presence of the steeple, ship, or child that determines the discharge and draws it down. A priest may be at prayer within the church, a sailor at work on the mast of the ship, the child may be lisping a hymn, but the pitiless fluid swerves not from its fatal path.

If the action of physical laws are inevitable, we may, however, find evidences of the Divine care and compassion in the framing of these laws, and in our own capacity to understand them and to take advantage of them. The laws of nature are inexorable, but God has not left us in ignorance of them; our life, indeed, is a long course of training in the knowledge of them. It was a bitter remark of John Stuart Mill, that Pope's pertinent query, "Shall gravitation cease when you go by?" might be a just rebuke to any one who should be so silly as to expect common human morality from nature, when, in sober truth, nearly all the things which men are hanged or imprisoned for doing to one another are Nature's every-day performances. But Mill overlooked the fact that Nature, generally at least, gives

fair warning of her penalties; she does not pounce upon a man unawares like a criminal: we are taught to know her invariable laws, they are freely open to our inspection, like the laws of our country, and if we suffer by transgressing them, it is absurd to throw the blame upon the laws. If a proprietor hangs out his sign-board to warn wayfarers off his land, he has a perfect right to punish those who trespass in spite of the notice he has given. Every man knows that if he should stumble over the edge of a precipice he will fall to the bottom, and in that case his mishap could not justly be laid on gravity. By gravity we are kept upon the earth; and were it to cease, as Pope supposes, we could not go past at all. It is serving us constantly; and all that is required of us is to avoid making a bad use of it.

The relentless apathy of nature has, perhaps, been too rashly transferred to its Creator, who—

> "Sees with equal eye, as God of all,
> A hero perish or a sparrow fall,
> Atom or system into ruin hurled,
> And now a bubble burst and now a world." *

It may be going too far to say that the Deity beholds these things with "equal" eye, although the material mask which hides His face is evenly callous. The scripture saith, "Are not five sparrows sold for two farthings, and not one of them is forgotten before God? But even the very hairs of your head are all numbered. Fear not, therefore, ye are of more value than many sparrows." Now, if we believe in the omnipresence of God,† we cannot doubt the first lesson of this text; it is the second which is open to dispute, for if we are to judge by the evidence of the senses, a hero is not of higher value than a sparrow in the Creator's sight.

* Pope's *Essay on Man.* † See last chapter.

But here again the outer experience may have to be supplemented by the inner.

Judging by the course of external nature, there is nothing that God has made of greater worth in His eyes than any other thing; but our human instincts tell us that the higher the creature, the higher the Creator must value it. A work of art rises in value according to the time, pains, and genius which the author has spent upon its development. A statue or a cathedral is more costly than a block of marble or a stone quarry. And, though the notion may seem too anthropomorphic for the taste of a materialist, we are fain to believe, that in the sight of God, a human being, with his living soul, is of more value than a living plant or a piece of dead matter.

But if we are to find any proofs of this special love on the part of the Creator, we may err in looking for it in material nature, which is the common ground on which all His creatures meet under the self-same laws. We ought, rather, to seek for it in the special privilege of communion with Himself which He has granted to us, and in those inspired teachers whom He has sent from time to time into the world.

One duty forced upon us by the sovereignty of law is the pursuit of science. If the laws of nature are the Creator's unchangeable decrees, His standing orders, as it were, it behoves us to seek them out and inscribe them on our memories, in order that we may be able to obey them. In this regard the modern man of science, like the ancient seer, is a lawgiver, interpreting to men the words which God has written upon matter. Gifted as we are with free-will, it is our noble prerogative to find out God's will, and help to further it by the direction of our own. And one of

the most important results of science has been the discovery that much of our bodily and moral sickness is due to the neglect of physical laws.

The necessity of self-help is another lesson, brought home to us by the assurance that physical laws are never interfered with by a special providence. It is clear that if we cannot depend upon God to alter the course of material nature in our behalf, we must rely entirely on ourselves to guard against the misfortunes arising from it. Practically, this is what has been done by men in all ages, especially by the great workers amongst them; but there has also been a disposition to trust something to Providence, or to luck. Hence the very last precautions have not been taken in myriads of cases; and crazy vessels have dared the sea, or foolhardy individuals have risked their lives, under the mistaken faith that prayer would ward off danger. They are wise proverbs which tell us to "Trust in God, but *keep our powder dry*," and that "God helps those who help themselves." In all the mechanical arts there must be no leaning upon Providence as an excuse for oversight and bad workmanship. All bridges, locomotives, ships, and other engines fraught with fate, must be made safe and sound, in strict conformity with natural principles, and nothing should be left to chance. The new commandment is "Thou shalt not blunder;" and if we are deprived of the hope that God will specially protect us from injury by suspending his physical laws, we are granted in exchange the firm assurance that if these be properly obeyed we shall be safe from harm.

It is not, however, a narrow selfishness which is incumbent upon us, but a genial and mutual helpfulness. If we can expect no help from the angels in heaven, we must

become as angels on earth to one another. In this way will the human race fulfil its brotherhood, and the world increase in happiness. Nor is it merely for our own profit that we should love and assist one another with all our might; but also because it is right to do so. By helping ourselves and each other we are also helping God. Careful conduct, both physically and morally, is not only a matter of good policy, but of duty. Our life is not to be the life of a material mechanism without any light from above; the whole soul revolts from such a view of existence. No! it is to be glorified by the thought that its guidance is in accordance with the Divine will, and pleasing to the Most High.

Another consequence of the recognition of general laws in nature is our emancipation from many degrading superstitions of the dark and middle ages. It is the triumph of our time that man sees himself to be left alone to walk in freedom and inherit the earth. The shade of ignorance no longer frightens him, as a child is frightened in the night. His spirit is now unshackled from paralysing humours of the blood, and fears of supernatural visitation. Misfortune is no longer a divinity, to be propitiated by further suffering and sacrifice, but the result of some material law which has been broken.

Positive science is demonstrating every day that prayer can produce no direct physical effect; that it cannot moisten the monsoon, for example, or draw rain from the thundercloud like a cannon shot fired into it; but notwithstanding this fact, our clergy continue to obey their natural impulse. Days of public prayer for fine weather are appointed by the Church of England; and the synod of the Scotch Kirk discerns a judgment for national sin in a bad harvest, which

the physicist attributes to a scarcity of spots on the sun's disk. A divine goes for his health to the South of France, we will suppose, and there encounters the "mistral," a cold dry wind, which blows down with great violence sometimes, from the snows of the Pyrenees or Alps. The consequence is, that he suffers from a severe attack of rheumatism, which he says, with pardonable doubt, he cannot see the benefit of, but believes to have been sent for his good. Now, to one who believes in the teachings of science, and knows the "mistral" to have been determined by purely cosmical causes, by the balance of the atmosphere over all the earth, by the mountains which were elevated on its surface thousands of centuries ago; by the snows which were condensed upon their summits by cold, referable to the position of the planet in relation to the solar luminary—to such a man, the only apparent good of these severe pains in the reverend sufferer's limbs, besides the discipline of suffering, is to read him the harsh, but wholesome lesson, not to go in the way of the mistral in future.

It is a common mistake of well-meaning believers in the physical efficacy of prayer, to give only a local or personal significance to operations of nature which are really of cosmical importance, and the resultant of forces operating since the creation of the universe. The storm which plunges us in hopeless gloom, and drives us to despair and prayer, is to Uriel but the passage of a cloud, his eye has followed from its source, across the world. Science endows us with something of this larger vision; and a skilful physicist would make an experiment imitating our terrible storm, in a glass bottle.

Another thing often overlooked by believers in direct physical response to prayer is the hopeless confusion which

would ensue if such prayers were answered. Take the case of two neighbouring farmers, one who prays for rain for a particular crop which he has planted, and a second who at the same time solicits fair weather. To grant the request of one party would be to refuse that of the other. From this point of view there is seen to be an element of selfishness in prayer which almost justifies the startling paradox of Emerson, "Prayer, as a means to effect a private end, is theft and meanness."

Of course it may be said the Deity would not answer the prayer of one person at the expense of another: but what is this but a confession that, after all, special interference with the physical order of nature is unnecessary, since a general dispensation of Divine bounty is required, and this can be effected well enough by general laws established in the beginning.

In spite of the physical futility of prayer, however, we may yet ask if there be no spiritual efficacy. Is the natural impulse of the human heart to pray a false and useless one, to be utterly suppressed in the future? Verily, if men are only automata we do not see any use for the practice. The lower animals, being automata, do not pray, and why should man, if he too is a mere puppet of law?

The brutes depend entirely on their own exertions in trouble, and do not know the name of God. Man, like them, is in contact with nature: but he also knows God; so, while he struggles with all his might and depends upon himself, he cannot help referring himself to God. He looks beyond the machine to its Creator; he is raised above nature by the idea of God; while he lives, and is sustained by nature, he is intermediate between it and its Author.

An articulate being inspired with the knowledge of God, he can, not only exert his own powers like the animals to their utmost, but also beseech the help of the Almighty One whom he believes to be regarding him.

The materialist is in the habit of looking upon the universe as a self-existent mechanism, capable of manufacturing certain automatic creatures, like marionettes, one of which is man. But why has man, unlike the rest of these, been fitted with an alarm, for calling on the Driver or Constructor, if there be no Driver on whom to call, or if the Constructor never interferes with the machine which he has once set going? An automaton has surely no need of such a futile organ, unless indeed it be to furnish sport for the gods.

On the other hand, if man has liberty of will, as we are still left free by science to believe, we can see at once how, if not a physical, at least a spiritual efficacy of prayer is reasonable. If man is to a certain extent independent of God, we can see how it may be necessary to deal directly with him, in order to correct distresses perpetrated by the agency of his spirit; if his soul can rise into voluntary communion with God, we can understand that God may exercise some kind of responsive influence over it.

Such a spiritual influence would be sufficient to effect not only the cure of man's soul, but also an indirect physical result. For it is by his soul and will that man changes nature. His soul gears in with matter through the medium of his body, and his will is a hair-trigger which launches powerful energies. The safety of his body might sometimes be effected by the disposition of his mind.

We cannot yet definitely say whether this spiritual response to prayer does take place. Many devout people, however, are ready to assert that they have had profound experience of its reality. On the other hand, there are many men of science who hold that the mind, too, is governed by absolute laws, which we are ignorant of, and that apparent spiritual response is a delusion, or at best a sort of moral reaction. Perhaps the question will never be decided, except by faith, for the mind is a stronghold of mystery which is like to baffle all the assaults of science. The secret of the soul appears to be beyond mere logic and dissection, and while it is a secret, while free-will is a point of faith with us, we are at liberty to believe the spiritual efficacy of prayer, for a miraculous influence on the will would not in that case lead to the intellectual confusion which would attend such interference with the working of the physical world. There is nothing in the model prayer of Christ to encourage any faith in material efficacy; and while it asks for the chief necessaries of life, it makes no special request for private ends whatever.

Though this spiritual efficacy existed, it would nevertheless follow that many prayers would be unanswered, many events past praying for, and beyond the reach of the means in question. It is a pathetic thought, that prayers are rising from the whole earth every day, which are doomed to go unanswered; but it is a great deal to be left with some hope that they *may* be answered.

To him who has no faith in the efficacy of prayer either physical or spiritual, for whom prayer, as an appeal to the Almighty, is simply a human error to which our eyes have been opened at last, there still remains a Divine service consisting of a reverent thanksgiving, acceptable to the

Lord, for benefits received, resignation to whatever destiny may have in store, and the inward contemplation of the Divine nature. He can put his soul, as it were, into silent communion with God—a practice which of itself induces a serenity and hopefulness of spirit.

In his ordinary life, if he have no longer any trust in a special providence preserving him from harm, and knows too well that calamity may overtake him at any moment as it has done thousands before, he at least learns the virtue of extreme care and caution, and to prevent the knowledge of his jeopardy weighing like a millstone on his heart and stifling all genial vivacity, he may indulge in the hope that his succeeding fortunes will be favourable.

It is doubtless natural that a man should feel and hope that his earnest prayers would be answered by a Being, not only all powerful, but all good. If, however, he should come to believe that God has established the order of the universe in the beginning, and does not interfere with it now, that therefore he must conform to the plan of things rather than expect God to conform that to him, he will thereby have gained a deeper insight into truth, and the intentions of his Maker with regard to him on earth. In the hour of his trial he will strive his utmost in self-defence, and when he can do no more he will resign himself to fate. Indeed, it is not difficult to decide as to which is the nobler figure, he who merely supplicates in his distress for the Divine assistance, or he who bears with uncomplaining fortitude the peril meted out to him by laws which have a higher purpose than his individual good. In the supreme moment perchance the former will not be without the lofty consciousness that the Creator sees his doom, and that he falls a sacrifice to the method of creation.

But the true Christian experiences a resignation equally sublime and much more tender, when, after doing all he can himself, he leaves the rest to God the Father, and ends his prayer for succour with the words of Jesus, "Nevertheless, not my will, but Thine be done."

BOOK III.

WHITHER?

Thine are these orbs of light and shade;
Thou madest Life in man and brute;
Thou madest Death; and lo, thy foot
Is on the skull which thou hast made.

Thou wilt not leave us in the dust:
Thou madest man, he knows not why,
He thinks he was not made to die;
And thou hast made him: thou art just.

Thou seemest human and divine,
The highest, holiest manhood, thou:
Our wills are ours, we know not how;
Our wills are ours, to make them thine.

Our little systems have their day;
They have their day and cease to be:
They are but broken lights of thee,
And thou, O Lord, art more than they.

We have but faith: we cannot know;
For knowledge is of things we see;
And yet we trust it comes from thee,
A beam in darkness: let it grow.

Let knowledge grow from more to more,
But more of reverence in us dwell;
That mind and soul, according well,
May make one music as before,
But vaster.

TENNYSON, *In Memoriam.*

CHAPTER I.

IMMORTALITY.

Thou, even as thou art, sunk in the sleep of death, shalt continue so to be in all time to come, freed from all distressing pains; but we, with a sorrow that would not be sated, wept for thee, when closely thou didst turn to an ashen hue on thy appalling funeral pile, and no length of days shall pluck from our hearts our ever-enduring grief. This question, therefore, should be asked of this speaker, what there is in it so passing bitter, if it come in the end to sleep and rest, that any one should pine in never-enduring sorrow.—MUNRO'S translation of *Lucretius*.

Eternity!—thou pleasing, dreadful thought!
Through what variety of untried being,
Through what new scenes and changes must we pass!
The wide, the unbounded prospect, lies before me;
But shadows, clouds, and darkness rest upon it.
* * * * *
The soul, secured in her existence, smiles
At the drawn dagger, and defies its point.—
The stars shall fade away, the sun himself
Grow dim with age, and nature sink in years;
But thou shalt flourish in immortal youth,
Unhurt, amid the war of elements,
The wreck of matter, and the crush of worlds.

ADDISON'S *Cato*.

THE haunting doubt as to the immortality of the soul which troubled the ancient thinkers, has taken a bolder and more alarming hold on the minds of our living men of science. Modern research has demonstrated the workings of the mind to be so intimately associated with the state of

the health and the structure of the brain, that there are many who think it impossible for the soul to exist apart from the material body. To these the ruin of the brain is not merely the wreck of a tenement in which the soul erewhile was lodged, but the final extinction of intelligence. Loss of life is no mere flight of the spirit from one phase of existence on this earth to another phase in some unknown sphere, like the passage of a caterpillar through a chrysalis into an aerial butterfly; but absolute annihilation for ever. Others, who believe in the doctrine of evolution, cannot conceal from themselves the serious question to which it gives rise: If man is but the last born of the lower animals, and his soul but a development of theirs, how is it that he claims an exclusive heaven solely for his species? or, if he denies the title of the "beasts that perish" to any future state, by what natural right does he alone expect to inherit eternal life?

Positive science might rob us of many fond illusions, painful to lose at first, perhaps, but soon forgotten. It is difficult, however, to see what would compensate us for the lack of faith in immortality. We may ask ourselves with the Roman poet, why death should be grievous if it bring us in the end to sleep and rest; but the inquiry is a vain one. Death, as a bitter parting from our loved ones, is only palliated by the hope of meeting them again. Did we believe it to be final, no assurance of their lasting rest would ever assuage our keener sorrow. Consciously or unconsciously we live in the expectation of rejoining our lost friends: and if we realized that they were gone for ever out of our existence, what a strange forlorn mockery our life would seem. The longing for immortality is apparently an instinct implanted in the human breast, and, with the

dubious exception of the early Jews and one or two savage tribes, all the races of mankind have believed in a Hereafter. To tell us, then, that there is no future state is to do a violence to our best feelings. Science busies herself with discovering the harmonies of nature: but she will reveal a terrible discord if she should prove that our hopes of eternity are false. There would be ample grounds in that case for the complaint of the materialist, that human consciousness is a mournful mistake.

Can it indeed be true, that after its short tale of years is told, the spirit of each of us will be totally extinguished, and we shall be no more? It seems impossible for the soul to conceive of its own death: but does the reason, nevertheless, force us to acknowledge the fact? The hope of eternity has exerted an immense influence in strengthening morality. Has the race, after all, been elevated by a holy illusion, a pious dream? and can a sham produce a higher species of man? Parting from familiar pets which have learned to love us, the dog or bird we have fed and fostered, is always cruel to us. Would God annihilate a creature who has known of Him?

These are the great riddles which are perplexing the age. Let us see if science can give us any solution of them yet.

At least we may safely say that immortality is not to be expected in the present world, and even in the present universe. For this is a universe of change, and, as we have seen before, death is part of the machinery of evolution. It is plainly a corrective device in the original design of nature, whereby living beings are kept in adjustment to their transitory environment. The body is made of perishable stuff; it is not so plastic as to prevent its habits

becoming fixed. Therefore a new generation succeeds the old, and forms another link in the great chain of life which gears into the material world. Matter appears to be very much the same everywhere throughout the visible universe, and to obey the self-same laws, so that immortal beings are not likely to exist for ever on any other habitable globe, though they may pass from one to another.

Natural death is probably painless; and, as Schiller has said, we cannot surely consider it an evil, since it is universal. As the body begins to die, the soul, in harmony with it, is gradually weaned from this life. Nevertheless, to those who survive there is something shocking and mysterious in death. The decease of a friend causes a blank in our lives which nothing can fill up, and breaks asunder ties which never can be mended.

To science the event is merely the stoppage of an engine, the breakage of a piece in the vital mechanism; but to the soul, the stark physical fact is transfigured by a strange aureole of sentiment. When one who was near and dear to us is suddenly struck down, we feel somehow that the finger of God has reached out of the darkness and brought us to the brink of the Unknown.

This wondrous awe and mystery of death, so common to all the children of men, is a blessing of Providence which we cannot allow science to take from us lightly. Neither can we willingly relinquish the consolations of religion which comfort the sorrows of bereavement, with the hope of a joyful reunion. In fine, until the scientist can prove beyond a doubt that the soul is mortal as well as the body, and ceases to exist when vitality is destroyed, the human race will have momentous reasons for not giving up their sweet and solemn faith that, "though the body dies, the soul shall live for ever."

Taking the body as an apparatus fitted solely for this world, and its destruction after a certain period of use as a feature in the plan of evolution, the question arises whether, apart from the assurances of revelation, there is anything in the nature of the soul which would seem to warrant the exemption of it from a similar fate. The spirit of the lower animals is mainly a collection of passions needful for the preservation of their species on earth. They are ignorant how they live, of their dwelling-place and of their Creator. But man, on the other hand, has a soul which may be said to be above the world, since it enables him to know of God, and other regions of the universe. He can understand the laws of nature, and possesses a faculty by which he can apprehend the infinite. Wherever his home might be in the universe, his reason, imagination, and volition would, presumably, be of service. Certainly he has a higher claim than the lower animals to immortality; but, nevertheless, his powers of mind are all employed in this world; and it is only his purely spiritual faculty of apprehending God and the Hereafter on which he can reasonably base any hopes of an exclusive immortality.

Some of the lower animals are believed to possess the germs of reason, fancy, and free-will, but no trace of the religious sentiment can be found amongst them. It is in keeping with our ideas of Divine love that a creature, in whom the dead world has risen into fellowship with its Maker, and whose holiest desires are to be nearer to Him, should not be suddenly and mercilessly cut off from the fulfilment of its dearest hopes. Surely the Father will not break asunder for ever the bonds of communion which have united Him to His children?

This, however, is a side of the question with which

physical science has no concern. Her inquiry is into the nature of consciousness from a material standpoint, and she does not distinguish between different kinds of consciousness. The sense of a worm is the same to her as the soul of a man, for her aim is to show the relationship between thought and matter.

Some extreme materialists, like Haeckel and Nägeli, arguing from the supposed fact that man is descended from the lower animals, and seeing no breach in the continuity of life, have come to hold that all matter is spirit and spirit matter. If elementary matter is eternal, elementary spirit will be eternal too: but the forms of matter change, therefore the forms of spirit will change also. They point to the action of anæsthetics, to sleep, and mental disease in support of their position. Anæsthetics, they say, are mere matter, yet they destroy consciousness, sleep is solely due to lack of chemical energy in the brain, insanity is the result of a deranged organ; hence they infer that all sorts of molecules are alive, and that their motions are associated in some occult way with simple sensations of pleasure and displeasure. George Henry Lewes promulgated the obscure theory that consciousness was only another *side* of matter; and his illustrious wife, in one of her psychological novels, has defined the soul to be the "last refinement of energy." The famous physician, Hartley, satisfied himself that thought is "an agitation of the nerves," and John Stuart Mill very cleverly hit off the mind as a "voltaic pile giving shocks of thought."

But scientific truth is ill at ease in the frippery of an epigram, and all these trenchant guesses of philosophy are merely bold attempts to grasp the mysterious and picture the unknown. The soul is an entity which baffles their

pursuit, and escapes their intellects, do what they will; and the striking phrases into which they coin their speculations are by no means to be taken upon trust.

The wild notion that the atoms have souls and that their attractions and repulsions are accompanied by feelings of pleasure and displeasure, is amusingly disposed of by Professor Clerk Maxwell, who quietly points out that the molecules like the planets move along with the gait of the blessed gods, rendering to every force precisely that amount of deflexion which is due to it, and keeping therefore a perfectly even temper, untroubled with either love or hate. The corollary to this extravagant theorem proving the soul of man to be the sum total of all the atomic souls composing his mortal frame, falls, of course, to the ground along with the theorem itself, for nothing is more certain than that the ordinary human spirit is sadly innocent of god-like serenity.

Anæsthetics and madness are, doubtless, evidences that the brain is an engine of thought, and that its proper working is essential to the sanity and vigour of consciousness; but they do not prove that nervous or other matter in a peculiar state is actually thought and feeling. The brain may be a material organ with which the spirit is linked in some occult manner: and when it gets choked with waste or defiled by foreign particles its action is enfeebled until it is cleaned and restored again by the circulation of the blood in sleep. Trance, whether due to anæsthetics or faintness, is a temporary failure of the organ to fulfil its duties, a paralysis of its parts, proceeding, doubtless, from a fouling of its delicate structure by alien atoms, or a deficiency in the fuel it requires. Insanity is obviously the derangement, and death the fatal wreck, of its mechanism.

It is a fascinating mystery to us where the spirit vanishes to during sleep, or coma, which are a kind of relapsing death. Does it leave the world for a time and return to it with the return of health to the brain, or is the consciousness only latent whilst the brain is faulty? To all our tests it would seem to have perished, yet we know it to exist, for it comes back again. But can we therefore say the spirit is extinct because in death it returns no more? Lucretius believed that the mind was made of atoms, smaller, rounder, and smoother than those which made up the bulk of nature, but our finest balances can show no reduction of weight in a body after death. If the soul, therefore, is a substance which forsakes the body after death, its total mass must be extremely small, else we should be able to detect its loss by weighing. If it were immaterial, of course, no scales whatever could indicate its separation from the body.

Physiologists assert that every specific thought is attended by a specific waste of the tissue of the brain: and that memory is dependent on residual traces of the state in which the brain was when the remembered sensation took place. But is there anything in this inconsistent with the notion that the brain is the physical organ of the spirit? We think not. The theory that spirit is united to matter by means of a special organ called the brain is a strong one, and all that physiologists can yet tell us may be reconciled with it. Carbon and phosphorus are said to be burned in the brain during consciousness; and if so, that is so much learned of the process by which soul and matter may interact; but after all it is very little, and, as the acute authors of the *Unseen Universe* have pointed out, we do not even know that phosphorus and carbon in the brain are in the same state as common phosphorus and carbon.

The fact is, the mystery of intelligence is as great a puzzle as ever, and the mind in trying to penetrate it finds itself brought face to face with Immensity. The connection between consciousness and the brain is an intimate one, but as yet it is quite beyond our ken, and probably always will be. Years ago, Professor Stokes, in his presidential address to the British Association, at Exeter, delivered himself of the following remarkable words: "Admitting to the full," he said, "as highly probable, though not completely demonstrated, the applicability to living beings of the laws which have been ascertained with reference to dead matter, I feel constrained at the same time to admit the existence of a mysterious something *sui generis*, which I regard not as balancing or suspending the ordinary physical laws, but as working with them, and through them, to the attainment of a designed end. What this *something*, which we call life may be is a profound mystery. . . . When from the phenomena of life we pass on to those of mind, we enter a region still more profoundly mysterious. . . . Science can be expected to do but little to aid us here, since the instrument of research is itself the object of investigation." Dr. Tyndall has also admitted "that the passage from the physics of the brain to the corresponding facts of consciousness is unattainable," and Professor Clerk Maxwell records his belief that "no new discoveries can make the argument against the personal existence of man after death any stronger than it has appeared to be ever since men began to die, and no language can express it more forcibly than the words of the Psalmist: 'His breath goeth forth, he returneth to the earth: in that very day his thoughts perish.' Physiology may supply a continually increasing number of illustrations of the dependence of our actions, mental as

well as bodily, on the condition of our material organs, but none of these can render any more certain those facts about death which our earliest ancestors knew as well as our latest posterity can ever learn them. . . . The progress of science, as far as we have been able to follow it, has added nothing of importance to what has always been known about the physical consequences of death, but has rather tended to deepen the distinction between the visible part, which perishes before our eyes, and that which we are ourselves, and to show that this personality with respect to its nature as well as to its destiny lies quite beyond the range of science."

Lastly, Dr. Allman, the president of the British Association for the time being, ended his discourse at Sheffield, last year, with the following memorable words: "When a thought passes through the mind, it is associated, as we have now abundant reason for believing, with some change in the protoplasm of the cerebral cells. Are we, therefore, justified in regarding thought as a property of the protoplasm of these cells, in the sense in which we regard muscular contraction as a property residing in something far different, but which may yet need for its manifestation the activity of cerebral protoplasm? If we could see any analogy between thought and any one of the admitted phenomena of matter, we should be bound to accept the first of these conclusions as the simplest, and as affording a hypothesis most in accordance with the comprehensiveness of natural laws: but between thought and the physical phenomena of matter there is not only no analogy, but there is no conceivable analogy: and the obvious and continuous path which we have hitherto followed up in our reasonings from the phenomena of lifeless matter through

those of living matter, here comes suddenly to an end. The chasm between unconscious life and thought is deep and impassable, and no transitional phenomena can be found by which, as by a bridge, we may span it over; for even from irritability, to which, on a superficial view, consciousness may seem related, it is as absolutely distinct as it is from any of the ordinary phenomena of matter. . . .

"That consciousness is never manifested except in the presence of cerebral matter or of something like it, there cannot be a question; but this is a very different thing from its being a property of such matter in the sense in which polarity is a property of the magnet, or irritability of protoplasm. The generation of the rays which lie invisible beyond the violet in the spectrum of the sun cannot be regarded as a property of the medium which by changing their refrangibility can alone render them apparent.

"I know that there is a special charm in those broad generalizations which would refer many very different phenomena to a common source. But in this very charm there is undoubtedly a danger, and we must be all the more careful lest it should exert an influence in arresting the progress of truth, just as at an earlier period traditional beliefs exerted an authority from which the mind but slowly and with difficulty succeeded in emancipating itself.

"But have we, it may be asked, made in all this one step forward to an explanation of the phenomena of consciousness or the discovery of its source? Assuredly not. The power of conceiving of a substance different from that of matter is still beyond the limits of human intelligence, and the physical or objective conditions which are the concomitants of thought are the only ones of which it is possible

to know anything, and the only ones whose study is of value.

"We are not, however, on that account forced to the conclusion that there is nothing in the universe but matter and force. The simplest physical law is absolutely inconceivable by the highest of the brutes, and no one would be justified in assuming that man had already attained the limit of his powers. Whatever may be that mysterious bond which connects organization with psychical endowments, the one grand fact—a fact of inestimable importance—stands out clear and freed from all obscurity and doubt, that from the first dawn of intelligence there is with every advance in organization a corresponding advance in mind. Mind as well as body is thus travelling onwards through higher and still higher phases; the great law of Evolution is shaping the destiny of our race; and though now we may at most but indicate some weak point in the generalization which would refer consciousness as well as life to a common material source, who can say that in the far off future there may not yet be evolved other and higher faculties from which light may stream in upon the darkness, and reveal to man the great mystery of Thought?"

Although Dr. Allman agrees with the fore-quoted writers as to the incapacity of man as at present constituted to reveal the secret of consciousness, he does not therefore despair of ultimate success. As a naturalist, he looks forward to the development of higher powers in our posterity by the operation of the law of evolution; but it is well to remember what physical astronomy teaches us about the maturity and decay of systems; that our planet is now apparently in its prime, and that man is probably its culminating inhabitant. The faculties he has may be

improved in the remote future, but it is extremely doubtful whether they will ever be succeeded by those of another kind: and only those of another kind would enable him to discover how it is that matter occasions intelligence.

It is reassuring to learn from such high and unbiassed authorities that science cannot as yet hinder the free exercise of faith in a future state. For aught we know to the contrary, the brain may be a focus between the material and the spiritual universe, by the form, texture, and health of which the mind is limited. Perhaps at birth, "a soul is drawn from out the vast," to which it returns again when the conditions rendering its mortal presence on earth are no longer possible. The expansion and contraction of metals, electric and magnetic repulsions, muscular irritability, are material effects which are not due solely to the bodies which are seen, but to the unseen ether which permeates them, like a finer universe within the grosser. Even so it may be that a spirit world lies within the ether world.

Soon after the invention of the phonograph by Mr. Edison the celebrated electrician, Dr. Siemens suggested that the brain might act in a somewhat similar manner. It is well known that in the phonograph the vibrations of speech are made to record themselves by driving a metal probe against a sheet of tin foil wrapped round a revolving barrel; and that by properly causing the probe to retrace its steps while the barrel is turned as before, the speech can be reproduced aloud from the inanimate register, almost as well as if it came from the living lips. Dr. Siemens' suggestion is mainly valuable as a mechanical analogy; but it serves to show how marvellous a thing the human brain is. In this mysterious apparatus are garnered up not only

sounds, but sensations of all kinds, pictures of the entire scope of visible nature, as well as ideas and feelings. What is the phonograph to such a splendid engine as this? Yet people wonder more at a phonograph than at their own brains, and there are plenty of men who would think it a sacrilege to injure the former; but at the same time would have very few scruples about damaging the latter!

The authors of the *Unseen Universe* have founded a cogent argument for immortality on the principle of continuity, which is the guide to all modern scientific advance. They reject the notion of the soul's extinction on the death of the body as a breach of continuity, and hold the opinion that it has simply migrated to another sphere. As one of the results of their inquiry, they are led by strict reasoning on purely scientific ground to the probable conclusion that "a life for the unseen, through the unseen, is to be regarded as the only perfect life." *

It may, however, be objected to this argument that the continuity of things is not broken by the extinction of the soul. The continuity of nature is not broken by the disintegration of material forms, because, although the particular forms have perished, their ruin is not lost but scattered; and in the same way it may be said that the elements of consciousness are only dispersed and not annihilated by death.

It is apparently a rude waste of power to bring to sudden end a wonderful creation like the soul, very often when it has just reached its full maturity; but the materialist would say that there is no real waste either of matter or force, because the natural energies which

* See Addison on the perpetual progress of the soul towards perfection, as an argument for immortality, *Spectator*, No. 111.

combined to form the living soul are simply conserved for other purposes.

The weak part of this defence, however, consists in the assumption that the soul is a mere combination of physical forces; since, as we have seen, it is agreed by high authorities to be something very different, we cannot tell what. Though the material fabric of the mind may crumble into dust, it is unthinkable that thought will therefore fall away from thought. The brain is a congeries of separate atoms, but the soul appears to be an indissoluble unity: the renewal of atoms constantly taking place in it does not seem to change the personality. Moreover, our very faith in the existence of a Supreme Spirit which designed and constructed nature should help us to believe more implicitly that mind can exist apart from matter, for we never think of demanding a brain and molecular motions for the operation of the Divine intelligence.

An obvious reason why the future of our soul has been left a mystery, is that we should not be too hasty in leaving this world. Did we know for certain what would befall us after death, we should not be disposed to bear "those ills we have" so patiently. The Hereafter is therefore a matter of faith, and not of knowledge. The lower animals are ignorant that death awaits them; but men are allowed to know of it, because they are permitted the hope of a life beyond the grave. The sceptic might reply that our common sense informs us of the fact of death, and our imagination escapes from the horror of it by conceiving the hope of immortality; but the human longing for eternity and the gospel of the prophets are too important to be explained away so easily. There is an inherent incapacity in man to feel that his intelligence can die, and

he acts as if his life were an eternal one. More than this, he has a distinct craving to be united to his Creator and the spirits of the good in heaven. If his life is to be entirely confined to this little earth, it is very strange he was endowed with the religious faculty and the perception of the infinite, or that any prophets were sent to keep the faculty alive and warn him of his destiny.

Manifestations of spiritualism so-called are involved in too much uncertainty and mixed up with too much charlatanry to be relied upon in proof of a future state of existence, as one would rely on the evidence of an exact science. Owing to repeated and signal failure of the alleged phenomena in their presence, many true men of science have become sceptical of the whole subject and treated it with scorn. But its votaries have sought to explain these failures by the curious fact that manifestations will not invariably take place, especially if there be any doubting or hostile minds in the circle of witnesses.

This element of caprice is not to be met with among the physical sciences, and hence the student of matter is apt to reject the excuse as a hollow one; but it may be true for all that. Spiritualism should be studied in the same unbiassed frame of mind which is brought to bear on chemistry or physiology; and if an unwonted effect is noticed, it ought rather to be received with interest as a possible clue to the solution of a mystery, than ridiculed as a sign of fraud. Important sciences have sprung from smaller beginnings than the elements of spiritualism. Electricity took its rise from the fact observed by Thales of Miletus (500 B.C.) that rubbed amber attracted shreds and dust; and stellar astronomy, from Newton's prism, which broke up the sunlight. Mesmerism is an undoubted phenomenon which is

not yet clearly explained; and the reputed spiritualistic results are, perhaps, of an allied nature. Mediums may be persons endowed with a peculiar power of revealing spiritual presences, just as there are certain individuals who have a mysterious sense of electricity in the air. In any case, it is unscientific to turn away from spiritualism as a degrading superstition without having thoroughly investigated these results. There would seem to be ample testimony to spectral effects; and whether they be due to subjective hallucination or objective apparitions, is surely a matter of the most serious investigation. In spiritualism we may be on the threshold of a new and momentous science, giving us some insight into another sphere, or at least into the constitution of the mind.

We have now seen that positive science cannot, at least as yet, disprove the immortality of the soul. For all that she can say to the contrary, the soul may continue to exist personally in another sphere, into which it is born either by a pre-arranged order or by special grace of God.

It is no part of our plan to discuss at length the nature of a future state. But we may briefly review the various ideas which have been held at divers times in the world's history by different races. Transmigration of the souls of men to other bodies on the world has been, to a small extent, believed in. Passage of the soul to a universe intimately connected with this, or to one quite distinct from this, has, on the other hand, been widely accepted. A future state, intimately connected with the present universe, is a notion which agrees best with the doctrine of continuity. In such a case earthly memories might not be wholly useless in the other world, and the suggestion of the authors of the *Unseen Universe* that every thought may stamp its

duplicate on the invisible, so as to form our future being, may not be without meaning. It should be remembered, moreover, that our personality at any moment is something distinct either from our past or future, though shaped by our past; and, though our memory would be in great part useless in a totally new sphere, since it relates chiefly to the things of this earth, our personality, pure and simple, might be serviceable in a sphere wholly apart from this one.

Among ancient peoples the Indo-German race, some fifteen hundred years before the Christian era, believed in a personal immortality; and the cry of sacred poets in the Rig-Veda was for a seat "where there is eternal light, in the world where the sun is placed, in that immortal, imperishable world, place me, O Soma. Where King Vaivasvata reigns, where the secret place of heaven is, where those mighty waters are, there make me immortal. Where there is happiness and delight, where joy and pleasure reside, where the desires of our desires are attained, there make me immortal." * Reference is also made in the Rig-Veda to a hell-pit, and the terrible dog of Yama, the king of the departed.

To the Brahman forest sages death simply meant the return of the Atman, or subjective self within a man, to the true Brahman, or objective self, from which it had been estranged for a time by birth and life.

Zoroaster, who reformed the idolatry into which Brahmanism fell, taught that there was a god (Ormuzd) and a devil (Ahriman), a heaven where the good were rewarded according to their merits, and a hell for infidels.

Buddha the Enlightened, who reformed the social tyranny of the priesthood which had corrupted Brah-

* *Chips from a German Workshop.*

manism, taught that all we see is vanity and a dream, and that the highest wisdom consists in knowing this and desiring to be freed from nature, with its penalties of birth, decay, and death, and to enter into Nirwana, the state of everlasting peace.

The Egyptian priests believed in one supreme God, whom they did not dare to name from very reverence; but the people worshipped numerous gods, and even sacred animals, such as the bull and ibis, emblematic of the Divine attributes. They held the soul to be a Divine emanation, which reunited itself to the Deity, if pure enough, but otherwise passed into the bodies of animals until it became pure. To them death and dissolution was only a new birth, and their elaborate tombs and funeral rites attest their strong belief in immortality. Anubis, like the Mercury of the Greeks, ushered souls into the land of the Amenti, of the Hereafter, where they were tried and judged by Osiris in presence of forty-two accusing spirits, supposed to represent the forty-two crimes from which a spirit should be free.

The Hebrews, at least after their deliverance by Moses from the bondage of the Egyptians, believed in one God, and apparently in an unseen world, where good and evil spirits, or angels, dwelt. There is, however, very little in the Old Testament to favour any belief in man's immortality, but there are a few passages indicating something of the kind. Perhaps, as Dean Stanley has suggested, this poverty of allusion to the subject was due to the overshadowing doctrine of the omnipresence of the living God.

Like the Egyptians, from whom their faith may have been derived, the Greeks and Romans believed in an Elysium, or state of bliss, where the souls of the good were conveyed, and a Tartarus, or state of misery, to which the

souls of the bad were consigned. But, on the whole, their conception of Hades, or the other world, appears to have been vague and shadowy. To Homer it was a gloomy reign, where dismal ghosts flitted in eternal sadness.

The Druids appear to have believed in the transmigration of souls, and the Goths in a Valhalla for the souls of heroes slain in battle.

Of course there were sceptics and dissenters among all these nations, and the exact form of the public faith changed, to some extent, in course of ages; but the belief in a Divinity and some future state, either ethereal or bodily, was entertained by them all.

At length our Saviour came into the world, and his apostles taught the resurrection of the spiritual body to a future state of reward and punishment, according to the works done in the flesh. "And I saw the dead, small and great, stand before God; and the books were opened: and another book was opened which is the book of life; and the dead were judged out of those things which were written in the books according to their works." *

As we have previously written, the last judgment here prefigured can only seem just to us on the assumption that we are what we feel ourselves to be, namely, free moral agents. If men are only complex automata, they cannot justly be condemned to suffer by their Creator for acting out their nature. As well inflict torture on a timepiece, if it were possible, for telling the hours and minutes badly after it has been wound up. To set the machine aside if it proved faulty might be right enough, but to punish it for what it could not help would be sheer cruelty. If, however, the Creator has endowed man with a spark of His own

* Rev. xx. 12.

Divine intelligence, and given him a certain freedom of action, a future state of reward and punishment would be a reasonable sequel to the present life.

The old notion of a resurrection of the material body has been again and again falsified by the actual fact that the remains of one creature enter into the living flesh of another; so that at the last day there would be atoms whose proper place might be in several distinct bodies. It is a notion which could only have arisen from ignorance of the words of St. Paul: "Behold, I shew you a mystery: We shall not all sleep, but we shall all be changed, in a moment, in the twinkling of an eye, at the last trump: for the trumpet shall sound, and the dead shall be raised incorruptible, and we shall be changed. For this corruptible must put on incorruption, and this mortal must put on immortality. So when this corruptible shall have put on incorruption, and this mortal shall have put on immortality, then shall be brought to pass the saying that is written, Death is swallowed up in victory. O death, where is thy sting? O grave, where is thy victory?" *

What time the last day may be expected is beyond the power of science to foretell; but if the ordinary course of nature holds, and if no unforeseen catastrophe, such as the advent of a comet into collision with the world, or near enough to the solar system to disturb the existing balance of the planets and their luminary, occurs, we may be sure that the world has a long career of several million years before her ere the sun burns down too low to destroy human life, or ere she crashes headlong into the sun. It is curious to find the death of Nature foreshadowed in old mythologies as well as prophesied in the New Testament. In the Norse

* 1 Cor. xv. 51–57.

Edda of the Twilight of the Gods we are told that after the final universal struggle and battle of the gods and jotuns, the whole created world would be swallowed up in darkness, and give place to a new and better land.* Mahomet also taught that when Allah withdrew his hand from the world the mountains would dissolve like mists, the earth whirl into wreck, and disappear in the inane. The immortal passage which Shakespeare puts into the mouth of mediæval Prospero is too well known to be repeated here; but it grandly expresses the idea of the modern materialist, who anticipates the time when he and all that is shall vanish in the infinite azure.

The sublime idea entertained by men during all historic ages, that the soul will survive the ruin of the visible universe, and be rewarded according to its deserts in a future state of existence, has probably elevated the conduct and promoted the good of the human race more than any other conception. There are some philosophers who doubt, however, if the decay of this ancient faith would ever weaken our morality, and point to the Jews as a triumphant example of a moral nation which does not appear to have been sustained by any "clutching other-worldliness," as it is called. But it should be remembered that the Jews had a very good substitute in a righteous "this-worldliness."

* The following lines are from Ossian's address to the sun, as rendered by Lord Byron:—

"Whether at morn, in lucid lustre gay,
On eastern clouds thy yellow tresses play,
Or else at eve, in radiant glory drest,
Thou tremblest at the portals of the west,
I see no more! But thou mayst fail at length,
Like Ossian lose thy beauty and thy strength,
Like him but for a season in thy sphere
To shine with splendour—then to disappear.

They believed that a just and omnipresent God would recompense them in this life for their good works, a faith surely every bit as "greedy" as that attributed to Christians, for it asks no visionary reward in the next world, but a substantial one in this. The world at large, seeing that Providence does not dispense with poetical justice in this life, can hardly be blamed for expecting a better state of things in the next.

Professor Tyndall, again, declares that there are individuals who lead very noble lives without any hope of immortality whatever: some of his best friends let the belief in it alone, and derive neither stimulus nor inspiration from it. But if these persons really let this belief alone, and it is not even unconsciously present to them, may the cause of their righteousness not spring from the inheritance of a noble nature, which is in part the fruit of that very creed which they ignore? Perhaps, there are characters of high intrinsic worth who do not require such a hope or restraint to keep them from vice and littleness: but these noble pagans are unfortunately very rare. The great mass of mankind are neither stoics nor epicureans, but just somewhere between; and we fear that until the race is greatly improved it will not be strong enough to renounce its hope of heaven and fear of hell.

"I will work faithfully and diligently for the sake of God," says a young man to himself: "I will earn His divine approval." And not even success in the aspiring struggle after wealth or fame can content the heart like this thought. Riches and reputation and power may be found to be empty baubles when they are gained. The striving for them is a feverish craving of the spirit which ends in dull satiety or sordid exhaustion. A man may have the best

the world can give, but how little it is after all! One does not need to live long to find out that the soul's desire is for things of a higher kind than the earth can yield. There is a marked disproportion between our real experience and what we long for. We soon learn to gauge the actual life, and as we feel its shortcomings, we find in our hearts a love for a nobler and a better life. The sense that our labours are agreeable to God is a far happier reward than mere worldly success.

But what does this happy feeling resolve itself into when it is analyzed? That the young man anticipates a day when he will appear before his Maker, and have the inexpressible joy of being received with the words, "Well done, thou good and faithful servant." This is the thought which really kindles his soul, and renders him happy in toil and patient in adversity.

But if the faith in a future state be utterly quenched out of his heart; if he believes that death means extinction; that all he can expect is what befalls him in this life; that the Supreme Being he is asked to love and righteously obey, often to his own pain, makes no acknowledgment of his efforts, takes no pity on his fate, and is even more impassive than the Sphinx, because He is a blank or a delusion,—then what will keep him from extracting as much earthly pleasure as he can from life, and sinking into selfish sensuality and despotism? The one great and tempting prize would be the fruits of this world. Poverty, the need of honest labour to earn his bread, the fear of going down in the world, and other considerations of prudence might restrain him for a while from seeking his own pleasure at the cost of sin. But when his position was secured from want and shame, what, we ask again, would restrain him from a career of

self-indulgence in this life, if the belief in a future state is taken from him, and he knows that there is nothing after death, no judgment he may undergo, no punishment he may incur?

On the other hand, there is an infinite power for good in the belief in heaven. It is a glorious and happy thought to think that all the bliss we may not hope to realize on earth, is yet in store for us in heaven. Chords of our nature, touched at odd times amidst the ordinary business of life, reveal in us possibilities of a Divine emotion and happiness, and we need not regret the "vesture of decay" which grossly hems us in, nor the prosaic drudgeries which so much engage us here, if we are led to believe that all these half-tasted joys will yet be fully ours in the world to come.

We are nobly elated, too, at the prospect of being received into the everlasting fellowship of the good and great, the idols of the imagination, St. Paul, Homer, Shakespeare, Newton, Hypatia, or Raphael, as well as into the kindly circle of the friends who went before. Above all, the sublime felicity is held out to us of resting on the bosom of Jesus. In the full faith of this great destiny, therefore, is it likely that we will readily do any act to forfeit it, and lightly yield to a degrading sin or vice?

CHAPTER II.

REVELATION.

Thy word is a lamp unto my feet, and a light unto my path.—PSALM cxix. 105.

Such a man is what we call an *original* man: he comes to us at first-hand. A messenger he, sent from the Infinite Unknown with tidings for us. We may call him Poet, Prophet, God:—in one way or other we feel that the words he utters are as no other man's words. Direct from the Inner Fact of things;—he lives and has to live in daily communion with that. Hearsays cannot hide it from him: he is blind, homeless, miserable, following hearsays; *it* glares in upon him. Really his utterances, are they not a kind of "revelation:"—what we must call such for want of some other name? It is from the heart of the world that he comes; he is a portion of the primal reality of things. God has made many revelations; but this man too (the prophet), has not God made him, the latest and newest of all? "The inspiration of the Almighty giveth *him* understanding." We must listen before all to him.—CARLYLE, *Heroes and Hero-worshippers*.

To an old-fashioned Christian the Divine inspiration of the Holy Scriptures is a plain and simple fact, which cannot be put down. He firmly believes that the Lord breathed his message into the minds of certain men, called prophets, in order that they might deliver it to the world from Him. The Bible is the record of these commands, and therefore they revere it as the veritable Word of God. It is a revelation from the unknown Creator to His intelligent creatures, and every word of it is to be taken as the absolute Truth.

In these latter days of evolution and the nebular theory, however, this happy creed has suffered many a rude shock;

and thousands who were taught to believe it in their youth, feel themselves compelled to give it up in their maturity. Their confidence being shaken in direct verbal revelation, they are apt to lose faith in all spiritual teaching soever, and to regard every religion as a mere human invention.

For if all that exists on the earth now or has existed in the past, all kinds and conditions of life, all cities and societies, all arts and learning, all thoughts and feelings were once latent in the embryonic nebula of our planet millions of years ago, and have been continuously developed from it by unalterable laws operating according to the mode or process which we term evolution, it would seem to follow that a direct revelation from God cannot have taken place. Such an act on the part of God would appear to be an unnecessary interference; and there is either no such thing as a Divine revelation from Him at all, or it is an indirect revelation from the beginning, when He ordered the pregnant elements into their places, and constructed the germ of the world.

Now, we know that every great man of genius is, in some sort, a revelation to us. He is an embodied principle, a law incarnate, the pioneer and guide of a fresh order of things; himself a new phenomenon, inasmuch as we have not seen his like before. He reveals truths to us which, to all appearance, we cannot otherwise discover at the time; and if he does not come too early, he will be recognized as one of the teachers of his age. The progress of mankind takes place through the force of his example; and just as, in the history of some individual mind, the idea which may dawn upon it in some rare exalted moment is afterwards made the standard of ordinary conduct, so the precept first enunciated by a genius becomes the rule of life for common men.

Every department of higher mental work has its great masters, whose authority to teach comes from Nature herself, and whose power consists in an inborn sense rather than an acquired aptitude. The man of science is gifted with an intellectual insight into the mechanism of the universe, and an inventive genius for utilizing its material energy. The Musician fills the world with new harmonies; the Painter with ideal scenes; and the Poet or Maker helps to decorate life with his fancies, and to reveal the beauty of the world. The Moralist again, is one who conceives in his imagination a nobler ideal than his fellows, and is impelled to furnish them a purer mode of living.

All these different types of teachers and benefactors of their species deal, however, with the present life and temporal things. They minister to our earthly welfare and enjoyment, by increasing our material comfort and good conduct, elevating our ideas, delighting our imaginations, and purifying our tastes. But there is another class, whose mission it is to tell us of a future state of being, and bring us tidings of the things which are invisible and eternal. These are the men we term Prophets, Men of God, and Saviours of their kind.

Every true man of genius is organically formed for a particular work, and feels that he has a special vocation for it. The poet derives his privilege to sing from Nature herself, or (as the ancients figured it) his inspiration from the nine muses. The prophet, on the other hand, who deals with the mysteries of the Divinity, and ministers not to sense and reason, but to faith, is he not the appointed mouthpiece of the Almighty? From whence does his inspiration come if not from God?

Isolated as man is on the earth, and surrounded by the

Infinite, a desire has sprung up in his heart for some communication with the unseen world, which he has come to believe in. The lower animals live only in relation to material nature. They have no internal communion with the ideal. They hunger for food, and food is to be had for the seeking—herbage, fruit, or flesh. They partake of it to their satisfaction, and are sensible of no gratitude for it. But man feels grateful in his heart for the blessings of providence, and would fain return thanks to some Unknown Being, to whose bounty he is sensible that he owes his happiness. He craves more than bread alone; and yearns for spiritual help and guidance—food for the soul. Shall there be nothing to satisfy these higher needs? Shall the physical world be self-compensating, and not the spiritual? Shall his body be environed with all the nourishment it requires to maintain it in health and vigour, free from pain, and even in joy, while the diviner part of him, the soul, is left to pine in want, and suffer in neglect? What are the aches of the frame to the despair and doubts of the spirit? The highest and greatest portion of human life is something which the lower animals entirely lack, and has its true home, not in visible matter, but in invisible consciousness. We feel that there is a universe for thought and feeling to dwell in too; we feel it instinctively, although we cannot prove it. "The things which are seen are temporal; but the things which are unseen are eternal." God's work would seem to be incomplete without such a home for the aspirations of the soul; there would be an unfinished blank left in creation if man's religious faculty existed without its true sustenance.

To feed this craving for spiritual manna, for knowledge of Himself and of His will with respect to man, the Creator

has, it appears, provided the order of inspired prophets. His plan is evidently to render the world as self-sufficing as possible; and hence the natural course of any inspiration from Him would be through man who is already formed to *speak*. God's inspiration would not dwell in rocks and rivers, or in atoms either, but in the human soul. He has no need to give the earth and floods a tongue. The only question is whether these human oracles of the Deity are directly inspired by the words which proceed out of His mouth, or whether their powers come by means of heredity and development, like those of other men of genius.

We have already pointed out that there is an important distinction between men of genius and prophets, inasmuch as the latter come to tell us of things altogether beyond this world, and incapable of proof. They appeal entirely to our faith, and not to reason, and hence their function is one of pure revelation. We require no revelation from God on matters of science, for by exercising the ordinary abilities He has given us, we can discover the laws of nature for ourselves; but if we are to know the truth about the unseen world, a revelation from Him is absolutely necessary. The peculiar and momentous calling of the prophet is thus exalted above all other human duties. If we admire the poet, we must revere the prophet.

Certain men of science have of late shown a disposition to arrogate to themselves the highest place as teachers of their fellowmen. But this is a pernicious error. Men of science, it is true, improve our mechanical aids, develop the resources of the planet, and so pave the way for a larger population. They may make the numbers of a nation; but it is the moralist or the prophet who determines whether it shall be a good nation or a bad one. A patent spinning-jenny

may help to put a fine coat on a man's back, but it will not make him any nobler within.

Even in an economical sense, the prophet is of infinite value compared to the man of science, or the poet either, for his business is to improve the character of man, the highest and most valuable mechanism of all, the tool from which all other tools proceed. He implants noble thoughts, lofty ideals, and a spirit of holiness into the human heart, and fosters its capacities for virtue. The prophet's task is to answer the questions which men are ever vainly asking themselves, as to their nature, whereabouts, and destiny,—What am I? Where am I? What is life? What is death? What am I to believe? What am I to do?—and to make men render unto God the things that are rightfully His. Without them men would grope in spiritual darkness, and be perplexed with never-ending doubts. "All Scripture," says St. Paul, "is given by inspiration of God, and is profitable for doctrine, for correction, and for instruction in righteousness."

All branches of mankind have had their prophets, even the North American Indians had their Hiawatha, who was sent by the Great Spirit to teach them peace and brotherhood; but none has produced so many prophets as the Semitic race, especially the tribes of Israel, which, for this reason, are justly called the "chosen people." The Greeks have enriched the world with sculptors; the Italians, with painters; the Germans, with musicians; the English, with moralists, and so on: but it was the high destiny of the Jews to furnish it with prophets and messengers from God.

The works of these Hebrew prophets are contained in the Bible, beside other historical matter. They are spread over a period of 1600 years, which may reasonably

be regarded as the great era of Inspiration, culminating in the advent of Christ, the long-expected Messiah.

He who believes in spiritual response to prayer need have little difficulty in accepting also the inspiration of the prophets as a direct effluence from God; for if God speaks at first hand to the soul of every man who sincerely asks Him, there is no natural reason why He should not breathe His thoughts into the minds of certain men peculiarly organized, whom He has selected for the purpose. Although of rarer occurrence and more exalted power, prophecy, either by means of visions or otherwise, would not therefore differ from Divine response to prayer in its real essence, and could not be considered as something more miraculous. Both would imply the direct action of the Holy Spirit on the human soul; and both are rendered reasonable if we admit the existence of free-will.

Nor is there anything in this view, as far as we can see, which the moderate evolutionist can object to, for as we have pointed out in discussing the efficacy of prayer, the Holy Ghost may interact with the human mind in such a way as *not to confound its understanding.* Thus the Creator might be ever revealing Himself to men, through nature, without producing what we should recognize as an interference in her mode of working.

Scholars tell us that there is internal evidence in the Bible disproving its verbal inspiration. Different versions have different wording, and it is not quite satisfactory to explain this fact by saying that mistakes have crept in through copying; for if the original version was verbally inspired by God, it is to be expected that He would keep it pure.

A Divine influence on the human spirit such as we have

described need not, of course, preclude mere errors of *form* which are no longer of any consequence, since the appointed prophet might be left to interpret and express the inspiration in his own way, which would be a way capable of being understood by the unenlightened people he addressed. Words are only symbols after all, and change their significance as time goes on although the truth they body forth remains the same. The expression which is true for one age requires a fresh interpretation for succeeding ages, and if God speaks to men at all it must be in language they can understand at the time. Indeed, they can only understand that part of His address which they are capable of understanding.

We do not maintain, however, that a miraculous inspiration of this kind is absolutely necessary; and are willing to accept a revelation produced by means of evolution without miraculous intervention. Nor do we think it any argument against the evolutionary inspiration, to say that Christ and the Apostles firmly believed in the direct inspiration of the Bible, because they quoted passages from it, and discussed them. This fact, in strictness, only proves that Christ firmly believed the prophets to have been inspired of God, and does not at all imply the method of their inspiration.

There is a growing disposition amongst men of science, and even divines, to regard the Bible as a record of progressive revelation, a collection of spiritual fossils, so to speak, illustrating the *evolution* of religion. As such it will doubtless be marred by trifling errors, just as organisms are found to exhibit trifling defects and rudimentary organs, or as the shining disk of the sun is known to be blemished with spots. The Bible should, according to this view, be

taken as a whole and not in detail, in the spirit not in the letter, and then it will be seen in all its true worth and beauty.

The utter materialist, who holds with the nebular theory, is apt to deny the Divine source of revelation altogether. Believing, as he does, that the prophets were once imprisoned in the flames of chaos along with all other products of the earth, spars, ores, and organisms, he attributes their origin as well as crystals, plants, and animals, to the inherent potency, the loves and hates, of atoms. And if we ask him who impressed that mystic "potency," that inaccountable caprice, on the elements, he is dumb himself, and, what is still worse, will not allow any other person to explain.

Now, even if what he says be true, and the primal nebula *did* contain the prophets, we might still believe that the Creator, in the beginning, disposed the atoms in such a way that as they developed by natural law, and of necessity, the works which we call inspired made their appearance in due course, and hence are attributed to His providence. But one class of scientific workers check the speculations of another class, and the molecular physicists of the day are evidently preparing a rude awakening for the ardent physiologists who dream about the souls of atoms. According to them, the atoms of matter are either vortex rings in ether, solid (and perhaps slightly elastic) spheres, or some other form of inert material; and it is of course preposterous to suppose that such contrivances can possess souls, or form the entire substance of the prophets.

Just as the ether plays a part in building atomic structures, so is it probable that at least one other unseen entity, the spiritual world, enters into the formation of a prophet.

The interaction of a spiritual world with the world of matter is not discountenanced by the Darwinian doctrine of evolution, which does not concern itself primarily with the origin of life but rather its development. Accepting the fact of the original life-germ or germs, it seeks to show how other organisms grew out of it by the action of environment. On this theory, we suppose, the prophet as well as the poet would be accounted for by the influence of external nature in fertilizing the mind of man with ideas. In the case of the poet the beauty of the world would in time produce a poetic genius, and speculations regarding the infinite would kindle a spirit of holiness in the prophet.

But here, again, it might be said that the capacity so implanted in the germ, and developed with the race, is as much a creation of God and the result of His design as a man's hand or foot. And being a creation, the spiritual truth of it is as sure as the bodily fitness of the hand. There are minor imperfections, doubtless, in the human hand; but they do not seriously affect its usefulness, they only mask a little the ideal form we have to find. And just as we should discern the representative hand in the faulty individual one, or as we should trace in a collected series of fossils the types which illustrate the descent of a particular species, even so from the history of revelation, preserved for us in the Bible, we can put aside all that is local and fleeting in order to lay bare the ideal core of heavenly truth. This is the task of the divine.

We have seen, however, that even in the development of physical life the Darwinian theory is inadequate; and that while it is admitted to account for the survival of the fittest, it does not seem sufficient to explain the origin of the fittest. But if it is incompetent in the case of animal bodies

how much more incompetent is it in the case of spiritual forms. There is still a mystery in the origin of living types, but a greater mystery in the origin of the prophets. And if in the one mystery we recognize the design of the Creator, may we not in the other discern the inspiration of the Holy Spirit?

The moderate hypothesis of evolution would not preclude the agency of the Holy Spirit altogether, but would make its action dependent on the development of matter; in other words, the interaction of the Holy Spirit would have to be in accordance with the laws of matter. The original life-germs would require to possess the power of interacting with the invisible world in such a way as to produce prophets by terrestrial development, as modified by the operation of human will. And here we may point out that the very existence of free-will, implying, as it does, the liberty to sin, gives a right of being to the prophets, who declare what God's law is, and the inexorable penalty of breaking it.

Whether inspiration be direct, or indirect through "evolution," is not perhaps, a very important matter, after all. The great point is that there is a revelation which obviously comes from God, and while we are assured of this, we surely need not quarrel about the way in which it has come. We have shown already that there is something mystical and Divine about the utterances of the prophets, which speak of the Unseen, and are in this respect distinguished from the doctrines of the world-sages. If the oracle which reveals to mankind the nature of the Godhead be not from God, from whom, we ask again, does it come? This is a matter which peculiarly concerns Himself.

There is a distinct need of revelation to satisfy the

aspirations of men, and that need has evidently been supplied. Though it may not have come direct from the Holy Ghost into the souls of the prophets, as one person speaks to another, it has come indirectly by the mysterious process of spiritual evolution, and that should be enough for us. In our fear of human error we are too apt to doubt that it has come from God at all; but just as we are satisfied that the world and all its beings was still created by God although we may no longer believe that He did so in six days by sudden fiats of His power, so may we rest assured that though He may not have breathed His divine words into the prophet's ear, He nevertheless gave the prophet his mystical soul, pregnant with its news of Him and of His will.

The Bible, or sacred book of the chosen people, is admitted by competent authorities to be superior to the sacred books of other races. We need have little difficulty in believing it almost entirely a Divine revelation; and if a Divine revelation, the highest we have received, or, in all essential matters, can receive. There may be imperfections in its several parts, but they are deficiencies rather than errors. It appears to be a progressive revelation, the several portions of which are fitted to the times in which they were revealed; and we seem to trace a consistent plan running through it, from Genesis to the New Testament. Thus, if we accept the Mosaic cosmogony as also inspired, we may regard it as adapted to the infancy of the world and therefore even now best suited to the childhood of the individual. The later revelations of the prophets satisfy the imaginative period of youth and the craving for the high ideal. Christ, as this ideal, is the fulfilment of their prophecy, the realization of their desires. His coming may

be held to mark the culminating point of inspiration, and the maturity of the world. The sacred record of Divine revelation is completed by His Gospels, and contains all that is necessary for man's salvation. The idea of evolution, worked out afterwards by man himself, deals only with the *process* of creation, and is therefore comparatively unimportant. Revelation gives us the supreme result. The fact of its existence, like the human hand or the mountain chain, is the main consideration, not how it was produced. The mountain peaks which drain the clouds to fill our wells with water, and lift our souls to heaven with their sublimity, shall not be valued less, although their origin, once lost in obscurity, is now attributed to physical law: and so we should continue to revere the prophets, even if there were less mystery in their origin, for we believe they come from God.

CHAPTER III.

CHRIST.

He is despised and rejected of men: a man of sorrows and acquainted with grief: and we hid as it were our faces from him; he was despised, and we esteemed him not.

Surely he hath borne our griefs and carried our sorrows: yet we did esteem him stricken, smitten of God, and afflicted.

But he was wounded for our transgressions, he was bruised for our iniquities: the chastisement of our peace was upon him; and with his stripes we are healed.

All we like sheep have gone astray; we have turned every one to his own way; and the Lord hath laid on him the iniquity of us all.

He was oppressed, and he was afflicted, yet he opened not his mouth: he is brought as a lamb to the slaughter, and as a sheep before her shearers is dumb, so he openeth not his mouth.

He was taken from prison and from judgment: and who shall declare his generation? for he was cut off out of the land of the living: for the transgression of my people was he stricken.—ISAIAH liii. 3-8.

MODERN criticism has thrown considerable light upon the nature and origin of the Christian Gospels; but there is yet a great deal to learn concerning them, which, perhaps, we shall never know. It has indeed proved that as records of the life and ministry of Christ they are fragmentary compilations based upon original traditions of the church, probably both oral and documentary; but when and where or by whom they were written still remains a matter of estimate and conjecture.

The three first Gospels, Matthew, Mark, and Luke, are found to contain many similar phrases which have evidently

been derived from a common source. Whether this Triple Tradition, or fountain-head of the three synoptical Gospels, was committed to writing, or merely handed down by word of mouth; whether it was in the Aramaic language, spoken by Jesus, or in the Greek tongue of the evangels; whether it had come untouched from its first author, and who that author was, cannot certainly be told. No doubt its authority in the early church was high, and it may even have originated at some of the early councils of the apostles after the death of Christ.

Mark appears to embody this tradition in its purest form, and both Matthew and Luke may either have copied from Mark, or translated from the original. "To sum up the contents of the common tradition," says the Rev. Dr. Abbott, "it omits the genealogies, miraculous incarnation, and the picturesque details of the infancy; it lays emphasis on the relations of John the Baptist and Jesus; it contains none of the parables except the sower, the mustard seed, and the wicked husbandmen, and few of the long discourses of Jesus, except an abridged prediction of the second coming. The disputes between Jesus and the Pharisees about fasting, about exorcism, about the baptism of John, and the tribute, and Christ the Son of David, and the dialogue with the Sadducees about the resurrection, are very fully given: and so also is the dialogue with the rich young man. Indeed, it is a collection of dialogues and anecdotes rather than a set treatise of doctrine or biography. The sayings of Jesus recorded in it are short, pithy, and abrupt, and many of them are polemical. Only now and then do we find a sentence which goes deep down below all polemics, and reveals a deep-laid spiritual plan. But putting such sentences together, we perceive that the Triple Tradition

describes a Prophet wholly different from any that had before appeared in Israel; a Prophet who not only (like Isaiah) protested against Sabbaths and purifications as ends in themselves, but who also preached the Fatherhood of God in a manner entirely peculiar to Himself, and who set aside the Mosaic law of divorce. He also instructed His disciples to enter into the kingdom as little children, and seems to have attached a certain symbolic mystery to childhood as representing Himself. He taught His disciples further, to devote their lives to Him, and to ignore all life apart from Him ('to confess Christ, to deny themselves'). From the first He claims the power of forgiving sins; and, as soon as one of His disciples confessed Him to be the Messiah, He prepared for death, predicting that He should die but rise again. Then, after prophesying the fall of the temple, and great distress in all nations, He predicted a final triumph for His disciples: and after bequeathing Himself, His body, and His blood, as at a funeral feast, as His final legacy to His disciples, He was arrested and put to death.

"Several miracles of healing are recorded, and, in addition to these, the exorcism of the Gadarene (in which, however, great confusion is apparent), the stilling of the storm, the feeding of the five thousand, and the transfiguration. From the beginning of the discourse on the second coming, Luke diverges more and more from Matthew and Mark. After the death of Jesus, Matthew and Mark continue to agree in words and phrases, but a little confusion is apparent; and the tradition suddenly terminates without any record of the appearance of Jesus to His disciples. However we may regret this, it is perhaps what may naturally be expected on the hypothesis that we have before us an early tradition,

originated at a time when the numerous manifestations of Jesus after His death were still attested by living witnesses; when as yet it had been found impossible to reduce the experiences and impressions of those who had seen Him—impressions necessarily variable and transient, blended with fear and with an excitement bordering on ecstasy—to a consistent and historical shape; and when it had not yet been found necessary to define and harden the narrative so as to adapt it for the purpose of meeting doubts and objections."*

Besides the Triple Tradition, there are signs that Matthew and Luke also borrowed from a documentary tradition in the Greek, which may have been translated from the Aramaic. This Double Tradition is thought to have been adapted for reading in the churches, and it was probably later than the Triple Tradition.

The dates of both these traditions are lost to us; but the Gospel of Luke must have been compiled at least seventy years after the birth of Christ. Matthew and Mark (which seems to be the oldest of all) may have been composed before the Fall of Jerusalem; while John was, perhaps, the latest written, for it did not become widely read and authoritatively quoted until after the middle of the second century.

None of the Gospels profess to give a full and complete account of the person, life, and ministry of Jesus. Each evangelist apparently relates what he can remember of the sayings and doings of Christ, and the events to which he was a witness, or which were otherwise best known to him. The synoptists confine themselves chiefly to the Galilean

* *Encyclopedia Britannica*, 9th edit., Art. "Gospels," by Rev. E. A. Abbott, D.D.

ministry, and eke out the sketch supplied them by the original tradition from their own experience. St. John, on the other hand, treats mainly of the Judæan ministry, while supposing the Galilean one. The style, too, and literary purpose of each Gospel is different from the rest. Matthew, the publican and ready writer, groups together long records of the sermons and parables of Jesus, and seeks to identify Him as the expected Messiah by tracing His descent from David, and pointing out the incidents in His life which fulfil the words of prophecy. Mark, who is supposed to record the story of St. Peter, furnishes a plain and blunt report of the Saviour as a man, adding little to the original tradition, and ending with it at the return of the women from the tomb. Luke, again, has written with the order, power, and beauty of a true artist, editing what had been loosely jotted down by many, and, unlike Matthew, narrating the acts rather than the speeches of Jesus. John, who, at a great age, may have dictated the fourth Gospel to an interpreter, dwells upon the mystical being of Christ, and exalts Him as the Logos, or Word, of God, which had existed from all eternity, and was at length born into the world. The four Gospels are therefore supplementary to each other, and it is chiefly from their united testimony that the orthodox view of the life and work of Jesus is obtained.

From them we gather that some 1883 (not 1880) years ago the infant Christ, called Jesus,* was born at Bethlehem in Palestine, a small but important country situated at the junction of the three great continents, Europe, Asia, and Africa; and, in a geographical sense, the middle of the ancient world. His birth and parentage was of the humblest kind. Joseph, His legal father, was a carpenter

* Jesus, or Joshua, the Salvation of Jehovah.

by trade in the little town of Nazareth in the ill-famed province of Galilee; but both he and Mary, his wife, are said to have been Jews of the house and line of King David. In order to enrol their names in a national census, they had left Nazareth and gone to the village of Bethlehem in Judæa, because it was the city of their ancestor David; but not being able to find lodgings in the khan, or inn, Mary made her bed in a rock-hewn stable, and here she brought forth Jesus, and cradled Him in the manger.

The childhood of the Boy was quietly spent at Nazareth, a rural hamlet, embosomed in the green hills of Galilee, where He appears to have been taught His father's homely craft. While His hands were learning to ply the tools of Joseph, however, His heart was thirsting to know the Lord, and His holy genius began to recognize its future mission. It is related by St. Luke, that when His parents had taken Him to Jerusalem, in His twelfth year, to a feast of the passover, He tarried behind in the city after the homeward caravan had left, till, after three days' search, they found Him in the Temple, sitting amidst the doctors, both hearing them and asking questions. "Wist ye not," said He, "that I must be about my Father's business?"

His life at this period, and until His manhood, was probably one of peaceful, healthy toil, of sweet, lonely meditation among the hills, and pious study of the Jewish law and prophets.

It was an evil time. Paganism was far gone in its decline, and the ancient world was utterly corrupt. Men were longing for a new revelation, a messenger from the spiritland who would give them the unerring rule of conduct and show them how to dwell with God and men. Plato had written that Socrates amongst the Greeks had already

predicted the advent of a just man who would teach the world how to pray; and now, according to the Gospels, John the Baptist among the Jews was crying in the wilderness, "Prepare ye the way of the Lord; and make His paths straight"—"the kingdom of Heaven is at hand."

Jesus heard the fame of John's preaching, and when He was about thirty years of age, He went out to the wilderness, to be baptized by the new prophet in the river Jordan. When John saw Jesus, he declared Him to be the Messiah * of whom he prophesied, and wished to humble himself before Him. Jesus, however, did not suffer John to do so; and after receiving His baptism went into the wilderness for a space in order to commune with His own Soul. Here He was powerfully tempted in different ways to choose the evil and forsake the good; but He came out of the ordeal victorious. His mission was now clear to Him: He had received the Divine call; and from that time He began to preach in Galilee, and other parts of Palestine, that the Scriptures were now fulfilled and the kingdom of heaven at hand.

The idea that He was the expected Messiah whom the Lord had anointed and sent into the world to preach the gospel to the poor, to heal the broken-hearted, to deliver the captive, and give sight unto the blind, as the prophets had foretold, was now, it seems, firmly planted in His mind; but He appears to have asserted it with greater force as His ministry went on, and He encountered the unbelief of those who heard Him. He selected a few disciples from among His followers with a view to instruct them in His doctrines and train them to preach His gospel, and it is remarkable that they were mostly men drawn from the

* Messiah, or Christ, the anointed One.

lowest ranks of life, men whom other priests and sages would have ignored, if not despised. They were illiterate, dull, prosaic, vile, yet He, the enlightened, the pure and holy, chose them as His companions. He associated, too, with the lowest characters, the poor, the wretched, the diseased; He who fondled little children, and whom all Christendom esteems to have been sinless, took up his quarters with "publicans and sinners." The ignorance and hard literalism of His disciples frequently saddened Him; the hypocrisy of the Pharisees or pietists often awoke His righteous anger, and the wickedness of the world grieved Him. Still He went about doing good and preaching the gospel to the poor, and His fame went abroad through all the country. Great numbers of people followed Him, bringing with them their lame, halt, and blind; for not only did He speak to them "as no man ever spoke," but He wrought miraculous cures. He healed the sick, He restored the palsied limb, He gave sight to the blind, hearing to the deaf, speech to the dumb; He brought the maniac back to reason by the word of His power. But in addition to these wonderful cures on the living frame, He even raised the dead to life, He changed one substance into another, He walked on the sea despite the laws of gravity, He created bread and fish where there was none, and took upon Himself to forgive sins. In the beginning of His ministry He seems to have besought the power and leave to work these miracles from God, but afterwards, as His confidence increased, He perpetrated them as it were in His own name and authority; and finally, when His rejection by the Jews and Pharisees made Him dispirited, He effected them with greater difficulty and earnest prayer. Faith, He represented, was an essential requisite to the performance of these works, faith

on the part of the agent, and faith on the part of the subject.

It is plain, from the Gospels, that whatever His Divine relation may have been, Jesus also felt Himself to be a man, and represented His miraculous power as a gift from God. Although He claimed to be the Messiah He did not exalt, but rather always humbled Himself; and it is curious to see how He wished many of His miracles to be kept secret, as if He shunned the character of a mere wonder-worker, and deprecated the fact that His miracles and signs were so eagerly desired and noised abroad while His Divine teaching, which should have recommended itself, was left neglected. The miracles were avowedly subsidiary, and intended to accredit His gospel as a veritable revelation from the Almighty Father; but the vulgar crowd seized upon the marvel and overlooked its true significance. That Jesus did not work any futile and unnecessary miracles out of mere display of power, or even to convince the sceptical at request, but did them out of charity in the natural course of His work, is also evident from His refusal to show the Pharisees the "signs" they asked for, and to work them in His own behalf when He was in extremity.

The greatest scepticism of His Messiahship was encountered among His own people at Nazareth and among the Pharisees at Jerusalem. He had "found no honour" as a prophet in His own country, for was He not "Joseph the carpenter's son," whom they all knew? His kindred wished to lock Him up as a madman; and the proud bigoted Pharisees, failing to understand how this Man knew letters, having never learned them, denounced Him as a *mêsith*, or deceiver of the people. Nevertheless, many believed that He was in truth the

Messiah, the Holy One of God, and others said, "He is a good man." The rejection of Christ by the Galileans, and the hostility of the Pharisees, at length drove Him into other lands, a fugitive and houseless wanderer upon the face of the earth; and the foxes had holes, the birds of the air had nests, but the Son of man had nowhere to lay His head.

At last He began to have premonitions of His approaching fate; and if He Himself had no misgivings of His Messiahship, He was at any rate anxious to test the faith of His disciples, whom He had selected to carry on His work; for after questioning them as to what men thought of Him, He asked them, "But whom say ye that I am?" Peter answered, "Thou art the Christ, the Son of the living God;" and Jesus made the memorable response, that on Peter's faith He would build His Church.

He then acquainted them with His impending death and resurrection, instructed them to preach His gospel, and, as if further to confirm their faith, He was transfigured before the principal three, Peter, James, and John, so that they were initiated into His heavenly glory. The transfiguration is also understood to mark the end of the old dispensation represented by Moses and Elias, the Law and the Prophets, and the beginning of the new order under Christ.

After this event was consummated, He set His face towards Jerusalem, in order to meet His death, and entered the city in triumph, riding on an ass amidst the cheers of the multitude, who hailed Him with hosannas as one who came in the name of the Lord. The religious feast of the Passover was going on, and Christ preached in the Temple, and prophesied to His disciples the fall

of Jerusalem and His second coming. The animosity of the Pharisees and Sadducees against Him rose to a high pitch. They charged Him with blasphemy; He denounced their hypocrisy and boldly asserted Himself to be the Son of God. At length an open rupture ensued, and His death was resolved upon by the Sanhedrim.

Meanwhile Jesus ate the Passover with all His disciples, and foretold that one of them, Judas Iscariot, would very soon betray Him to be crucified. Hé distributed the bread and wine with great solemnity as at a funeral feast, bidding the disciples to regard it as His body and blood, which was broken for many, and to keep the sacrament in remembrance of Him.

That same night He went into the Garden of Gethsemane, near the city, to pray, and while here in an agony of spirit, over the sacrifice He was about to make, and sublimely bowing to the will of God, He was captured by a party from Jerusalem led on by Judas, and taken before the High Priest Caiaphas, who charged Him with blasphemy. Palestine was then a Roman dependency, and Jesus was brought before the Roman Governor Pilate, who, although impressed with His innocence, delivered Him over to be scourged, and crucified at the entreaty of the mob.

After suffering for six hours the terrible shame, the excruciating pain, and spiritual anguish of the cross, a trial which wrung from His lips the despairing groan, "My God, my God, why hast Thou forsaken me," Jesus cried with a loud voice, "It is finished," and bowing His head, He gave up the ghost. He was buried in a new tomb cut in the rock, but after three days rose again to life, and appeared in the flesh at different times and places to his disciples. He commanded His chosen apostles to preach

His word unto all nations, beginning at Jerusalem, where the power of the Holy Ghost would be given them; and, after blessing them at Bethany, he was "parted from them and carried up into heaven."

It is easy to see from the Gospels that the personal impression made by Jesus on those about Him was very great. John the Baptist when he saw Him walking by, proclaimed Him the Messiah which was to come; the herd of money-changers in the temple fled before His face; even the Pharisees were sometimes awed in His presence; His captors in the Garden were arrested by His majestic mien; and Pilate was so struck by His appearance as to believe Him innocent. While He yet lived His earnest manner and inspired aspect would, no doubt, authorize His teaching; but so transient an influence would surely not account for the extraordinary spread of Christianity after His decease. His early death in an outlying part of the lettered world, the disadvantages of His birth, the degradation of the age, and the bitter hatred of the reigning priesthood, would very soon have blotted out His name. Even now, the Talmud speaks of Jesus as the "fool;" the "hung;" "that man;" "so and so;" and condemns His memory to oblivion.

It was the miraculous element in His works, and the belief among His followers that He was the veritable Son of God, which promoted so rapidly the doctrines of the Prophet of Nazareth, not only in Jerusalem, the city of the Jews, but far away amongst the Gentiles. Jesus, though aware of the posthumous influence of His personality on His apostles, neither trusted to that nor to the witness of His miracles for the fundamental proof of His Divine mission. Knowing the short-lived nature of the one, and the dubious

character of the other, He appears to have based His claim to be the Son of God, and the success of His plans, on prophecy; for He predicted His death and resurrection, the fall of the Temple, great distress among all nations, and finally the second coming. It was the belief that His prophecy had come to pass, and that He had risen from the dead, which gave the irresistible authority of God to all His words, and sped the leaven of His kingdom among men. It was for this blessed assurance that the apostles wandered, and the martyrs bled. "If Christ be not risen," says Paul, "then is our preaching vain, and your faith also is vain." *

But apart from the Divine sanction of the Christian gospel, it was doubtless welcome to the ancient world. Its own inherent excellence fitted it for reception by a people which had begun to tire of the old myths, and yearn for a higher and purer religion. The new evangel taught men to regard the Deity as a loving Father, who, out of His Divine goodness had sent them a beloved Messenger and Mediator. It enjoined them to obey God like little children, and to trust in Him. It comforted their souls with the hope of a glorious immortality, through faith in Christ and a sincere repentance. He who had not sinned Himself, had yet revealed the secret and mysterious virtue of contrition. The humanity of the gospel was of the sublimest order. Jesus was not merely a lawgiver like Moses, or a seer like Elijah; he gave to men the loveliest and best ideal of human life, not as a mere picture or poem, but in the shape of a living reality.

"And so the Word had breath, and wrought
With human hands the Creed of Creeds
In loveliness of perfect deeds,
More strong than all poetic thought."

* 1 Corinthians xv. 14.

He commanded the exercise of that universal charity and brotherly love which is the most Divine and acceptable service man can render to the Infinite Goodwill, and freely sacrificed His life for the benefit of the whole world. He inculcated the utmost purity of thought and deed, forgiveness, humility, and patient endurance to the end. He exalted labour and poverty, and had compassion on the loathsome and the vile. "Come unto me," He cried, "all ye that labour and are heavy laden, and I will give you rest. Take my yoke upon you and learn of me, for I am meek and lowly in heart, and ye shall find rest unto your souls."

Within two hundred years after its foundation, Christianity was, we are told, the religion of Rome, notwithstanding the persecutions which the early Christians suffered. The humanizing influence which it has exerted on Europe, is thus eloquently summed up by Canon Farrar:—"It expelled cruelty; it curbed passion; it branded suicide; it punished and repressed an execrable infanticide; it drove the shameless impurities of heathendom into a congenial darkness. There was hardly a class whose wrongs it did not remedy. It rescued the gladiator; it freed the slave; it protected the captive; it nursed the sick; it sheltered the orphan; it elevated the woman; it shrouded as with a halo of sacred innocence the tender years of the child. In every region of life its ameliorating influence was felt. It changed pity from a vice into a virtue. It elevated poverty from a curse into a beatitude. It ennobled labour from a vulgarity into a dignity and a duty. It sanctified marriage from little more than a burdensome convention into little less than a blessed sacrament. It revealed for the first time the angelic beauty of a Purity of which men had despaired, and of a Meekness at which they had scoffed. It created the very

conception of charity, and broadened the limits of its obligation from the narrow circle of a neighbourhood to the widest horizons of the race. And while it thus evolved the idea of Humanity as a common brotherhood, even where its tidings were *not* believed—all over the world, wherever its tidings were believed, it cleansed the life, and elevated the soul of each individual man." *

Although the unbeliever and the believer alike partake of the benefits of Christianity, these benefits have become general through the faith of the believer. Every one must recognize the civilizing power of the gospel, "but the true believer sees in the Cross of Christ something which far transcends its historical significance. He sees in it the fulfilment of all prophecy as well as the consummation of all history; he sees in it the explanation of the mystery of birth, and the conquest over the mystery of the grave. In that life he finds a perfect example; in that death an infinite redemption. As he contemplates the Incarnation and the Crucifixion he no longer feels that God is far away, and that this earth is but a disregarded speck in the infinite azure, and he himself but an insignificant atom chance-thrown amid the million living souls of an innumerable race, but he exclaims in faith and hope and love, 'Behold, the tabernacle of God is with men; yea, He will be their God, and they shall be His people.' 'Ye are the temple of the living God: as God hath said, I will dwell in them, and walk in them.'" *

For nigh two thousand years the Faith of Christ has been the religion of the most civilized nations in the world; but many people now begin to fear its reign is over. Creeds, like races, have their day. They rise and flourish for a

* Farrar's *Life of Christ.* * *Ibid.*

time and then become extinct. Fossil ferns and shaly skeletons buried in the rock remain to tell of bygone living types: crumbling ruin, broken torso, and splintered column, upon the sands of Egypt or the capes of Greece, bespeak the death of the old gods. Scandinavian Odin with his wrathful brows and clanging hammer, Grecian Apollo shaking out light from his golden hair, Syrian Adonis with his love-locks and blooming youth, have passed from the hearts of men into their intellects. Once they were living gods and objects of devotion, but now they live only in the memory of men as the relics of an ancient error, or the poetical symbols of beauty, strength, and genius; while the marble shapes in which they were embodied to the sight are copied by our artists as models of the human form.

Shall Christianity perish in its turn? Shall the image of Christ be cherished as a mere emblem of holiness, and the sacred temples where His gospel was enshrined be handed over to the revelations of the lime-light? or shall the broken vestiges of these solemn monuments, the gilded altars, the pictured saints, and sculptured angels, yet be stored in public museums, to gratify the curiosity of an enlightened generation which has learned to smile upon them with a touch of pity as the fetishes of a mistaken worship? Or is the time approaching when the works of Jesus, the Galilean peasant, surnamed the Christ, shall appear in *editions de luxe*, with a portrait of the author, and a preface by an able critic, clearly proving that Joseph the carpenter was a master builder after all!

Such a prospect is neither cheering to the Christian, nor to the poor; but the consequences of the fall of Christianity cannot, of course, be anticipated without knowing what

religion will succeed it. Though the ancient creeds and living types became extinct, they left behind them a higher progeny to take their place. What creed, then, we may ask, can take the place of Christ's? Surely there is no higher faith than that.

CHAPTER IV.

THE OLD CREED.

I believe in God, the Father Almighty, Maker of heaven and earth:
And in Jesus Christ His only Son, our Lord, Who was conceived by the Holy Ghost, Born of the Virgin Mary, Suffered under Pontius Pilate, Was crucified, dead, and buried, He descended into hell; The third day He rose again from the dead, He ascended into heaven, And sitteth on the right hand of God the Father Almighty; From thence He shall come to judge the quick and the dead.
I believe in the Holy Ghost; The holy Catholick Church; The Communion of Saints; The Forgiveness of sins; The resurrection of the body, And the life everlasting. Amen.—THE APOSTLES' CREED.

FAITH, as an act of the mind, is necessary to every man, and the more his faith the happier he would seem to be. Even the atheist, denying God, must nevertheless believe in the laws of nature and put his trust in the certainty of their operation. Did he not, he would be miserable, since he could never at any time be sure of his life and safety. The Christian, on the other hand, by his exalted faith is elevated above mere earthly security and happiness by the rapture of his confidence in God and his hopes of everlasting life in Jesus.

It is a trite saying of the pulpit that faith is higher than reason, and that we must live by faith. But why should we live by faith with all its tormenting doubts, and why is faith higher than reason? It is higher than reason because it sees things which pure reason fails to see; it stands on the

shoulders of reason and looks, as it were, far beyond. In living by faith we are freer as moral agents than we should be if we lived by knowledge only. For could we know to a certainty the wages of our deeds in this life, we should have less credit in our conduct. Our wills would be the slaves of lust or fear, for the reward would bribe us on the one hand, and the punishment would frighten us on the other. The more room there is for faith, the freer our wills are, the more commendable is our success, and the more pardonable is our failure in righteousness. He is a nobler boy who obeys because his father bids him, than one who does so because he has been shown the lash and prize. In fact, pure duty for its own sake, and without any hope of pay in any kind, is the noblest action of all, and hence materialists are apt to flout at a religion which is so base as to expect rewards and punishments. But the obedience of the true Christian, like that of Christ, is irrespective of any reward that God in His mercy may have in store for him. He obeys because it is the Will of God, and if he is encouraged by the hope of future glory, his standard of duty is far higher than the materialist's.

Faith, however, is more liable to err than reason, and we may readily believe in a delusion. It is necessary, therefore, that our articles of faith should be tried by science, and this testing process must go on until the critical limit of science has been reached. Doubt and controversy are to faith as darkness is to light; and even here the law of personal exertion holds. To get our faith we have to struggle for it. Apathy alone is the great offence, and surely we may hope the effort made will weigh against the error. The sweeping condemnation of Christian unbelievers by St. Athanasius is evidently too severe.

Faith, then, is a prime condition of our spiritual being, and "I believe in God" is the first article of the Apostles' Creed. We are left to *believe* that God exists, for we cannot have any sensible knowledge of Him. His works can be seen, heard, and handled, but Himself is silent and invisible; the Art is before us, but the Artist is withdrawn from view. And yet this golden silence finely speaks the Infinite Wisdom, this viewlessness reveals the Unapproachable Majesty.

For however we may desire to have a direct knowledge of God, we must confess that there is something gross and paltry in the notion of a Deity who should take the form of an apparition, and address us in the loud voice of an oracle. It is a more exquisite, liberal, and exalted policy which leaves us to trace the Godhead in His handiwork.

The signs of God are to be found in Nature and the human soul, and hence it is that our theology is progressive. The order and immensity of the material universe exhibit His power and wisdom; the "still small voice" of conscience proclaims His will and love to us. The man of science investigates His relations to the cosmos, the prophet expresses His relations to man. The former interprets the physical creation, the latter interprets the spiritual, and thus they supplement each other.

How vain a purely scientific quest for God is, may be gathered from the fact that nearly all the atheism of the day is due to the study of science; and on the other hand, the early religions show us that unassisted revelation is apt to render our ideas of Him by far too anthropomorphic.

Physical science tends to widen our conception of the Almighty Essence, Maker of heaven and earth; but it is revelation which informs us of His Fatherly character with

respect to ourselves, and thereby satisfies our heartfelt and proper desire.

But what are the rights of revelation to regard the inscrutable Creator as a Father? In the first place, He is the author of our being; He gives us work to do and laws to obey. By our obedience to these laws we evidently please Him, for He has arranged things so that we are rewarded with inward happiness; and by our disobedience we evidently offend Him, for He chastises us with pain. Love is at the root of His commandments, and in all His dispensations He desires our good. If He is strict, He is only just; if He seems cruel, it is only to be kind.

True, He is an absent Father, a Father whose face we cannot see because He dwells in heaven, but whose presence and lovingkindness is everywhere apparent, both in the goods provided for us and in teachers which have been sent. Moreover, if His ostensible absence demands a greater faith in Him, it increases our freedom while it dignifies our responsibility.

So far, then, the Creator may be justly likened to a father; but when we assume, with many scientists, that prayer is futile, and that God makes no response to our petitions, the paternal relation seems to be entirely vitiated. For would he not be a stern parent, a hard stepfather, who could turn a deaf ear to the groans and passionate entreaties of his children? To this it may be answered, that even as God differs from a human father in providing ALL the conditions of his children's existence, so is He free to disregard their outcries without incurring a charge of ill-will or indifference. A human father can only in part arrange the circumstances about his children; and therefore he must exercise a watchful care over them, and be ever ready to

respond to their appeals for help. But it is otherwise with God, who has provided all things for our welfare since the beginning; and we may rather compare Him to a provident nurse who has disposed her charges in the nursery in such a way that, though she leaves them to their own resources for a time, and on their good behaviour, she knows that they can take no permanent harm.

It has been pointed out, however, in a former chapter, that the spiritual efficacy of prayer is not necessarily incompatible with the physical theory that the sum of energy in the universe is constant. Nor can such efficacy be said to run counter to the theory of development, at least as far as moderate Darwinism is concerned, for it does not come into play until man has been developed, and therefore leaves all the lower world under the entire control of evolution. Pursuing this train of thought, we are even led to inquire whether a response to prayer might not come under some higher law of evolution, applicable only to man. It is not necessary to surrender the freedom of will for this arrangement to hold, because the response might solely depend on the fact of an earnest and voluntary request, much in the same way as the sunshine is ever ready to our seeking. But then comes the difficulty that all prayers are not granted, that the sunshine is often withheld by clouds, and we are obliged to return to the idea that effective spiritual prayer must be to all intents and purposes a voluntary petition on man's part and a voluntary grace on God's.

We come now to the difficult question touching the Divine nature of Christ. Was Jesus of Nazareth the true Son of God, and therefore, in a certain sense, God Himself, or was He only a man of the highest possible type? The

human race has long yearned to know the God who made them and their world, long craved a special messenger from Him. Has God broken His eternal silence once, and satisfied this natural desire? Not content with giving seers and prophets to the earth, has He also given it a Messiah?

Regarded in this light there is nothing improbable in the idea of the Incarnation. On the contrary, it would seem likely enough that God *had* visited His people, either in His own Person or in that of an accredited Representative. But yet we hesitate to believe in a special fecundation, because it may not be His mode of working.

Evolution, we are told, is the Divine process, and whatsoever is inconsistent with evolution cannot be accepted. Now, the miraculous fecundation mentioned in the orthodox creed *would* be inconsistent with evolution, such as we know it. Let us look a little closer at this point.

If the pure materialist is right, and the world as it stands, with all its products, is nothing but a nebula in a certain phase of its necessary development, and if free-will in mankind has no existence, then, indeed, a special fecundation, at a certain stage, would be absurd. For, in the first place, the same result could be provided for in the original nebula, and, in the second, without free-will there could be no real meaning in Christianity, no Fall, and therefore no Redeemer.

But it is a different matter if we recognize the existence of human free-will and human sin. Then, although evolution continues to operate as before, we have also to take into account the arbitrary element of free-will. By virtue of this quality, man has power to interfere with the natural progress of evolution, either hastening or retarding it. And

if man is thus allowed to tamper with the normal course of nature, why may not God be? If there were no sin—that is, if man always willed in accordance with God—there would be no need of any special interference on the part of God; but as man has disobeyed God's will, there is a reason for His interference. In a former chapter we used this argument in favour of a Divine response to prayer in certain instances, and now we may employ it to illustrate the reasonableness of the supreme mystery, the miraculous conception of a Messiah.

It was there shown that spiritual response to prayer may not necessarily be incompatible with the doctrine of the conservation of material energy,* but in the case we are considering it is difficult to see how the violation of that doctrine could be avoided. Nevertheless, we must remember that the Agent here is the Almighty.

It is part of our method to assume the truth of evolution and the conservation of energy; and hence we are careful to discover how far the old faith holds good without infringing either doctrine. There are some, however, who reject both theories as unproven; and others, again, who, in defiance of both theories, would still claim the birth and works of Christ as a Divine breach of continuity in nature tantamount to a special creation. We need not concern ourselves with this uncontroversial view of the matter, further than to point out that a peculiar and avowed breach of continuity, as in the case of Christ, could hardly put the human intellect to that perpetual confusion which is so much dreaded by men of science.

We will not dwell upon the scriptural evidence for the divinity of Christ, the predictions of His coming contained

* See Book II., Chap. V.

in the Bible, from Genesis downwards,* the manifest simplicity and truthfulness of the Gospels, and the Divine greatness of the Personality which emanates from them, despite their plain matter-of-fact style, the glory of a Sinless Life, and the wonder of a Being whose like the world had never seen before. That may be left to worthier pens. But we may remark here, that the sayings and doings of Christ are so intimately blended together in the Gospels that it is not easy to see how the truth of His words can be accepted without also believing in the truth of His deeds. There is a class who reject the miracles, but retain the precepts of Jesus. Now, if the miracles are false, what hope have we that the precepts are true, since both rest on the self-same Witness. Assuredly none but the fact that the sayings are in themselves more credible than the miracles. At least, they are more credible now, after eighteen centuries of Christian culture; yet the fact remains that the miracles were at first the vouchers of the sayings. Christ's doctrine was found so "hard" to understand and practice by his followers that it had to be accredited by wondrous works.

We have heard scientists argue, with some show of reason, that miracles could not prove the verity of Christ's doctrine, since a physical feat is no test of spiritual truth. But they forget that miracles were used to show *that Jesus came from God,* and thus indirectly to attest the truth of His precepts, since that which came out of God's mouth must be true. Jesus appeared as the Divine Plenipotentiary, and the miracles were His credentials. Common sense recognizes the justice of this plan, which, even to-day, would serve the purpose intended.

* Genesis iii. 15, etc.

Attempts are sometimes made to explain away the supernatural character of the miracles, by representing them as curious freaks on the part of Nature, or spectral illusions on the part of the witnesses. This is equivalent to confessing that the miracles were a pious fraud imposed on the disciples; but it is quite patent from the Gospels that the miracles were not a sham.

On the other hand, is it necessary to suppose that they were wrought in opposition to the laws of nature? Let us have as clear ideas on this point as on others.

True, they were out of conformity to the usual custom of nature, but breaking the old custom need not be breaking the old laws. Living matter, sensation, instinct, reason, present themselves one after another in the world by a slow and gradual growth in keeping with the changes of its mineral mass, and we call the process natural. An inexplicable sudden growth at God's command would be miraculous, and contrary to all custom, but would it be antagonistic to the laws of evolution?

Man, by his knowledge of nature's laws, his free-will and power, is able to produce new kinds of animals, and plants, or build up mechanical marvels. This he does by influencing nature, yet obeying her. He breaks her ancient customs, but he cannot break her ancient laws.* Cannot God, then, with His perfect knowledge and control of all the inner mechanism of nature, perform miracles without transgressing these laws?†

* Dr. Siemens coaxes tulip-buds to blow by his electric light, and Mr. Edison makes the diaphragm of his phonograph restore the speech of yesterday.

† It has been ingeniously suggested that the miracles might be a unique result of evolution, such as would be manifested by a machine which performed a peculiar act just once in its whole course of working.

But man can only do these wonders by exerting force on nature. He employs part of the total energy in the universe in directing another part to his private ends. By the conservation of energy theory, however, God is not permitted to add any energy to the sum of that within the universe. Therefore He must perform the miracles by means of power already stored in nature. He must not communicate energy to the universe, or, in other words, must not create.

Spiritual response to prayer may possibly take place without adding to the sum of energy in nature; and the forgiveness of sins may also be effected in a similar manner. Both of these operations belong to the region of mind, which we can never penetrate and wholly understand. Divine interference there, cannot put the human intellect into confusion, any more than man's free-will can. But the physical miracles deal with matter, the laws of which we learn to know. Science can permit no arbitrary meddling here, or else her inferences would be confounded.

We cannot see how the material miracles could be performed without communicating energy to nature, how the miracle of the loaves and fishes, for example, could be accomplished without the creation of matter. Nevertheless, we cannot therefore say the feat is absolutely impossible.* One thing we may be sure of is that God would work the miracles in the simplest and easiest way; that is, by utilizing existing means as far as they would go.

In studying the nature of Christ, we have to consider

* The growing probability that all bodies are combinations of one primitive matter may give us a dim inkling of how the water could be changed to wine, and air to bread and fish, etc. Moreover, the alleged phenomena of spiritualism, if there be any truth in them, may afford a clue to other miracles, such as walking on the sea.

whether He was God made man or man made God, whether His birth was an Incarnation or an Apotheosis. In mediæval times, when the earth was thought to be a great plain and the most important part of the universe, it was far easier to believe that God had entered the womb of a creature, and been crucified on the cross by men, than it is now, when the overwhelming magnitude of the cosmos is revealed by science. The preferable view is that which regards Christ as a God-sent man, conceived by the Holy Ghost, and bearing a peculiar relation to God, best expressed by the phrase "His Son." This relation was such that at Christ's request God performed miraculous works. This view is favoured by Christ's own conduct in praying repeatedly to God as to His Father, and in many passages of the Gospels.* The Athanasian Creed also expresses the same idea in the clause, "One; not by conversion of the Godhead into flesh: but by taking of the Manhood into God."

The mystery of Christ's atonement for the sins of others is frequently assailed on the ground of its being unjust for an innocent person to be made to suffer for the guilty. But if all the human race is guilty, the punishment of the guilty would mean the suffering of the whole world. To save the world, therefore, Jesus offered Himself as a sacrifice; and the naturalness of the act is illustrated by those historic instances of captured cities in which the inhabitants were spared by the vicarious sacrifice of two or three of their chief men. The Mayor of Calais who offered himself to the offended English monarch in order to save the city from destruction, is a heroic example of this kind of propitiation. If Jesus voluntarily gave His life as a

* See John x. 31–37; John v. 30.

"ransom for many," might not an offended God forgive the rest of the world for His sake?

Guided by the foregoing considerations, we are led to the following definition of the orthodox Trinity:—

The three Persons of the Godhead are:—

First Person, God the Father, omnipresent, but unseen almighty, who out of His infinite goodwill, and in order to give happiness to His creatures, created heaven and earth, and all that in them is.

He endowed man—that is, mankind—with free-will; and hence, also, the power to disobey His commands—that is, to sin. Mankind sinned, as was to be expected. Sin is offensive to God, and death to the soul of man. Therefore to redeem man from sin by showing him a Divine example of righteousness, and, by contrast, the heinousness of sin, He sent Christ, the sinless Man, into the world to teach men, and be crucified by them. Christ, being wholly sinless, was conceived by the Holy Spirit. He is therefore called the Son of God, and His mission is a sign of God's love. Love shows itself in self-sacrifice for others. "God so loved the world that He gave His only begotten Son to be a propitiation for our sakes." The love is shown by God in giving Christ into the world; the propitiation is accomplished by Christ in dying for us.

Second Person, Jesus Christ, sent by God to be the Spiritual Light, and therefore the true Lord, of the world, God's representative on earth. He is the highest revelation of God to man; his life was an incarnation of the commandments, "the Word made flesh." In His hatred of sin, His universal love, and special mission, He is at one with God, and worthy to be called His Son.

The human race, created free moral agents, have sinned

or disobeyed God. They have therefore offended God, and brought spiritual suffering and death upon themselves. God, however, does not destroy them as a race; He provides them with a Redeemer, who, by His sufferings, shall expiate the offence of the race against the Deity; and by the example of His life, shall help each individual to see the error of his ways, and to turn from his wickedness and live. He is thus the Saviour of the world. His death, the cruel death of the Divinest Being the world can ever know, is calculated to show God's hatred of moral evil, and bring home to men the awful heinousness of sin. His life is an example aiding each free moral agent to accomplish his own personal salvation. The end of His work on earth, the establishment of His kingdom, is the reign of universal charity and holiness. His resurrection gives an assurance of immortal life to all who truly believe in Him, for true belief in Him implies the doing of His word, repentance, and the renunciation of sin.

Third Person, the Holy Ghost, or Spirit of Holiness, which showed itself in the world before Christ's advent, but has been especially active since that event, in carrying on Christ's work, and extending His kingdom. All holiness is from God; and the Holy Ghost is the source or germ of the prophet's inspiration, the nature of Christ, and the goodness of the saints.

The mystery of the Trinity lies in the dogma that these three separate Persons are one, a mystery which is best explained to a logical mind by supposing them to be three aspects or *manifestations* of God, namely, the Creator of the Cosmos, the Saviour of the World, and the Fountain of all Goodness. By proclaiming the unity of nature, science confirms the Christian idea of the Oneness of its Maker.

Belief in the divinity of Jesus Christ involves belief in all His doctrines, His resurrection from the dead, His glory in heaven, His last judgment. His resurrection *demonstrates* the truth of man's instinctive belief in a hereafter. It is clear from our knowledge of the evanescent and atomic character of the body, as well from many passages of Scripture, that the old material body is not raised again.* Many scientists incline with Priestly to regard the soul as mortal in itself, and the future life as a fresh gift of God to those who have obeyed Him. But we must bear in mind that science has *not* proved the soul to perish with the body. She only suspects it, because she cannot see how it can be otherwise. According to Christ's teaching of a heaven and a hell, and St. Paul's illustration of a seed sown in the ground—"that which thou sowest is not quickened except it die," the soul is in itself immortal, and enters on a new life at or some time after the death of the body. This is a view in keeping with the process of evolution and the continuity of things. The plant springs upward from the rotted seed; the butterfly emerges from the chrysalis.

Heaven and hell are described by Christ in strong but figurative language, which must not be taken literally. His object was to impress his hearers with the bliss of heaven and the misery of hell, and this could best be done by using images with which they were acquainted. So he likened heaven to a beautiful city, and hell to the Valley of Gihon, or Gehenna, the sink of Jerusalem, a revolting sewer where the rubbish of the city was perpetually burning, "where the fire is unquenched and the worm dieth not." Heaven was not necessarily a place exclusively for Christians, but Christians were there to enjoy perpetual fellow-

* See Matt. xxii. 30; 1 Cor. xv. 35.

ship with Him, their Master. For aught we can find to the contrary, there is a heaven for all who obey God, pagan and heathen; but belief in Jesus is a sure title to heaven. "I am the way, the truth, the life."

The prophecy of the Last Judgment is one of those remarkably significant passages of holy writ which make even the materialist pause and ponder, whether, after all, there is not such a thing as a Divine revelation. In Psalm cii. 25, 26, we read, "Of old hast Thou laid the foundation of the earth; and the heavens are the work of Thy hands. They shall perish, but Thou shalt endure: *yea, all of them shall wax old like a garment: as a vesture shalt thou change them, and they shall be changed.*" Christ foretells that the sun shall be darkened, the stars shall fall and the powers of heaven be shaken, when the Son of Man shall come in the twinkling of an eye. Elsewhere we read of the Last Day, "wherein the heavens being on fire shall be dissolved, *and the elements shall melt with fervent heat.*"* Now, modern science assures us that the whole visible universe is slowly waxing old, and that a day must come when the lifeless ruins of its worlds shall dissolve through sheer inanition into some primal fluid, and,

> "Like the baseless fabric of a vision,
> Leave not a rack behind;"

or that the collisions of dead and wandering suns shall "shrivel up the earth like a scroll," and reduce the cosmos to a glowing nebula, perhaps the embryon of a new earth and heaven.

The arguments against the Divinity of Christ are numerous enough; but it will suffice to mention a few of them here. The prophecy of Christ's coming is held to be

* 2 Peter iii. 12.

a natural instinct in men, leading them to expect moral teachers. Socrates, for example, is said to have predicted the appearance of a Just Man who should teach his fellows how to pray. A Messiah was expected in the Holy Land, and Jesus of Nazareth, urged by His prophetic soul, believed Himself to be the Man. The authority of the Gospels is weakened, we are told, by the superstition that has become mixed up with it. The miraculous element has a habit of growing up round the founders of all the earlier religions; for example, Buddha. It gathered round his life, within one hundred and fifty years of his death, and he, too, is believed to have been miraculously conceived. Lastly, it is submitted that a practically sinless person could be born of human parents in a natural way.

We must leave to others the discussion of these opinions. Time will show whether they will come to be accepted by mankind or not. But, meanwhile, we are fain to see what would be left to us of the old faith were the miraculous ingredient sifted out.

No "cosmic emotion," or facts of science, are like to compensate us for the loss of that sublime and hallowed mystery, the personal visitation of the Father, the special token of His endless love, which Christians recognize in the Divine and blessed life of Jesus. Nevertheless, although the miraculous element which fostered the young faith were separated from it, much would remain behind. When the husks of so-called mythus are stripped away, there is still a healthy core of living truth revealed; and incidents in the Gospels held as true objectively, might still be held as true subjectively, or in a symbolic sense.

Putting aside the idea of a special interference, we have now to regard the birth of Christ as the natural result of

evolution, tempered by the operation of human free-will. To admit the debatable factor of a Divine response to prayer, in other words, a supernatural influence on the soul, into the problem, would be to admit a miraculous agency competent to produce a Sinless Person without the aid of a special fecundation. Supernatural response to prayer *may* be a real influence in human evolution, as it seems to be, and if so, the production of a Sinless Person by Divine and human agency together could apparently be brought about. But for our present purpose we will consider prayer a *natural* agent in evolution, and not a supernatural one. Let us suppose, then, that Christ was born in the usual course of nature. He was the Perfect Man, the prime result of evolution, the choicest fruit of cosmos. And being such, He was conceived in God's mind from the beginning, just as the human type was pre-designed. As the selachian fishes, and batrachians of the ancient eras foreshowed the advent of mankind,* so did the prophets foretell the coming of Jesus. Moses and Elias were his spiritual ancestors. As the first man was the offspring of a chosen tribe of anthropoids, so Jesus was a scion of the Jews, the sacred branch of the human stock. Adam came upon the earth when it was ripe enough to render his works permanent, and Jesus when the moral world was ripe for the duration of His teaching. In the one the animal creation reached a climax, and in the other the religious life attained its culminating form.

Both were monarchs who established a new order—Adam in the physical, Jesus in the spiritual realm.

Created intelligent and free, or capable of knowing both good and evil, man was therefore fallible. He was free to

* See ante, Book II. Chap. I.

follow his conscience and obey God, or be guided by the promptings of the flesh and disobey God. In this freedom lay his glory and his danger. Tempted by the hereditary strain of the lower animals (which, in the Hebrew parable of the Fall, is typified by that most degraded beast, the serpent, inspired by the spirit of lawlessness which dwelt in chaos), man sinned, and incurred the penalty of moral suffering and moral death. God foreknowing the failure of mankind from the ideal, that many would fall and all might, provided a Saviour * for them, who is represented in Scripture as the seed of the woman, the Word or Spirit of Law, dwelling in heaven, made flesh. The Saviour is the ideal Man, and as such is an examplar to the race. He obeys God in all things, and voluntarily dies for the sake of His fellow-men. His conduct is therefore pleasing to God, and atones for the disobedience of mankind. His life revealed to men the beauty of holiness: and His death the hideous crime of sin, that sin which crucified the Divinest thing the world had known. His Divine precepts, and heroic endurance of the most terrible ills, constitute Him our highest possible pattern and teacher. By believing in Him, and therefore striving to do likewise, we will be saved from sin, and all its evil consequences.

Having now reviewed the birth and mission of Christ in a natural light, we may in like manner briefly consider the doctrine of the Trinity. The First Person may still be defined as the Creator of the Cosmos—that is, all matter and living things in this or other worlds; the Father, Almighty, Maker of heaven and earth. The Holy Spirit becomes the spirit of holiness infused into the world through man. In the material and lower animal nature, no spirit of holiness

* "The Lamb slain from the beginning of the world."

is seen; but it appeared before Christ conspicuously in the prophets,* and after Him in the saints. Christ is the pure incarnation of this Holy Spirit, and in this sense may be regarded as conceived by the Holy Ghost. He was apparently designed by God to be a light unto the world, a special response to the spiritual craving of man. Hence He may be looked upon as a Messiah. He is a complete expression of all that God desires man to be. Hence He is an Ideal Exemplar, a Redeemer, Saviour. In His infinite love, God-like character, sinlessness, and heavenly mission, He may be called the Son of God. As the spiritual heir of the world, and its crowning figure, whose life is its highest joy, and whose death is its deepest woe, He may be called the Son of Man.

The Creator, the Spirit of Holiness, and Christ are three aspects then, or manifestations of the same Godhead, as recognized by men. According to the nebular theory of creation, the latter two were latent in the primal nebula; but if the nebular theory is not strictly correct, they may really be special manifestations of God made later on.

If Christ be not God Himself, He is, at any rate, the highest emblem of God that men can ever know. No love can be greater than that of Him who sacrificed His life for the whole world. No moral teaching can be loftier than His, let science and culture advance as they will. It neither conflicts with physical science, nor, rightly interpreted, does it stifle culture. In a social respect, it is free alike from the asceticism sanctioned by Buddhism, and the sensuality and fatalism of Mohammedanism.

* The prophets, and we include religious teachers other than Jewish in the word, must also be regarded as Divine missionaries to men. Buddha, indeed, is called "Saviour," because he saves men from sin and evil desires.

Christ cannot fail to take a deep hold on the hearts and imaginations of those who seek a knowledge of His life. He is the soul's idol, the Ideal Being we are all ready to love. Whatever was good in the past, and whatever shall be good in the future, was centred in Him. All the spiritual loveliness which poets and painters have feigned beamed from the eyes of Jesus. His life is a standing protest against any sneers and scoffs that may be levelled at humanity. Christ has lived, whose holiness, purity, and goodness transcends imagination. That fact is enough to silence carping cynics, and at the same time to inspire all noble spirits. He is our supreme moral exemplar; and just as the human body is evidently the highest and dominating animal form to be developed on the planet, so is the teaching of Christ the crowning spiritual evolution. By its beauty and fitness it will survive, for surely we are right in thinking that it is the best and highest possible. And if it is the fittest for us here, life will rebuke and scourge all our departures from it. Since, then, we have received His teaching, and acknowledge its truth, our duty is to obey it. "He that hath my word and despiseth it, hath that which shall judge him at the last day." We may not, with impunity, construct moralities to suit ourselves. The glory as of the Highest has been revealed to us, and the image of His divine beauty will never die out of our eyes. It behoves us to study His life and precepts, as recorded in the Gospels. And shall we not also love and reverence, in a word, adore Him?

We see, then, that revelation will bear a natural interpretation; and that even a rational version of the old faith is consistent. Let us pursue this treatment still further.

If the whole earth is to be regarded as a Divine work, it may be argued that the person of Christ would be equally sacred, whether produced by a special fecundation, or by the operation of Divine laws from the beginning.* A thing is sacred in proportion as it manifests the Divine nature. Christ manifested this in a supreme degree, and therefore He is supremely sacred. Eighteen centuries have proved the truth and beauty of His cultus; and hence it may be pleaded there is now no need of miracles to warrant it. The human race, especially the poorer classes, can ill afford to let it perish.

As for the hope of immortality, science cannot deny there is a hereafter; and, therefore, faith is free to believe in one. The all but universal instinct of mankind, the firm assertions of the prophets, are in favour of a future state. If science could one day prove that there is none, why expose the race to such a needless disappointment, and discount the teaching of the prophets, by laying bare so gross an error? It would surely have been better to permit no such instinctive hope, no such innate conviction to grow up in men. Christ, as Highest Prophet, also preached a future state. We know His moral teaching to be true, and Heaven-sent, and therefore are the readier to believe His promises of immortality. Even if He did not rise from the dead in the manner related in the Gospels, He may have risen in some normal way, open to other souls. Faith in a future state of happiness is so blessed, so inspiriting, and so universal that, while science has no positive proof against it, we may well be pardoned for indulging it.

* This does not touch the argument that free-will might *necessitate* a special fecundation. That argument can only be answered by submitting the questionable proposition that a practically sinless person could be born in a natural way, despite the operation of free-will.

It has been pointed out by a recent writer that there is a progressive refinement in the action of the different senses. Touch has primarily to do with solids coming into direct contact with the organ, taste with a liquid medium, smell with particles carried by a gas, hearing with vibrations in a gas, and seeing with vibrations in an ether. And this advance in power to appreciate finer qualities of matter, and discern to greater distances in nature, together with the well-known fact that certain persons have a peculiar power of "reading the thoughts," has led him to the speculation that a special sense may yet be developed enabling men to divine thoughts by a kind of clairvoyance;* an induction of thought, or direct action of soul on soul. On the theory of evolution it is highly probable that the senses were developed in organisms in the order named; and we may institute a parallel between their evolution and the spiritual evolution of mankind. At first men groped about after God, and perceived Him in tangible things, then gradually rose to higher knowledge of Him. New spiritual senses were given them as they were required. At last came Christ, who looked on God as the intelligent eye of the original man would gaze upon the sun. Perhaps the whole human race will, in the days to come, acquire a direct sense of God's presence in the universe, similar in kind to that which was possessed by Jesus. And, if not on earth, perhaps it will be granted us when we have laid aside the garments of mortality.

* Such a power is recorded of Christ, and it would seem miraculous to His followers, even though due to natural evolution.

CHAPTER V.

THE NEW EVANGELS.

How is it that our modern thought
Has travelled from these sacred ways,
And every certain truth is bought
By parting with some Faith and praise?
We light our earth with the quenched rays
Of heaven; and yet we only seek
Truth for the strong and for the weak,
Loving it more than length of days
Or the ruby lip and the blooming cheek.

* * * *

'Tis wisdom, doubtless, for the man
To learn the fact and steadfast law:
Yet wisdom also in its plan
Embraced the child's great wondering awe
Which found the Unseen in all it saw;
Whom now we seek with cruel strain
Of longing heart and wildered brain,
Tossing our barren chaff and straw
In search of the old diviner grain.

From *Olrig Grange.*

In the whole history of the Christian religion there probably never was a period when doubt and infidelity were as rife in Christian countries as they are at present. England is no exception to the rule. The conflict of heretical opinions among her leading thinkers, and the cultured classes who share their society and hearken to their teaching, is a notorious trait of the times. Philosophers who have grown grey in poring over test-tubes and microscopes, assure us

that the soul is nothing more than a cluster of molecules which death shall for ever disperse; that God is either an ideal myth or an inscrutable Power, whose real nature baffles the heart and bewilders the brain. Weaned from their allegiance to Christ, our poets long to join in the vanished festivals of Apollo; and freed from the burden of the Cross, they languish for the seductive licence of paganism. Even within the pale of the Church herself there are ministers tainted with the prevailing scepticism, who either overtly preach or secretly believe some heterodox version of the old creed; and callow freshmen at the universities improve their leisure in chattering about Christianity as a defunct superstition, to be relegated ere long to the lumber-room of fossil faiths. The upper classes, early infected by the decay of the old belief and the ferment of new ideas, have become cynically corrupt; the middle classes, though they have to a great extent caught the same mental epidemic, have borne up better against it, owing perhaps to their busy lives; and only the lower classes are as yet comparatively exempt from the prevailing malady.

This lamentable state of society is largely due to the spread of materialism, whatever eminent materialists may urge to the contrary. By teaching that every event taking place in the world is the result of mechanical laws and never of any supernatural agency, positive science deprives Christianity of its miraculous element, and shatters our faith in the gospels and the divinity of Jesus Christ. To the work of spiritual demolition thus begun, materialism adds the finishing stroke by announcing that the soul perishes with the body; and that nothing exists but matter and motion.

It would appear, however, that men can not be happy

without a faith of some kind, and since the old one has been discarded, by many persons, they have found it necessary to manufacture new ones. We will examine some of these latter-day evangels.

Beginning with materialism, we find that there are two sorts of it, mild materialism and rank materialism. Dr. Tyndall is, perhaps, the chief exponent of the first kind, while the German professor, Haeckel, is the great mouthpiece of the second. In the eyes of Dr. Tyndall a red-hot star is a fiery embryo, out of which endless forms of life and beauty will develop by its inherent potency. "Supposing," he writes, "a planet carved from the sun, and set spinning round its axis, and revolving round the sun at a distance from him equal to that of our earth, would one of the consequences of its refrigeration be the development of organic forms? I lean to the affirmative. *Structural* forces are certainly in the mass, whether or not these forces reach to the extent of forming a plant or an animal. In an amorphous drop of water lie latent all the marvels of crystalline force: and who will set limits to the possible play of molecules in a cooling planet? If these statements startle, it is because matter has been defined and maligned by philosophers and theologians who are equally unaware that it is at bottom essentially mystical and transcendental."*

Dr. Tyndall further regards the animal body as a piece of mechanism kept at work by consuming the blood, which is the "oil of life;" "but," says he, "in affirming that the growth of the body is mechanical and that thought, as exercised by us, has its correlative in the physics of the brain, I think the position of the materialist is stated as far as that position is a tenable one. . . . If you ask him

* *Fragments of Science*, 6th edit.

whence is this matter of which we have been discoursing, who or what divided it into molecules, who or what impressed upon them this necessity of running into organic forms, he has no answer. Science is mute in reply to these questions. But if the materialist is confounded and science rendered dumb, who else is prepared with a solution? To whom has the arm of the Lord been revealed? Let us bow our head and acknowledge our ignorance, priest and philosopher, one and all."*

In this cautious confession of faith, or rather of non-faith, it will be seen that the claims of Holy Writ are entirely ignored.

Professor Haeckel goes far beyond Dr. Tyndall, and boldly asserts a positive creed, which he has termed Monism in opposition to the Dualism of divines, which would affirm the universe to consist of both matter and spirit. According to monism there is only one force acting on matter, namely, mechanical force; and as for mind, it is a quality of all matter. By the play of mechanical force and matter the universe is evolved in a regular and rational manner like the working of a great machine. The theory of descent, or *transformism*, which explains the origin of living types by change of shape due to mechanical causes, is an essential part of monism: and the theory of selection, or *Darwinism*, is until now the *chief* among the different theories which try to explain this transformation.

Not content with a description of the general process of development, Dr. Haeckel attempts to trace its actual steps, and he has therefore drawn up a "Stamm-baum," or family tree, to illustrate the pedigree of man.

From this interesting archive, we learn that, some time

* *Fragments of Science*, 6th edit.

about the beginning of the Laurentian period of geology, the atoms C, O, H, N (Carbon, Oxygen, Hydrogen, Nitrogen) were thrown together by chance, and united to form a monera, or bleb of living jelly, which was the primal germ of all succeeding organisms. From this monera, by a slow and devious course through intermediate vermin, the humble worm issued, and from the worm there sprang in time the fish, and from the fish the ape. Later on, in Miocene ages, the man-like ape parted with his tail, and eke his hair, while receiving in exchange a more capacious brain-pan. At last this "dumb-ape-man," our idiotic first-parent, who dwelt in the paradise of Lemuria, a lost island of the Indian ocean, left off his disagreeable howling and became a talking person. How he ever learned to laugh is as yet a mystery; unless, indeed, there were Haeckels in those days.

There is no break in the continuity of this long chain of descent; and all the various links of it are solely due to mechanical force. "A stone falling to the ground," says Haeckel, "according to definite laws, a crystal forming in a saline solution, sulphur and mercury combining into cinnabar, are *neither more nor less* mechanical life-phenomena than the growth and flowering of plants, the propagation and sensation of animals, or the perception and intelligence of man."* There is no essential difference between animals, plants, and minerals, that is, between dead and living matter. All natural bodies are equally alive: every atom has an atom-soul; every plastidule, or molecule of protoplasm (COHN), has a plastidule-soul which is the resultant of all the atom-souls composing it; just as the

* *Natural History of Creation.* For a similar theory see the famous eighteenth century romance, *The Fool of Quality*, by Henry Brooke, Ch. IV.

soul of a weed or a man is the sum total of all the plastidule souls it contains. Soul-life resolves itself into two elements, attraction and repulsion; or, in other words, the love and hate of atoms. All our thought and feeling may be ultimately referred to the food we eat; and our highest social instincts, even the Christian sense of duty, so far from being peculiar to mankind, are to be found in still greater perfection amongst the ants.

Monism is, in its founder's eyes, destined to be a panacea for all the evils under the sun. It will correct the effects of bad education, and raise us from the barbaric state we grovel in despite all our boasted civilization. By a prompt recognition of our apish ancestry, we shall arrive at the only true religion, the religion of nature, whose highest commandment is Love!

The idea of a God, creator of the world, is to Haeckel so absurd that it can only have originated in the crania of the dumb-ape-men, or parental idiots, before they had begun to exchange ideas; and as for free-will, right and wrong, good and evil, virtue and vice, they do not exist. Man is an automatic brute; human nature is the intricate play of atoms; inexorable fate rules all.

"The time has come," says Haeckel, "to replace the antique dualistic and teleological conception of life and spirit by the monoistic or mechanical conception. We have arrived at the boundaries of the old faith and the new. Mystery which is, perhaps, impenetrable exists; but, in any case, scholastic arguments will not pierce it. The doctrine of final causes has all the artless simplicity of the explanations which prevail among savages or children; and the theories of Lamarck and Darwin have given the quietus to this decrepit doctrine. Modern morphology is irrecon-

cilable, not only, I say, with the dogma of creation, but also with that of a Providence, or a vague ideal pantheism of the kind associated with the names of Hegel, Schopenhauer, and Hartmann."*

As for Christianity, Herr Haeckel treats it with rather more courtesy than he bestows on Providence, and shows his appreciation of it by coolly proceeding to appropriate a portion. "It is certain," he remarks, "that the Christian religion, as well as the Buddhist doctrine, if freed from all dogmatic fables, contains an excellent human kernel; now it is just this humane and truly social democratic part of the Christian creed which proclaims the equality of all men in the sight of God, and preaches 'Love thy neighbour as thyself,' in fact 'love' in its highest sense, compassion with the poor and unfortunate, etc.; I say these truly human sides of the Christian faith are so natural, so pure and noble, that I comprise them with pleasure amongst the moral laws of our monoistic religion."†

We need not linger long over the avowed ignorance of Professor Tyndall. If science cannot tell us anything about the Deity, we are still free to put our faith in revelation; for revelation, as well as plants and crystals, may have been included in the original "promise and potency" of atoms.

The bold denial of Professor Haeckel concerns us more; but in its boldness there is an element of rashness, and therefore of weakness. It is altogether unwarrantable to deny the existence of a God because science can find no traces of Him in nature; and Dr. Tyndall takes a safer position in leaving the question open. Materialism seems to be a kind of inverted Christianity. Instead of seeking God in the wide heaven of the human soul, the materialist inverts his

* See *Nature*, Sep. 5, 1878. † *Freie Wissenschaft und Freie Lehre.*

view and peers through the small end of his glass into the stocks and stones of the ground. No man can be absolutely certain that God exists; but if He does, we are more likely to discover signs of Him among His higher than His lower works. It is not among the bricks and mortar of a building that we expect to trace the aim and genius of the architect, but rather in the finished edifice, especially its superior parts. Life, indeed, appears to be an ascending scale, like Jacob's ladder, based upon dead matter and leading up to God. Man, who is at the top, is, of all earthly things, the nearest to Him; and it is among the highest men that we shall best discern His image. Moreover, if we assume there is a Creator, may we not derive an argument for Divine revelation from the very unlikelihood that He would leave all His creatures ignorant of their Maker, and sit eternally in solitary state, environed by a blind machinery?

Time was when proofs of providential design in nature were one of the happiest products of science, and this design was held to imply an original Intelligence; but we have changed all that, and while one physicist mystifies matter another demonizes it, and gets rid of the necessity for a Creator by endowing each atom with a spirit of its own. Haeckel is obviously led to this preposterous notion by the apparent absence of any break in the continuity of nature from man downwards, through brutes and plants, even to the minerals. Animal life glides into vegetable life, and vegetable life into mineral matter, and we cannot detect where the one ends and the other begins. But surely, we are not therefore forced to conclude that soul and sense are mere properties of matter; for though matter and spirit were two distinct entities, we might expect an all-cunning Artist to join them so closely that to our perception they appear as

one. The weak side of materialism consists in assuming that the visible universe alone exists; and that, because all the "forms and qualities" of temporal life *appear* to arise wholly out of matter, matter is therefore all in all. But appearances are never more deceitful than in science; and we know not into what hidden worlds the visible may strike its roots and draw forth sustenance. Besides, in taking for granted that life was evolved from dead matter, the stark materialist oversteps the rigid limits of ascertained fact. He allows his hypothesis to carry his imagination away, and an ugly surprise may some day bring him back to sober reason. The spontaneous generation of living from dead matter is only an hypothesis as yet, however agreeable to the reason it may be to reckon it as proven truth. And further, we ought not to overlook the fact that even if abiogenesis were practically demonstrated every day in the laboratory, and the "missing link" were ticketed in our museums, the existence of a spiritual world ingearing with the physical, though perhaps discredited would not be disproved. There would still be room for a spiritual Creator and, similarly, a spiritual universe; only His mode of working, instead of being thought fitful, would be shown to be continuous, and the connection between the seen and unseen worlds less abrupt than was supposed.

Monism does indeed please the desire for causality in the human mind, but we are afraid it fails to satisfy the spiritual cravings of the human heart. It gives us a grander conception of what we must still persist in calling God's handiwork, but it leaves our knowledge of God Himself a blank. As a theory of nature it is magnificent, as a religion it is contemptible.

The splendid pageant of evolution, the long panorama of

change through endless aeons, may fill the imagination with sublimity; but it is not by this kind of knowledge that a man must live. The affairs of our parish to-day are more important to us than the dragons which made their lairs upon it a thousand centuries ago; and the state of the sky above our heads, than the mean temperature of Jupiter. Moreover, when we reflect that all this wondrous scenery of nature is but an infinite grinding mill and masterless engine of destruction, all its enchantment and poesy is at once extinguished. The soul can only be genial to spirit; it can have no communion and fellowship with matter, and in the mechanism seeks instinctively the Maker.

In his ethical aims Haeckel evidently means well by incorporating into monism all that he considers good in the earlier religions, and especially Christianity. But taking the good of Christianity, without also adopting its authority, is likely to be of little avail, since every sinner will be at liberty to interpret his canons to his own taste. If he does not believe that his commandment is God's word, and that God has power over him and loves him, will he deny himself indulgences to keep his patchwork faith? We think not.

In the case of public offences monism may indeed serve as a deterrent, but not in the case of secret sins. For these only the eye of God can be the restraining power.

A faith evolved by doctors like a principle of science, and formulated like a mathematical theorem, even though illustrated by the sublime example and ideal of Jesus Christ, will, if we mistake not, have little hold upon the hearts and minds of men, since the great boon which they have ever craved is an accredited revelation from the Most High.

Positivism, again, holds that as yet we know nothing about God, or a hereafter, and that until we do we need not concern ourselves about them. It is a need of our higher nature to devote ourselves to some worthy object, and if the idea of God be eliminated from the question, the next best thing we are sure of is man. It is man, therefore, that the Comtist would worship in place of God, not indeed any individual man, but an ideal Humanity created by his own imagination. His rule of conduct is to renounce all egoism for the sake of others; and, instead of looking forward to a blessed immortality after death, he derives a satisfaction from the thought that, when his elements shall dissolve for ever, he will leave behind him in the cosmos the memory and impress of a well-spent life. This lofty but melancholy faith appears to be the last refuge of noble souls disappointed of their God. From His deserted mercy-seat and desolate altars they turn away as with a sigh, and stifle their sadness in good works. The very feeling that they are abandoned of God, that in fact no God exists, and that it lies solely with ourselves to make the planet as happy a place for each other as we can, endues them with a tender sympathy for their fellow-creatures thus left groping in the dark and crying for the light.

The flaws in Comtism are similar to the flaws in monism. It is too weak in its authority, for example, and only half satisfies the aspirations of the heart. It may incite to righteousness the few who are inherently noble; but the multitude of secret sinners will laugh to scorn the threat of posthumous disgrace. And a religion which cannot restrain the wicked and vile from evil doing is unworthy of the name. The actual human race, with all its vice and folly, is a sorry kind of god; and further, it may be retorted on

the Comtist that if the Deity is a fiction of the mind, so in reality is the ideal race. Good fame, too, would prove, we fear, a hollow mockery of immortality in the hour of sickness or of death. Love of God and of humanity, in fact, are complementary, and require to go together. Now, it may here be remarked that Christianity embraces both, and while it commands us to love one another, it enjoins us also to love the Father.

Another candidate for the toppling shrines of Christianity is the doctrine which has been termed Cosmic Theism, and which, in the opinion of its apostles, is destined to become the religion of the future. It professes to unite the principle of nature with the God of history, and if we understand the vast abstraction rightly, it is a kind of mystic hybrid between Pantheism and Judaism. The new deity is, however, neither a phantom man nor a living universe, but a combination of two abstruse ideas. It is therefore only knowable by the learned, and in this respect resembles the godhead of the Egyptian priesthood, which was so far beyond the capacities of the multitude that it had to be parcelled out to them in the form of idols symbolizing its various attributes. This ideal maze and "august bewilderment" may indeed excite a feeling of devotion in the souls of a few deep thinkers, able to brood over the grandeurs of the cosmos; but to the great bulk of mankind, whose business is with life, not science, it will probably remain an empty sound, if, indeed, it does not lure them on to madness.

Beliefs are now as plentiful as blackberries; and each eloquent layman, not content with preaching his own particular gospel in the magazines or on the platform, must needs essay his prentice hand at fabricating to himself a

new creed from the remnants of the old. It would be a vain and endless task to criticise all these clever adaptations of Christianity with the part of Christ left out. But we cannot here overlook the doctrines of a certain school of Broad Church divines, whose aim is evidently to make a compromise between science and theology at the expense of mystery. Their views are rarely or never stated with that unmistakable clearness and precision which befits this era of definite thought, probably because they are somewhat hazy and sophistical to the preachers themselves; but we may glean some notion of them from a sermon recently preached by an eminent theologian, in which he spoke of the divinity of Christ's life, but did not mean that Christ was divine: he alluded to the overshadowing providence of God, but did not therefore imply a personal God; and he defined the three elements of the Christian Trinity to be all that is God-like in human life and character, and all well-attested facts of science and of history. This Trinity, it will be remarked, is apparently the Deity of Cosmic Theism with the human element added, and we do not very well see in what essential respect it differs from the Infinite God, who already dwells in our imaginations. It is mainly in regard to the nature and office of Christ that their ideas materially diverge from orthodoxy. For instance, another reverend theologian, preaching in Westminster Abbey one Christmas Day, explained that Jesus Christ was the mediator because He was the middle-man who reconciled all the conflicting parties among men. Again, in a sermon to children preached in the same place on the succeeding Innocents' Day, he taught that "He was good, and went through all sorts of trouble and pain for no other reason but to render us good; and this is why He is called the Son of God, the Saviour of men."

Now, surely we are right in saying that, until these latter days of Broad Church divines, the reason why Christ was called the Son of God was simply that He was believed to be the actual Son of God, and not because He went about doing good or suffering pain. It was not in a metaphorical but a real sense that the term was wont to be and still is employed by the less advanced clergy of the Church. Indeed, while the reverend theologian quoted was busy spinning his elusive verbal refinements in the Abbey on that particular Christmas morning, a preacher in St. Paul's Cathedral was at the same time engaged in proclaiming to his hearers the ancient gospel, that the Maker of the world had become flesh and descended into the world to seek and save mankind.

However true this ingenious rendering of Christianity may be, it is certainly not the Christianity of our fathers. The sacred pile of Westminster Abbey was not erected by the faith which now is taught within its precincts. No masquerading in traditionary vestments, or cant of borrowed epithets can disguise the fact. Though it be preached at Christian altars and hallowed by Christian hymns, we cannot forget that the new faith is not the old; though the image of Christ be represented with a halo, and the head still bowed at mention of His name, we cannot help feeling that it is a mere effigy of His former self that we are worshipping, and that the divinity with which His person was once instinct has vanished quite away.

These creedless Christians, doubtless, have a sincere and amiable motive in acting as they do, but it has landed them into a species of insincerity. They are striving to reconcile the new scientific culture with the old religion, but they have not succeeded very thoroughly. They seem to lack

both the courage to treat Christ as a mere man, and the faith to recognize Him as a God. The consequence is, that they "are really a new firm trading under an old name and trying to purchase the goodwill of the former establishment"* by palming off an inferior article under the old trade-mark.

There is a stratum of good in all these new religions as far as they go, and they preach in their fragmentary way some old doctrines with a new force. Materialism enlarges our ideas of the size, age, and structure of the visible universe, it raises the value of material things, and impresses upon us the importance of a wise obedience to material laws. Evolution brings into prominence the momentous fact that we are links in a great chain of being, joining the past and future; that our health is a precious legacy which we bequeath unto our children, and our weakness means the weakness of those who follow us. Comtism encourages us to leave a good name behind us in the world, by helping others, and points out the eternal consequences of even our most trivial actions; while Cosmic Theism preserves us from a too petty conception of the Godhead, by reminding us of His infinite power and majesty.

Nevertheless, we have an uneasy feeling that there is something wanting in these fine-weather faiths, and that they will not serve us in the hour of need. Amid the blinding storm of fresh ideas they are, we fear, but the illusory glamours of the rainbow, and not the vivifying sun of Truth. They present us, it is true, with a pure system of morality, an inexorable providence, and an abstruse God; but the human soul yearns for something better. It longs for the assurance of a loving Father, who will guide and

* *The New Republic*, by Mr. W. H. Mallock.

care for it; it seeks to enter into communication with Him while on earth, and hopes to draw nearer to Him after death. Morality is not religion; and it is not the inscrutable Power which created the universe, so much as the Being who made us, that we wish to know. The chemistry of our own little planet is of more consequence to us than the astronomy of countless galaxies; and, similarly, the relations of the Deity to mankind are more to be desired than His relations to the cosmos at large. It is not the Creator, but the Father, to whom our souls incline. The deep craving of our generation for some lofty and regenerative ideal sanctioned by the Lord is patent to all close observers. The new evangels fail to supply it, for they can only give us an eidolon of the human imagination; but the old creed gave us what we wanted in the living Jesus before its Divine authority was cankered by the insidious doubts of recent science. Christianity is all the world requires, and yet some of the noblest men and women cannot honestly accept it; even its central Figure is degraded and its lovely ideal sullied in their sight, for it lies under a suspicion of being false.

To endeavour to clear away this suspicion is the urgent task imposed upon our clergy. The Church is the appointed warden of the old faith, and it is her duty to guard it against the attacks of hostile criticism. What then is the state of the Church at the present time? We desire to approach this question in a reverent and charitable spirit, knowing that Christian ministers have fallen upon evil times; but over and above this desire, we are impelled to speak out plainly, in the assurance that it cannot be a matter of indifference to the Church to learn how she appears to a very great number of laymen. Our remarks

will apply rather to the English Church than to the Dissenters; and it must be understood that there are numerous exceptions to them in both bodies.

We do not think it is any exaggeration to say that the Church is fast losing her hold upon the love and reverence of many educated men. Instead of a holy temple, consecrated to the worship of the Deity, and the exercise of the highest thoughts and sublimest feelings, she has sunk almost to the level of a moral lecture-room or a sacred concert-hall. Numbers of her priests enunciate with artificial solemnity, and all the sanctimonious tones which hide a spurious piety, the tenets of a creed which they themselves dare not examine. Her pews, when they are filled at all, are mostly occupied by women and young girls who are ready to accept all that is told them with implicit trust, and, being innocent of natural science and the new ideas, are of course incompetent to detect any weak points in the doctrine. The ten-minutes' exhortation which often does duty for a sermon, may be a very nice little lesson for children, but it is sorry stuff for thinking men and women; and to one distempered with scientific scepticism it sounds but the parrotlike repetition of an empty fable. Many people go to church for the sake of keeping up appearances, and doubtless the Divinity is highly honoured by their condescension. Some go to hear the music in a pleasure-seeking spirit, as one goes to hear an oratorio; and others, far more earnest in fleeing from their doubts, take refuge in the sacred gloom of a beautiful and traditionary faith, where for a moment they can silence their hearts in a strain of heavenly music, or beguile their reason with the pomp of ceremonial. To the former, the services of the church are a mere entertainment; to the latter,

they are a saving sham: to neither are they what they ought to be.

It is the habit of some clergymen to repudiate science altogether; and another favourite mode of avoiding the difficulties of belief which are raised by science, is to assert that science and religion are fundamentally at one, however they may appear to differ in our imperfect knowledge. We are told that "Whatever enlarges our ideas of nature, enlarges our ideas of God;" "Whatever is bad theology is bad science—whatever is good science is good theology," and so on; but these cant phrases, however they may cloke the antagonism of science and religion, do not dispel it. They will satisfy the ignorant and confiding, perhaps, but they will not cure the doubts of thoughtful people. While the spirit of science is entirely opposed to the working of miracles, to the apparition of angels, to the Divine conception of Christ and His resurrection from the dead, is it not idle to tell us that science and the orthodox faith are in harmony? It is equally vain to combat scepticism, as is often done, by quoting passages from Scripture, when the truth and authority of Scripture are the very things which are doubted. What use is there in citing the words of Christ, when the Divinity of Christ is called in question? Before certain young curates, whom we have heard, begin to prate of science and pass their judgments upon it in the pulpit, they should at least have taken the trouble to know something about it; otherwise they are in danger of misrepresenting it to the unversed, and of exposing their holy office to the ridicule of the learned. The science to be gathered from quack advertisements in the *Rock* newspaper, or even from the pages of popular Magazines, is not exactly the positive science of Faraday, Helmholtz, Darwin, and

Thomson. Let them see what positive science really means before they attempt to set the world right about it.

In a great number of English churches now the sermon has dwindled into insignificance, and the time is almost wholly taken up with choral singing, by boys in white surplices, and in mumbling over the Prayer Book. Such a service is well enough adapted for the officiating priests and for true believers; but it is worse than useless for persons who wish to become true believers, but cannot conscientiously do so until their doubts are set at rest. Men of this class are at present, if not always, out of all proportion to the true believers, and therefore it is essential on their behalf to make the sermon a very important part of the service. Listening to the music of a well-trained choir of good voices may be a very agreeable mode of spending time, but (except to the few) it is hardly worshipping the Most High. True, there are many of the unconverted who feel the better for the music, especially when they are allowed to join in the singing themselves; but that holy influence is too transient to suffice. It may be likened to the perfume of flowers beside the well of Truth, when the living waters are out of reach and the burning thirst unquenched.

Repeating the liturgy is an act more worthy of a rational being worshipping his Maker, but when that being is uncertain that his Maker exists, or will hear his prayer; when he fears that the Saviour in whose name he pleads was only an erring man like himself, how spiritless is his entreaty, and how hollow is his creed! Under these circumstances, the reading of the liturgy is even worse than a lesson said by rote.

As for the sermons themselves, or rather school-boy essays dignified by the name of sermons, they are often, we

regret to say it, almost an insult to the understanding of men who know the world. For the sake of the music the sermon is tolerated, under the comforting reflection that in any case it will not last long. Brief as it is, however, it frequently does more harm than good, by stirring up again the silt of doubts before subsided, and calling forth derogatory criticism. There is something radically wrong in this state of things, for the services of the Church are meant to put men in a good, and not a bad frame of mind.

Until there is a reform in the quality of sermons delivered in the English Church, those persons who are capable of thinking for themselves, in other words the most valuable members of the community, will stay away. If we ask these men why they do not go to church, we shall hear the same answer from all of them. "I would fain go to church; I long to hear a good sermon; but I can never hear one anywhere."

The art of preaching is lost! Scientific scepticism is spreading its insidious poison through all classes of the people, and the Church is quite incompetent to stop the evil. Instead of studying the nature of this mental disorder, and battling it manfully with its own weapons of acute logic and clean-cut scientific thought, too many of our clergy turn aside from the fray, and seek a refuge in the effete ceremonies of a past age. The scientific doubts of the day will never be cured by sentiment; and when the very foundations of the faith are undermined, it is of little use adorning the superstructure.

It is needful therefore that the clergy should inform themselves thoroughly with the science of the day, imbibe its spirit, investigate the religious doubts to which it gives rise, then fight and overthrow them in the pulpit if they

can, and vindicate their creed before all men. They must go to the root of the evil, and attack it there, if they would check its ravages.

It is not perhaps so much the infidelity of our time the Church has to fear, as its own incapacity. Infidelity is an old complaint which she has coped with successfully ere now; and though it may wear a new armour at present, the substance is essentially the same in all ages. What the Church needs is that vital want of wants, capable men, men who feel they have a vocation for the work, not superfine dandies, with commonplace brains set off by elegant manners; men who have passed through the fire of scientific and scholastic doubts, and come out of the ordeal with a firm faith of some sort, which they believe in, and the power to help others who may be suffering the like spiritual trials, and bring to them the peace which they have found. Eloquent men cannot be obtained on demand; but the pernicious system of reading written sermons as one reads a manuscript essay, should be as much as possible discouraged.

To hear able essays on religious topics, one does not require to go to church in these days, when the press competes so strongly with the pulpit. What the people want is an earnest man who will speak to them out of the fulness of his heart; and if it is necessary for him to write his thoughts out beforehand, let him at least speak them in delivery as if they sprang spontaneously, so that they may smite home to his hearers with living force. This growing practice of reading written sermons is one of the chief faults of the English and even now the Scotch clergy. In giving way to it they are cultivating the art of writing instead of the art of speaking, which is the proper study of the preacher. Verily the Scottish Presbyterians of fifty

years ago erred on the right side with their keen antipathy to read sermons. Nowadays, even in our best cathedrals, we rarely hear anything else than a read sermon; and after the frigid propriety of phrase in which our ordinary preachers dress their mediocrity, it is a great refreshment to the wearied soul to hear the native eloquence and poetic fervour pouring from the impassioned tongue of a John Caird or Knox-Little.

It is of infinite moment that the Church should be a strenuous power for good in the community. At its lowest estimate, it is a place where men devote set periods of their lives to adjust their moral balance, and revive their sense of the ideal; and at its highest, it is an altar where they may renew their vows to God. But if the preaching is in discord with the progress of thought, and men learn from the press truths to which the pulpit shuts its eyes, the natural result will be that the latter will grow dissatisfied and forsake the Church altogether, so that even its mere moral benefits will be lost. When the services of the Church and other appointed ceremonies, wisely ordained to remind us of the unseen world, are neglected, we are in a fair way of forgetting religion altogether, and losing the highest culture. At whatever cost, then, the Church must try to keep its hold upon the minds and hearts of the people. Nothing in the world will compensate us for the loss of the sublime sense that the earth is Divine, and it is the mission of the Church to keep this feeling alive. Whoever does not feel, in spite of all the laws of science, that the earth is a sacred place, the temple of the living God, is devoid of all religious inspiration, and a stranger to the holiest charm of life.

Having touched upon the condition of the clergy, let

us now consider the position and aims of men of science. There is an impulse in the human mind prompting it to learn all the facts it can, and probe all the secrets of nature. This is the true scientific spirit, the sacred ardour to know the truth whatever it may cost. By experimental science we gain an insight into the interior mechanism of nature, and tap the stores of concealed energy therein. By applied science we are enabled to turn these treasures of power to our own uses, so as to increase our material comfort; and the worthiest inventor is he who best economizes the energies available in the world. The pursuit of science trains the mind to observe well, to think justly, and to be accurate and truthful in all its doings.

Yet a scientific habit of mind is not an unmixed good, and science is very far from being the all-in-all which some of its votaries proclaim it to be. Although it informs us of the elementary constitution of bodies, and can say, for example, that water is made up of the elements H_2O (two molecules of hydrogen and one of oxygen), these so-called "elements," if elements they be, are mere phantom-symbols, after all; the real stuff of nature remains as much a mystery as ever. If it supply us with many material luxuries, it is also apt to breed a lustful ease, degenerating both to soul and body, and to develop organic monstrosities and engines of destruction. If it enlightens the understanding, it is also in danger of blighting the feelings; and though it kills both error and superstition, it tends to wither both poesy and faith. In adding to the grandeur of the universe it diminishes the glory of human life.

In this age of science we patent the laws of nature, and trade upon them as if they were a mere marketable commodity, forgetting in this huckstering spirit and mechanical

view that they are the method of God's own handiwork. We have, indeed, become assimilated to the very matter in which we deal, and are little better than intelligent engines working among dead matter, with no higher feelings than a gin-horse. The Divine idea of the world, felt by poets at rare times when gazing at a beautiful scene or a noble human type, or when their souls are being tuned by music, is getting lost to us. We pry into the anatomy of beauty until the ascertained cause disenchants us with the effect. To the student of science the dewdrop is merely a condensed vapour, the diamond crystallized carbon, the rainbow a refraction-spectrum, the music of the winds and the trees nothing but the friction of air particles upon the boughs, and all the poetry of the fallen leaf resolves itself for him into an evolution of gases. He cannot admire the rose for thinking of its juices, and his chief emotion on beholding the Venus of Milo would be a curious desire to analyze the marble.

This morbid relation to the external world and human life is, however, mostly confined to young scientists who have plunged too exclusively into their proper studies. Science, when pursued after a healthy method, is not wholly inimical to the finer feelings. There is a lofty poetry in contemplating the celestial panorama of the cosmos, with its pristine fires, its planets rising out of chaos and teeming with lovely forms, the long vista of evolution, with its successive scenes of earthly splendour, and the varied history of man himself. We experience, too, a pleasing sense of awe and wonder on viewing the minute as well as the stupendous works of nature. A biologist watching the mystic motions of the blood corpuscles under his microscope, or a physicist noting the marvellous symmetry of tiny snow-

crystals, feels some of the solemn reverence of a priest who has been permitted to peep into the secret arcana of his faith; and this high privilege is in itself a kind of consecration. But there is undoubtedly a tendency in science to reduce even the most sacred and mysterious things to the commonplace. Novel truths and triumphs of science invariably awaken our wonder, and fresh glimpses of the works of nature incite our awe; but, in course of time, familiarity breeds a kind of contempt for them.

There are some who fear that science will destroy poetry; but this idea is, we think, a morbid one, arising from the one-sided culture of the new scientific phase through which we are passing. While the mystery of life and the soul exists, poetry and religion will live also. Both spring from the yearning in man for the ideal and the infinite—in a word, the Divine, and therefore are higher than science, which can only deal with the actual. It is a presumptuous error on the part of scientists to say that poetry and religion must give place to science. If the human race is rising in the scale of being, we should rather expect poetry and religion to be more and more prized as time goes on, since they conjointly tend to make man more and more Divine. Let science learn the How as it may, the Why is still the more important quest; the effect is higher than the means, the ideal than the real, the Deity than nature.

Indeed, we may expect that science by unifying our conception of nature, extending our knowledge of it in time and space, and providing new materials for the hand as well as the imagination, will largely assist both art and poetry in the future. It is highly probable that the great poets and painters yet to rise will find new inspiration in the idea of evolution.

The moral results of scientific culture, too, are not unadulterated. It is true that positive science helps to show that virtuous conduct alone is right, and that the noblest men are those who have a clear sense of this fact, and act consistently up to it; yet it generates a pernicious tendency to excuse every vice on the plea that it has a physical cause. Now the devil himself might be excused on such grounds, since a cause could, no doubt, be found for his defalcation too; and, though we should be charitable in our views of practice, we ought to have a clear sense of and reverence for principles.

Self-help and intelligent care of the body are inculcated by science; but these excellent principles are sometimes accompanied by incipient selfishness and cruelty. The doctrine of the survival of the fittest is liable to take possession of the mind, and preach to the conscience that weakness is a hateful thing and might is right. Indeed, we are not sure but there are some professors who hold that all deformed and weakly creatures should be put to death, and infants murdered, for the benefit of society, just as heavily taxed householders may drown puppies. The physiological green-sickness has jaundiced their humanity, and men and women appear to their objective vision, along with plants and brutes, as nothing more than cunning works in protoplasm.

As we have said before in this work, the cardinal blunder here consists in forgetting that revelation is a phenomenon of human life just as the survival of the fittest is of animal life, and that while selfishness is the lesson of the latter, the highest teaching of the former is self-sacrifice. The race is not always to the swift nor the battle to the strong, and physical evil is often productive of moral good, which is a still more precious thing than bodily strength.

The most pernicious result of scientific study is, however, the descent into infidelity and atheism. "We must deny God and trample the Cross under foot," says Posner, "before we can become even scholars, far less masters, in natural science." Yet there are many Christian masters of science, and some of these the greatest, as, for example, Newton, Brewster, and Faraday. It is not easy to see how a man of science, whose days and nights are given to a study of the wondrous works of nature, can become an atheist; yet it is so. The late Professor Clerk-Maxwell, himself a true Christian we believe, was wont to say he had examined every system of natural atheism and found them all to imply a Deity at bottom. Nevertheless, we cannot doubt the sincerity of those materialists who deny the existence of God.

How, then, is this atheistical frame of mind brought about? The answer is, by a too exclusive study of matter. To them the universe is entirely filled with matter, and nothing else can be detected by experiment or sense. All the phenomena which make up our positive knowledge are apparently caused by the actions and reactions of this matter. Reason alone is exercised, and faith is carefully eschewed. In tracing back the history of the world the materialist can find no definite beginning. The primal nebula seems but the glowing pyre of ruined worlds, whose prior life directs his mind still further backward until it loses itself in the abysm of time. World springs out of world in never-ending cycle, and there is no sign of a creation to be found. At last the little automaton stands forth and disowns his Maker. A strange sight, indeed! The clay pot, which has just been fashioned, mocks itself at the notion of a potter and falls to worshipping the wheel.

If the thoughts of these materialists could only be given at times to a consideration of the possibility of God and the unseen universe, they would probably soon become, after some sort, religious men. But, as it is, they banish these subjects entirely from their meditations. They think they have been initiated into a new revelation, to the effect that all religions are delusive dreams, and that the only proper study is reality and proof.

In doing so they overlook the fact that the senses are their only caterers, and that these are but imperfect witnesses at best. Both consciousness and ultimate matter elude their grasp, but as reason infers the supra-sensible from the sensible matter, so faith infers the spirit world from the spirit phenomena.

Since they have eliminated the idea of God from the universe, we need not wonder at the essential sadness of materialists. In their souls, no doubt, they would fain bring Him back again if pride and reason would allow it. Their consecrated matter is only a cultured fetish after all, an idol of ether atoms instead of stocks and stones, the very dirt of the ground which they cannot keep from secretly despising. They are nobler than the thing they worship, and crave the Deity they have disclaimed.

But if the materialist errs in thinking too highly of matter and neglecting the spiritual world, the divine is, on the other hand, too prone to think meanly of material things. Science and religion have their separate spheres; the one confines itself to the mechanism of nature, the other deals with the character of its Creator. When sense and reason have done their utmost in exploring the experimental world, there still remains a field for the exercise of faith.

The proper culture is a combination of religion (with poetry) and science. Since the Author of matter and the Source of all true science is likewise the Author of spirit and the Source of all true revelation, we cannot suppose that there is any real antagonism betwixt them. The so-called conflict of science and religion must therefore limit itself to a struggle between truth and error; and however severe the tests to which religion may be subjected by science, all the genuine parts of it will only shine forth the brighter for the test. Religion and science should be mutually helpful and go hand in hand. When thus united, the immensity of the universe which science reveals would speak the power and glory of God, without making us feel unworthy of the Divine regard, for His care is exhibited equally in the small things of nature as in the great, in the exquisite cells of foraminifers as in the systems of the planets. By teaching man the extent of his capabilities and his true relations to the present universe, science would assist him to find out his earthly destiny, and to destroy the false ideas which are the parasites of true faith in the Unseen. It is incumbent upon men of science to pursue their proper studies with all diligence, in order to discover new truths, and to disseminate old ones amongst all classes, especially the spiritual teachers of the people, with whom it will mainly lie to keep the peace between material and spiritual doctrines. But if the clergy err in neglecting science, so also we think men of science err in neglecting religion. The Scriptures are full of remarkable passages which would command the reverence of men of science, and the works of many leading divines would well repay their examination.

They ought ever to guard themselves from making dogmatic statements, or indulging resentment against

theologians, and scoffing at exercises which men hold sacred. When they repudiate the virtue of religion they should not forget that they are surrounded by Christianity, and owe to it that very peace which enables them to prosecute their researches. By the Divine service of worship the heart is purified and strengthened with the best motives and the noblest aspirations. It calls up thoughts and feelings which no electric lights or growing crystals, however lovely, could evoke. All the marvels of the telephone or phonograph could not produce so fine an emotion as the strains of a simple hymn sung in a village church.

The triumphs of science may make us more skilful in our work, more entertaining in our talk, and prudently moral in our conduct; but they will scarcely make us more forgiving, self-sacrificing, and nobly good. They assist us to fit the earth for man's abode; but they do not teach us how to train ourselves for the life to come. It is in view of a hereafter that religion takes its highest importance. For a future life science offers no hope, and has therefore no guidance to give. At this point the region of Faith commences. Reason is chained to the temporal, but faith soars into the eternal. On the death-bed, religion is greatest and science least. If a man is dying, what shall it profit him to know the chemical constitution of the rocks of Terra del Fuego, or the spectrum of the aurora borealis?

CONCLUSION.

Believing where we cannot prove.
TENNYSON, *In Memoriam.*

THIS work is the record of a mental phase. In writing it the author's primary object was to ascertain whether the new science is or is not incompatible with the Christian faith. He began it without knowing what results he should arrive at, and worked them out by degrees; hence it is a kind of growth. The conflicting doubts which filled his mind were gradually laid, and harmony grew out of chaos as he proceeded in his study. He has not sought to promulgate his own personal views, or to enter into the minutiæ of the old faith, but simply to draw the line between it and the new science in a broad but clear manner. It only remains to state the net results as briefly and definitely as possible.

Most controversies on the same subject have hitherto dealt with the truth or untruth of the doctrine of evolution; but the writer advanced beyond this point, and assumed that doctrine to be true. He finds, however, that the Darwinian theory does not fully account for evolution, since there is still a mystery in the origin of life and of living types. Darwinism may be the main agent in *developing* life, but the inherent nature and capacities of

life are yet unknown. A beneficent design was traced in the creation and development of the world, which was referred to God.

The cosmogony of Genesis is not to be taken literally. Sudden creation by Divine fiats is at variance with continuous development by fine degrees and with majestic leisure. But though not interpreted literally, it is not therefore to be spurned by men of science, for as a sacred poem it is remarkable, and worthy of all reverence. If deficient in describing the *process* of creation, it expresses more important truths; and as it seems to contain no actual error, may be believed in as a partial revelation telling the earlier men what it was good for them to know. Under a more enlightened reading than the old, it will be found to contain nothing at variance with science. It expresses the creation of the world by *one* God according to design (whether out of nothing or pre-existent substance is not stated); and the production of living beings out of "dust," or pre-existent matter, in a certain order occupying successive periods of time. Its remarkable freedom from error, theological, fanciful, or scientific, and its adaptability to human progress, is an argument in favour of its Divine origin.

Whether living matter sprang from dead matter spontaneously is not yet known; neither is it known how consciousness became associated with living matter. Granting the first living germs, however, it is believed by Darwinians that all living types, including man, were developed from them. But though we admit this, it is still, we think, an open question, whether human free-will, and knowledge of God, does not introduce arbitrary and supernatural factors into evolution.

Science cannot, at present, prove that the human will is not, to a certain extent, free; on the contrary, facts of consciousness show that it is. This is a most important result; for on man's belief in the freedom of his will is based his dignity, morality, and religion. Self-respect, conscience, and revelation would be meaningless without free-will.

By magnifying our conceptions of the universe, science tends to prevent our ideas of God from becoming too narrow and anthropomorphic, but does not attempt to define His attributes. This is still left to Faith, which alike from nature and human history, including revelation, believes Him, *in His relation to man*, a personal God, uniting the infinite power and justice of the Author of Nature with the infinite goodness and mercy of the Author of Revelation. He is all-seeing, all-knowing, almighty, eternal; His ways are past finding out; but the Christian may still believe that He who sent Christ Jesus is a loving Father.

Science denies the physical, but cannot yet deny the spiritual efficacy of prayer. Free-will is a reason for the existence of spiritual response to prayer by God, and such response would not confound our intelligence as a physical answer would do. Faith is therefore free to hold by spiritual efficacy. And if the time should come when even spiritual efficacy is no longer believed in, there will still remain a service of thanksgiving and Divine communion, which cannot but be pleasing to the most High, and sweet as well as beneficial to mankind.

Science cannot demonstrate that there is no Hereafter. Indeed it is probable she never shall be able, for it seems that we are meant to live by faith, and therefore must not know for certain what happens after death. Man *knows* not whence he comes nor whither he goes, but finds himself

upon the world for a time. Being free and living by faith, he undergoes a test, which would imply a final reward or punishment. This fact, and the instinct of immortality common to the human race, together with revelation, support belief in a Hereafter.

Just as the Darwinian theory does not fully account for the origin of living types, it likewise fails to explain the origin of the prophets; and if we refer the mystery of life to the Creator, so may we refer the higher mystery of revelation to the Holy Spirit. We cannot prove whether or not spiritual revelation was miraculously inspired by God, but even if not, we may continue to believe it comes from Him by a process of evolution not fully understood, and that the Bible, including the New Testament, contains all spiritual truth necessary for salvation.

The Divine element in the prophets reaches its fullest glory in Christ. His origin may have been due to a miraculous fecundation, to a new and unique manifestation of evolution, or to ordinary birth. Science is antagonistic to a miraculous fecundation; but free-will makes it reasonable, and, being avowed, no serious confusion would result from it. A more acceptable explanation, however, is, that just as life or consciousness may have appeared in the world by the action of some higher law than had operated before, so Christ may have been born into it by a special act of what may be called supernatural intrusion. This process would still be called evolution. Again, Christ may have been born in the normal way, and acquired miraculous power from God by prayer. The question of Christ's birth and life is a mystery which may be left to individual faith based on the evidences of history and Scripture; but we know it was of infinite moment to the world. That

God at the proper time specially manifested Himself to the world, either Personally or by means of a Representative, and either through evolution or despite it, is a consummation so likely and desirable that it will be very difficult to controvert belief in it.

Should the time come, however, when the miraculous element in Christianity shall be taken as symbolic, there would still remain a new or rationalized version of the old faith; and Christ would still be regarded as the climax of development, the Ideal Man, the Highest Prophet and Divine Examplar, the Representative of God on earth, our Lord and Saviour. He who regards the miracles as superstition may possess such a faith.

Although absolute knowledge of his origin and destiny is evidently, by the conditions of existence, impossible to man, we find that science allows us to believe, in accordance with Christianity, that man has come from God, is preserved by Him on earth, and returns to Him in heaven.

One result of our study is, that though evolution is an attractive idea, the process is not at all fully understood; and it is a doubtful question whether all that exists, in the solar system let us say, was originally contained in the primal nebula or not. Laplace's theory of planetary formation does not agree with latest facts—for example, the recently discovered satellites of Mars do not travel round the planet in the direction demanded by the theory; spontaneous generation has never been observed; and Darwinism is now considered inadequate to account for the origin, though it may account for the survival, of the fittest. The molecular physicist is taking the ground from the materialist by showing that matter is inert, and that material structures require the co-operation of a finer

medium, the ether. We may well ask, then, if evolution is not the Creator's mode of continuous creation by development, and if there are not worlds within worlds. Naturalists can detect no break in the chain of life from vegetables to animals, but this may be due to cunning workmanship. "For Thy pleasure they *are* and were created," says St. John. *

Though the Creator may not continue to create in the solar system or the world still (an idea which does not preclude His activity elsewhere), it seems necessary to admit that the world as it is was not all contained in the material nebula, and that there is an Invisible Universe interacting with it. The dead matter of the world may have resided in the nebula, but it is very doubtful if consciousness did. The tendency of chemistry is to show that, in order for the material world to develop as it has done, the atoms in the primal nebula would have to be arranged in a certain way, and at a certain temperature. How came they into their places? The "Shekinah," or glowing cloud, was the Jewish symbol of God, and in the nebula, perhaps, the Creator is at work.

Again, we assumed, for the purposes of the study, that the theory of the conservation of energy is true; but it is right to remember that it is only a theory, a daring inference drawn from our present scientific experience. Perhaps it will be recognized yet that it is going too far to pronounce upon the whole universe from the results of our petty experience; and that though the theory be held as true for matter, the mind is too indeterminate a factor to be included in it.

But be these things as they may, we can still continue

* Rev. iv. 11.

to believe that in the beginning God created the heavens and the earth; and that though the progress of science has given rise at present to a phase of scepticism, it will pass away. Science and revelation will yet go hand in hand; as it is written, "man shall not live by bread alone, but by every word that proceedeth out of the mouth of God." And though we find that Nature is regulated by inexorable laws, we can reflect that "every good gift, and every perfect gift is from above, and cometh down from the Father of lights, with whom is no variableness, neither shadow of turning."

THE END.

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