even as it is done in heaven." Manifesting its activity first of all in the operation of inorganic forces, the material Universe is centralized by gravitation; non-conscious life is centralized by fixity to a point in space; conscious life is centralized by instinct. With the unfolding of moral life, self-conscious existence is a time of probation, in which the uncreated Will manifests itself in a single command, obedience to which by the created wills maintains the relationship. Taken up into a higher stage, obedience prepares the way for the giving of the Holy Spirit, to be at last manifested in that to which it has all pointed, and of which it has been the gradual unfolding and revelation—the Will of God Himself. And the consummation of all the progressive developments of all the Ages of the world's history is summed up in the Christian teaching given by Paul in that grand oratorio of the universe: "But now hath Christ been raised from the dead, the first-fruits of them that are asleep. For since by man came death, by man came also the resurrection of the dead. For as in Adam all die, so also in Christ shall all be made alive. But each in his own order: Christ the first fruits; then they that are Christ's, at His coming. Then cometh the end, when he shall deliver up the Kingdom to God, even the Father; when He shall have abolished all rule, and all authority and power. For He must reign, till He hath put all His enemies under His feet. The last enemy that shall be abolished is death. For, He put all things in subjection under His feet. But when he saith, All things are put in subjection, it is evident that He is excepted who did subject all things unto Him. And when all things shall have been subjected unto Him, then shall the Son also Himself be subjected unto Him that did subject all things to Him, that God may be all in all."

Many other relationships might be traced out between the different principles of the different stages. To

attempt that here would simply induce weariness without giving any compensating advantage. But there is one further main relationship it may be well to indicate, that will perhaps deepen our sense of the organic oneness of all life. To speak of different stages of development is, in some senses, misleading, as though one stage of development had no organic connection with those above and below it. The orderly progressiveness in the unfolding of the principles is, in reality, the true inwardness of the orderly progressiveness in the development of the organisms. Accordingly we find that in each stage preparation is made for the stage that is to follow, by the operation in an initial way, in a manner suited to the stage in which it begins to operate, of the principle that becomes the centralizing principle of the stage to come. Thus the principles that give coherence, strength and direction gain some foothold, before the central principles which they are intended to control come into operation. Students of historical movements will be familiar with the fact that, antecedent to the movement itself, there have been preparatory stages in which the centralizing principles of the movement have first taken root. History thus forecasts itself, and by the principles that strengthen and establish themselves in one age, the life of the next may in general terms be predicted. The philosophy of one generation is the religion of the next. In the case of the generation now living, the philosophy of thirty years ago has woven itself into all our life. The philosophy of Natural Selection sought to explain the Universe without God, and to-day unbelief is rampant. It is at least a possible explanation of the troubles and unrest and reactionary movements of the day, to trace them fundamentally to the weakening of the great centralizing principle of Religion through the materialistic philosophy of Darwinism. Nor, as we look forward to the life of thirty years hence, need we hesitate to predict

that it will be created by the fundamental principles and conceptions which, amid the turmoil of the present hour, are slowly emerging and establishing themselves in the life of the race. The conquering principles of to-day will create the actual life of to-morrow.

We saw, then, that the centralizing principle of the lowest stage of organic development was fixity to a point in space, and we evidently have the preparation and foreshadowing of that in the creation of the material Universe. The life principle gains a footing for its creative activity by the rooting of the organism. Similarly the nature of vegetable organisms, with their unfolding of the principle of self-preservation, developed around the primitive multiplying function of life at its nearest point of contact to the material, points up to the creation of independent organisms. The first elements that enter into the building up of this independence is found in the emotional instincts that seem characteristic of the largely fleshly organisms of the invertebrata, while in the more highly organized communities of the invertebrata, the ants, etc., there seems the foreshadowing of the more intellectual of the instincts manifested in the vertebrata.

But in the next stage this relationship becomes more strikingly apparent. From the side of man the centralizing principle of the next stage was obedience. The effect of this is to give uprightness and strength to character. It has also determined the expansion of the intellectual powers, characteristic of man's progress. It seems impossible to resist the conclusion that this is foreshadowed in the feature from which the vertebrata take their name—the existence of the backbone. The uprightness and greater range of power the backbone gives to the physical organism obedience gives to moral life, while the controlling influence of the moral element is strikingly shown, in that the vertebrata, below man,

have not even physically realized perfect uprightness. All have more or less of a stoop; no brute can stand the steady gaze of the eye of man; and apparently the purely intellectual element in the brute creation is only developed among domestic animals by subjection to training, and obedience to the direction of man.

The next illustration opens up a problem of peculiar interest at the present time, but I must not dwell upon it. I can only shed upon it the light which comes from putting it into relation with other phenomena. The centralizing principle of spiritual life is the agency of the Holy Spirit. This is manifestly foreshadowed in the previous stage of development, in the complex phenomena we group together under the title of Inspiration.

Last of all, the centralizing principle of glorified life we saw to be The Will of God. That evidently appears in the stage below in the much abused and apparently little understood spiritual phenomenon—Election by God.

The mention of that subject raises a question Darwin himself treats from his materialistic standpoint, under the heading: "On the Degree to which Organization tends to Advance." The great fact to be explained is the existence at the same time and within the same area of organisms widely variant in their degree of development. After having assumed the tendency of all living beings to rise in the scale of organization through Natural Selection, Darwin says: "But it may be objected that if all organic beings thus tend to rise in the scale, how is it that throughout the world a multitude of the lowest forms still exist; and how is it that in each great class some forms are far more highly developed than others? Why have not the more highly developed forms everywhere supplanted and exterminated the lower? Lamarck, who believed in an innate and inevitable tendency towards perfection in all organic beings, seems to have

felt this difficulty so strongly that he was led to suppose that new and simple forms are continually being produced by spontaneous generation. Science has not as yet proved the truth of this belief, whatever the future may reveal. On our theory the continued existence of lowly organisms offers no difficulty; for Natural Selection, or the survival of the fittest, does not necessarily include progressive development—it only takes advantage of such variations as arise and are beneficial to each creature under its complex relations of life." (*Origin of Species*, p. 92.)

Now this great fact presents itself for explanation in different forms according as our standpoint is that of Evolution by Natural Selection, or Creation by Principle. The assumption underlying Natural Selection—that the capability of variation in organisms is unlimited, that therefore there is an innate tendency towards development, and that new species have arisen when the variations have become sufficiently marked and fixed—gives us a standpoint from which the question takes the form: Why, with innate tendency to rise, and the continual activity of Natural Selection inducing it, do forms of low development persist? And Darwin answers: Because, from some cause or other, Natural Selection has been unable to act. The assumption underlying Creation by Principle—that new species are originated by the unfolding of new creative elements of the great life principle of the Universe, which tend to preserve the type of organism they create; that the innate tendency of organisms is towards reversion to and preservation of the type, and that, therefore, capability of variation from type is limited—gives us a standpoint from which the question takes the form: Why, with innate tendency to reversion to type, by the continual operation of the principle preserving it, do forms of high development come into being? And the answer is: Because higher

elements of the great organic principle have come into operation, creating and preserving the higher types. And then immediately the further question presents itself: How then do the higher principles operate at first, and if they operate on some of the organisms of the stage below, why do they not operate on all?

It will be recognized at once that the question of 'election' is thus not to be confined to the stage of spiritual existence only, but that it is a universal phenomenon, presenting itself for explanation as one aspect of the larger question of the origination of new stages of development.

I must defer anything like a full discussion of this important question at this point, contenting myself with pointing out now that, from the nature of the case, the higher principle operates within the inner sphere of action of principles, not on the outer created organisms; that the higher principle acts only within the stage immediately preceding its own stage of fuller activity; that principles never in themselves act in any exclusive way; that, therefore, the reason for the election is to be found in some sympathetic fitness of the composite principle creative of any particular organism to be taken up into the higher principle, so that election is itself orderly, and not arbitrary and exclusive; and lastly, that there is a given probationary period during which alone the possibility of the lower principles being taken up into the higher remains open.

If now we cast a backward glance over the orderly progressive developments of the Ages, we find at one end inert matter—primitive homogeneous nebulosity—in which, beginning with the simplest elements, the great composite organic spirit principle unfolds itself in its creative activity. At first there is simply inorganic movement. Then chemical affinities between the created atoms appear. Life, with its essential function of self-

multiplication, unfolds itself, and in its simplest form operates according to the law of self-preservation. Richer and fuller elements are unfolded in succeding ages. The emotional and afterwards the intellectual elements of mental life come into operation. With man, will-power appears, creating moral life. Spiritual life comes next in order, and all culminates at last in glorified existence. Each new element has not simply been added on, it has incorporated all previous elements into itself, in the creation of the higher organisms. But these lower elements have continued operative in their own stages. Thus there has come increasing complexity, variety and correlation in life. From the first the conditions of existence have persisted. In the earlier stages they were largely dominant, but as the organic is unfolded with increasing fulness, it creates organisms increasingly able to rise above the conditions of existence and to mould them to their will. From age to age the life principle seems to unfold itself from deeper centres and levels of Being. Controlled, at first, by centralization, that is simply fixity to a point in space, the centralizing principles spring from deeper centres correlatively with the central principles creative of the natures they control and nourish. Instinct centralizes the mental natures of the brute creation. Obedience fulfils this function for man's moral nature. The Holy Spirit centralizes the spiritual nature, and all life reaches its culmination and is blest when, not in any arbitrary way, but by spiritual principles, it is swayed and nourished by The Will of God. Then, at last, true fellowship is realized and man, at peace with God, is at peace with his brother also.

It is evident that the view taken of the Universe—and in its general conception the view here set forth is applicable to the Universe—will depend upon the point in the long line of development at which the

scientific investigator cuts the cross-section he examines for the data on which to found his theory. The cross-section of the growing shoot differs materially from the cross-section of the developed trunk. So the data obtained by the examination of the cross-section of, say, the physical stage of existence, treated by themselves, will lead to a different conclusion from that arrived at by the examination of the psychical stage. That again from the spiritual, and that again from the glorified. Now the naturalist has examined a cross-section through the physical stage of existence. That is a closed life. There the conditions of existence are largely dominant. The man of religion has worked from examination of a cross-section through the spiritual stage of existence. That is an open life. There the conditions of existence are subordinate. Each, working from the data obtained by him in his own field of enquiry, and unwilling to acknowledge the work of the other, finds himself at cross-purposes with the conclusion which those he deems his rivals have reached. Hence has come the eternal conflict between Religion and Science. It seems as if now, by the aid of Creation by Principle, we are able to reconcile the two, to know that truth is truth wherever found, in the domain of Natural Science or of religious experience, and to realize that since all has come from the one Hand, any ultimate inconsistency is impossible in the Universe.

THE
UNIFICATION OF THE UNIVERSE.

XI.

THE UNIFICATION OF THE UNIVERSE.

I HAVE have hitherto spoken of the stages of development as if they were different stages of existence. We have now to consider if these stages can be unified, by ascertaining in what way the principles come successively into orderly operation.

Turning this matter over, I endeavoured to devise a diagram which should show the operation of the principles, and from it work out a line that would indicate, by the points of intersection of the lines representing the principles, a line representing the the course of development through the Ages. Starting with the idea of representing the development of man by a straight line, I found insuperable difficulties in working out a suitable diagram. The eternal unchangeable principles would naturally be represented by straight lines, and the intersection of these should show the line of development. It seemed impossible to obtain a satisfactory diagram, when the simple truth flashed across my mind one day that progressive continuous eternal development, in its very conception, was of the nature of continual approach to absolute perfection, without this perfection being ever completely realized. If this

were to be represented by a straight line along which development progressed, the point of absolute perfection would have to be represented as some point that moved farther and farther away as development proceeded. This was not at all satisfactory. For if perfection were once reached, then all progressive development would naturally cease, and all the marvellous developments of the Ages would seem to culminate in a chaos of perfection, inconceivable to the mind. Incentive to effort, the joy of living, and perhaps personality itself would cease. It seemed to lead one to a doctrine of the annihilation of the absolutely perfect, or of a Brahman doctrine of absorption into an eternal spirit, both alike absolutely repugnant to contemplate.

Then it occurred to me that this conception of eternal progressive development, ever approaching, but never realizing perfection, was the characteristic feature of a curve, not of a straight line; and that the mathematical curve characterized by this peculiar feature was that known as the hyperbola, which is continually approaching a given straight line, its asymptote, without ever touching it. The progressive development of man must therefore be represented by an hyperbola. Now a very slight knowledge of Conic Sections makes one acquainted with the fact that the hyperbola stands in certain definite mathematical relations to two other curves—the ellipse and the parabola—and indeed also to the circle and the straight line. And it is well known that the ellipse, whose properties were worked out in the first instance as abstract mathematical problems, has a definite relation to the world of actuality, being the orbital path of the planets. If then the ellipse has relation to the material world, and the hyperbola to man's development, it occurred to me that the mathematical relations connecting the two might give us a clue to the solution of the problem of the unification of the Universe. The

FIG. 1

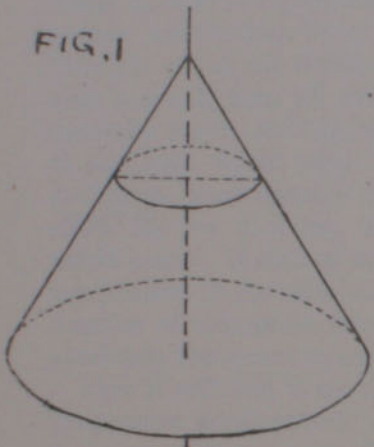


FIG. 2

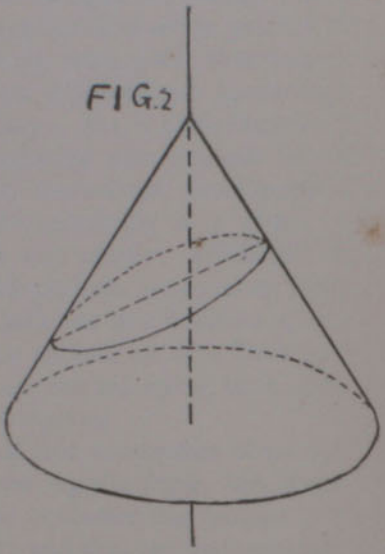


FIG. 3

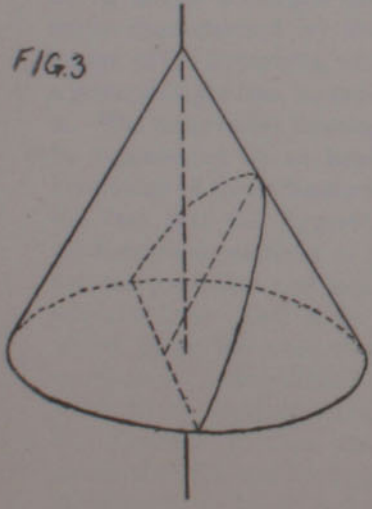
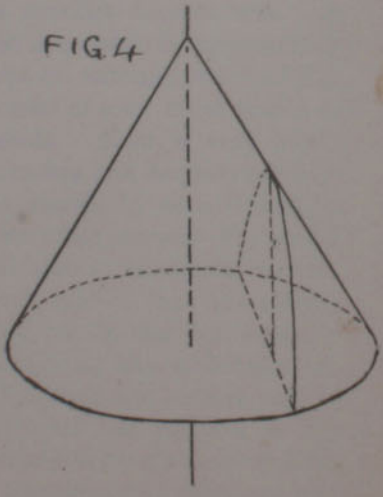


FIG. 4



idea worked out as follows, which I give in form suited for the general reader. The mathematical proofs of the relationships can be found in any even elementary work on Conic Sections.

If a fixed straight line be taken, and another line cuts it at any angle, then if this second line, centred at the point of intersection, swings round the fixed line at the same angle to it throughout, it will mark out in space a cone of which the fixed straight line is the axis. The revolving line is known as the generating line of the cone.

Now if the cone so marked out is intersected by a plane, the line of the intersection of the plane with the cone will be a regular mathematical curve. And the nature of the curve will depend on the angle at which the plane cuts the cone. Thus when the plane cuts the cone at right angles to the axis, as in Fig. 1, the curve is a circle ; when it cuts the cone at an oblique angle, as in Fig. 2, it is an ellipse ; when it cuts the cone parallel to a generating line (Fig. 3) it is a parabola, and when parallel to the axis (Fig. 4) it is an hyperbola.

Now let us assume a cone in which the axis would represent the great organic principle of the Universe, acting eternally and inflexibly in the same axial direction. Lines moving in a plane at right angles to the axis would represent the great inorganic forces of the Universe. And a generating line moving round the axis would represent the moral purpose manifested in the moral life characteristic of man. We should thus get a cone of Forces marked out in space, representing mathematically what we already know to exist. And if a plane which we may call a plane of Being slowly rotates round an axis passing through a generating line of the cone, then the intersection of the plane with the cone will give us in orderly succession as it rotates, the circle, the ellipse, the parabola, the hyperbola, according as it is at right

angles to the axis, oblique to the axis, parallel to the generating line, or parallel to the axis.

Now the forces operative in the rotating plane of Being will vary as the plane rotates, and can be easily ascertained by aid of the principles of the Composition and Resolution of Forces. When the plane was in the first position the force would be wholly inorganic. In the last position the force would be wholly organic. Between these two it would be a composed force, the exact composition depending on the angle of obliqueness of the plane to the axis.

By the agency of the simple rotation of the plane within the sphere of operation of such a cone of forces, therefore, forces increasingly organic would come into successive operation, and these would create in the plane of Being organisms of ever increasing development. The rotation, moreover, would not be confined to the quarter of a revolution I have yet spoken of. If then we trace the curves marked out by the intersection of the plane with the cone from the time it enters the cone to the time it leaves it, we have to note that the first position will be when the plane, just entering the cone, lies along the side of it, and the intersection will be the straight line of contact. As it passes on it will intersect the axis obliquely, giving ellipses, till it reaches the position at right angles we first noted. And after the position of parallelism to the axis is passed, the plane will continue rotating until it leaves the cone, when the intersection will again be the straight line of contact of the plane and the cone, where the two first intersected.

There are certain special points to be noted that occur during the semi-rotation of the plane within the limits of the cone. After the plane has passed the position of right angles to the axis *o c*, the oblique intersection of the plane with the cone *o d* is an ellipse—a closed curve—until that point is reached at which the plane becomes

parallel to the generating line of the cone *o f*. Important changes take place at this point. As the plane approaches this parallel position the curve of intersection is still an ellipse, but the ellipse approaches more and more the form of the parabola *o e*. But at the point where the plane becomes parallel, the closed curve, the ellipse, ceases, and an open curve, the parabola, appears.

In the first place we have to notice that the force acting in the plane of Being is now the force indicated by the generating line of the cone. That indicated moral life. The point at which the rotating plane becomes parallel with the generating line gives a mathematical indication of the epoch of the creation of man. We may therefore expect that as the properties of the ellipse are now known to have relation to the material Universe, so the mathematical properties of the parabola will have some relation to the moral life of man. Other properties will appear later, but we may immediately note that the curve is now an open one. The suggestiveness of this, as corresponding to the responsibility that comes with moral life; to the immortality of man, as against the mortality of the brute, whose life is indicated by a closed curve, and to the relationship of supremacy in which man stands to the conditions of existence, is too striking to be ignored.

By the continued rotation of the plane within the cone, we come, at length, to another position of special importance, at which changes parallel to those just noted take place. This is when the plane becomes parallel to the axis of the cone. Then the force acting in the plane will be the reverse of that active in it, when it was at right angles to the axis. Then it was wholly inorganic, now it is wholly organic. Evidently as the point of passage from the ellipse to the parabola indicated the coming in of psychical life, this new position indicates the initiation of the spiritual stage of existence. And at

this point the next curve, the hyperbola, suggestive of eternal progressive development, first appears, and marks the day of Pentecost.

This whole hypothesis points to the trustworthiness of the Bible record, and, accepting the Biblical chronology, the portion of the path of rotation intercepted between the coming in of the parabola and of the hyperbola would evidently represent the four thousand odd years that elapsed between the creation of Adam and the giving of the Spirit on the day of Pentecost.

One further development may be especially noted. It is the point *o h*, at which the plane passes out of the sphere of operation of the cone. At that point the plane will contain within itself a generating line of the cone, and that line will be seen in all its length. It will be a perfect manifestation of glorified moral life and moral relationships. It evidently indicates the point at which the stage of development of glorified existence comes into being.

But previous to the point *o f* at which the ellipse passed into the parabola there are phases of the rotation needing notice. At the first contact of the plane with the cone *o a* the plane will contain a generating line of the cone, and thus have stamped on it the moral purpose which runs through all the ages of development. As rotation proceeds the curve marked out as *o b* will be elliptical and the force operative in the plane be largely organic, but as it nears the position at which it is at right angles to the axis *o c* the organic diminishes to a minimum, and the inorganic increases to a maximum, while after it has passed the critical point of the minimum of the organic and the maximum of the inorganic, indicated by the curve of intersection being a circle, the organic will, as we saw, increase, and the inorganic correspondingly decrease. Now what does this indicate? Does this shed light on anything actually known to us

Diagram showing successive Lines of Intersection of Revolving Plane with Cone of Forces

a'
b'
b1'
b2'
c1'
c'
c2'
d1'
d2'
e1'
e2
d'
o'
f1'f2'
h'
e
e
Y
f1
a
o
h
f2

in nature? Surely it is a striking illustration of what geologists tell us of the glacial period in the history of the earth. Darwin makes such suggestive use of this to explain questions concerning the dispersion of forms of life that I make no apology for quoting from him at length. He says: "It is remarkable that the plants on the White Mountains, in the United States of America, are all the same with those of Labrador, and nearly all the same, as we hear from Asa Gray, with those on the loftiest mountains of Europe. Even as long ago as 1747 such facts led Gmelin to conclude that the same species must have been independently created at many distinct points; and we might have remained in the same belief had not Agassiz and others called vivid attention to the glacial period, which, as we shall immediately see, affords a simple explanation of these facts. We have evidence of almost every conceivable kind, organic and inorganic, that within a very recent geological period Central Europe and North America suffered under an arctic climate. The ruins of a house burnt by fire do not tell their tale more plainly than do the mountains of Scotland and Wales, with their scored flanks, polished surfaces, and perched boulders, of the icy streams with which their valleys were lately filled. So greatly has the climate of Europe changed that in Northern Italy gigantic moraines, left by old glaciers, are now clothed by the vine and maize. Throughout a large part of the United States erratic boulders and scored rocks plainly reveal a former cold period.

"The former influence of the glacial climate on the distribution of the inhabitants of Europe, as explained by Edward Forbes, is substantially as follows. But we shall follow the changes more readily by supposing a new glacial period slowly to come on, and then pass away, as formerly occurred. As the cold came on, and as each more southern zone became fitted for the inhabitants

of the north, these would take the places of the former inhabitants of the temperate regions. The latter, at the same time, would travel further and further southward, unless they were stopped by barriers, in which case they would perish. The mountains would become covered with snow and ice, and their former alpine inhabitants would descend to the plains. By the time that the cold had reached its maximum, we should have an arctic fauna and flora covering the central parts of Europe as far south as the Alps and Pyrenees, and even stretching into Spain. The now temperate regions of the United States would likewise be covered by arctic plants and animals, and these would be nearly the same with those of Europe; for the present circumpolar inhabitants, which we suppose to have everywhere travelled southward, are remarkably uniform round the world.

"As the warmth returned the arctic forms would retreat northward, closely followed up in their retreat by the productions of the more temperate regions. And as the snow melted from the bases of the mountains the arctic forms would seize on the cleared and thawed ground, always ascending as the warmth increased, and the snow still further disappeared higher and higher, whilst their brethren were pursuing their northward journey. Hence, when the warmth had fully returned, the same species, which had lately lived together on the European and North American lowlands, would again be found in the arctic regions of the Old and New Worlds, and on many isolated mountain-summits far distant from each other.

* * * *

"These views, grounded as they are on the perfectly well-ascertained occurrence of a former glacial period, seem to me to explain in so satisfactory a manner the present distribution of the alpine and arctic productions of Europe and America, that where in other regions we

find the same species on distant mountain summits we may always conclude, without other evidence, that a colder climate formerly permitted their migration across the intervening lowlands, now become too warm for their existence." (*Origin of Species*, pp. 310-11.)

My illustration indicates, by the intersection of the plane with the cone when at right angles to the axis, the explanation of this large phenomenon of the glacial period that seems to have played so important a part in the dispersal of organisms over the world. It occurred when the plane of Being was at right angles to the direction of activity of the great organic principle. The importance of this in dealing with chronological questions will be readily perceived.

The illustration also sheds light upon another obscure problem. When the plane of Being is nearing its position of parallelism to the generating line *o e*, at which the curve passes from the ellipse to the parabola, the intersecting curve is still elliptic, but approaches more and more the parabolic. In this a suggestive clue is given as to the orbits of the comets. "In conformity with the laws of Kepler, the cometary orbits are ellipses having the sun in one of the foci. As the ellipses are in general extremely elongated, and the comets are only visible while they describe a small portion of their orbits on either side of their perihelia, their paths during the time of their appearance differ very little from parabolas, whence it is usual on account of the facility of computation to assume that they really move in parabolic curves." (*Encyclopædia Brittanica*, Art. Comets.) It has even been suggested that the orbits of some of the comets really are parabolas, and that the comets have been drawn in to the solar system from some extraneous source. In the light of my illustration these elongated elliptic and nearly parabolic orbits are what should have been expected as the plane

of Being rotated near to the position of parallelism to the generating line.

The properties of these three curves also afford a very suggestive illustration of the varying dominance of the organic and inorganic, characteristic of different stages of development. Mathematically, the curves are defined as the path marked out by a point which travels so that the ratio of its perpendicular distance from a given straight line to its distance from a given point is constant. In the ellipse this ratio is greater than unity. In the parabola it is unity; in the hyberbola it is less than unity. Now, mathematically, the length of lines is taken to represent the measure of a force. In this case, the fixed point would be some point in the axis of the cone, and the distance from it to the moving point would represent the force exerted directly upon that point from the central organic principle. The fixed straight line would be the line of inorganic forces at right angles to the axis, and the perpendicular distance from it to the moving point the force exerted on that point by the inorganic conditions. Now in the case of the ellipse, the ratio of this latter to the former is greater than unity. It is a closed curve, representing the life of the brute, and suggests the dominance of the conditions of existence in that stage of development. In the case of the hyperbola the ratio is less than unity, indicating the supremacy of the organic over the inorganic conditions of existence in the spiritual stage of development. But in the parabola the ratio is unity, indicating the balance of the conditions of existence, and the operative organic principle. Surely no more striking or suggestive illustration could be found of that marvellous moral phenomenon—the Freedom of the Human Will. Man is created among the play of mighty forces that balance one another in a perfect equilibrium, setting him free to choose for himself the life he will live. By throwing the small weight

of his own will into the scale-pan of this one or that, among the delicately balanced and equilibriated forces of the mighty Universe, he can thus retard, or he can assure his own progressive development. In his probationary stage of existence let him voluntarily maintain intact the ruling principle of obedience to God, he will preserve his integrity and observe the conditions his moral nature demands.

And here I may advert to a point referred to in the previous chapter, namely, that there would seem to be a limited time of probation during which the principle of a higher stage operated to take up into itself the principles of the stage below, and thus give to an organism a richer and more enlarged life; and that according to its response to that principle it will depend whether it is to be lifted to a higher stage of development, or left to work out the cycle of its existence within the limits of the lower. From two extreme stages light comes to us. It has to be remembered, however, that on this theory each new principle that comes into operation gives a wider amplitude of life and all life's functions to the organisms created by it than was possessed by those in the stage below. It thus means a new step forward in development. With increasing complexity of organization and need comes increasing complexity of centralizing instinct. The higher the organism in the scale of Being, the larger will be his powers; the greater his needs, the more ample the scope of his activity, and we should expect the limits of probation to be correspondingly wider. In accordance with this we notice that the limits within the material stage of inorganic development are very narrow, and that in all stages below man election by the higher principle is decided for the organism in a determinate way. The orbit of a planet struck out by the intersection of the plane of Being of the planet with the cone does not vary as the plane rotates. The orbit seems to have

been struck out, and when once struck out to have become fixed, even though the plane rotates. Thus we have elliptical orbits of varying proportions in which the different planets move. The limits of probation here are just the time taken by the plane to strike out its intersection with the cone, and the planet that moves in that plane then remains fixed in that particular orbital path for ever. At the same time the plane, by its rotation, is continually modifying its own angle of incidence to the creative forces of the Universe, represented by the fixed axis of the cone, and thus progressive development of organisms on the planet whose orbit is fixed takes place by the coming into operation of new elements of the organic principle as the Ages pass. And as we rise in the scale we may expect those limits, within which the new principle strikes out its own type of organism, to become wider. Whatever may be said of it from the standpoint of individual belief, the doctrine advanced by many theologians is in strict keeping with this, when they declare the natural life of man to be a time of probation within the limits of which the opportunity is alone possessed of passing from the stage of moral development to the spiritual, and assert the eternal fixing of the condition of men, to whom the Gospel has been freely made known, when they pass beyond the limits of man's present life.

Now, seeing the significance of the rotation of the plane of Being in this illustration, it becomes necessary to ascertain if it has any relation to the world of actuality. Each other part of the illustration has—the organic principle, represented by the axis; the inorganic principle, represented as operative in a plane at right angles to the axis; the moral nature of man, represented by the generating line of the cone; and these all, co-ordinated and operative in the primitive nebulosity, which of itself is simply inert, being that on and in which the principles

act. With such a cone of forces I have now shown the main features of the varied and increasing developments of the Ages can be explained by simply assuming the rotation of a plane of Being within the cone.

I have supposed one plane of Being. But there are many planets in the solar system, each one of which has its own orbit. Each orbit would be represented by the curve struck out by the intersection of the plane with the cone at a given angle. As the plane rotates it would thus successively mark out with the cone the varying curves of intersection represented by the varying orbits of the planets. Now, if instead of one plane, striking out orbital curves of intersection successively, we assume a number of planes, struck out simultaneously at varying angles to the axis of the cone, then each plane would mark out a different curve from the rest, depending on its own angle of intersection. Hence, if, instead of assuming one rotating plane of Being within the limits of the cone, we assume a great rotating mass, in which a number of planes have simultaneously struck out a number of varied orbital paths, then as the mass rotated each plane would be carried round with it, and all the planes would rotate simultaneously and harmoniously.

In this readers will recognise the fact with which astronomers have made us familiar. They tell us there are two movements observable in the Universe—a movement of rotation, and a movement of revolution. The moon rotates upon its axis, and revolves round the earth. The earth rotates on its axis, giving us the phenonenon of the cycles of day and night. The earth also revolves round the sun, giving us the phenomenon of the cycle of the seasons. And now we know that the whole solar system rotates upon its axis, and in the light of my illustration we shall have to regard that—the chief element in the cause of the Precession of the Equinoxes—as giving to us the increasing unfolding developments of the Ages. For

as the whole system rotates it carries round with it the rotation of the orbital paths of the planets, and thus brings them into varying angles of incidence with the direction of activity of the great organic principle of the Universe. Thus, in the original movements of the material Universe, is involved the unfolding of ever new elements of the organic principle at definite epochs, determining the initiation of new stages of development and creating orderly, progressive development through the unfolding Ages. And when it is remembered that in actuality we have to deal, not with a mathematical plane, but with material planets of varying shapes and sizes that revolve in their respective orbits, the varying contour and aspect of the surfaces of the planets come into play to vary within smaller limits the influence of the creative principles that operate at any given time.

And it is hardly possible to avoid going further, and postulating the revolution of the whole solar system round some greater centre still, to ascribe to that the immensities of time we mask to ourselves under the name of the Eternities.

It is impossible to overestimate the significance of this conclusion. Evolution has taught this generation to believe in the age of the earth as covering almost incalculable millions upon millions of years. The explanation of the Universe by Natural Selection necessitated it. But that inert matter could have evolved organisms of high complexity out of itself is an idea that is destined to be laughed to scorn. The impossibility of the conception would have been realized had only limited periods of time been allowable in which Natural Selection could do its work. But Evolution by Natural Selection is of itself an inherent impossibilily. And an impossibility is not rendered possible by postulating millions of years in which to accomplish it. It remains an utter impossibility still. With the rejection of Natural Selection we shall

come back to more rational conceptions of time, and perhaps the Biblical chronology will be treated with more respect than has been accorded to it in recent years.

And perhaps, also, we shall learn to sit with more docility at the feet of the Great Pyramid of Egypt. Speaking of the entrance passage, Piazzi Smith says: "Sir John Herschel had not said that the passage was intended to serve as a permanent observatory, but that its cream-coloured, stone-lined, long, long tube seemed to *memorialize*, or further still, to *monumentalize*, the once occurrence of a particular phenomenon of the day when it was being built, and of that day only; a record, therefore, once for all, by *memorial* and *monumental* astronomy (whatever other practical use the passage may or may not have afterwards served, of a former special sidereal fact, but whose memory was destined to become increasingly important in distant ages for the purposes of exact chronology." (*Our Inheritance in the Great Pyramid*, pp. 369-70.)

The cone of forces has yielded us striking illustrations of certain points in connection with the developments of the Ages, and may doubtless yield much more in the hands of expert mathematicians. It is not to be supposed, however, that the solar system is actually to be conceived as a cone. It is a significant geometrical representation of the material and other relationships of the system, but we need now to analyze the forces and resolve them into simpler relations than we have yet done.

If, then, we conceive of the original condition of the Universe as that of primitive homogeneous nebulosity, possessed of the single property of attraction, the whole mass of the matter will remain in stable equilibrium because all particles are equally affected by all the others. Let us fix attention on any one particle. Attracting all other particles round it, and being equally attracted in

return, the particle is at rest, because of the equilibrium of the forces of attraction acting on it. If now a force act upon that particle it will tend to move it in the direction of its own activity. Difference within the mass is immediately set up. By virtue of the passive resistance of the mass the action of the force sets up reaction equal and opposite to itself. The particle will be displaced and driven through the mass. The forces of reaction will be of the nature of a pull. By the power of attraction the particles round the displaced particle will be displaced also, though not to the same extent. And by the aid of higher mathematics it can be shown that by the action of a single force, particles, which previously to the action of the force were arranged in a plane at right angles to the direction of the force, will be displaced, and tend to assume the form of an hyperbola. Thus the curve characteristic of the spiritual stage of existence is produced by the direct action of a single force acting in a simply passive medium. And, furthermore, it can be shown that the effect of a single force acting in a passive medium is to set up such forces as we have indicated in the cone of forces. But now the forces at right angles to the axis in the illustration, representing the inorganic forces, will appear as the reaction which is set up in the passive attractive medium by the action of the force, and the generating line of the cone will spread itself out into the plane at right angles to the direction of the force. The inorganic forces of the Universe would thus appear to be the reaction of the organic principles acting in a passively resisting medium. If, then, we assume a mighty nebula, as the scientists do, and also a principle acting in a line in it, we can explain the features of the Universe in terms of the direct action of the principle, and the reaction set up by it in the mass of the nebula.

We shall then have to conceive of the Universe as a mighty nebula, penetrated in certain definite directions

by mighty lines of force, developing in it the solar and other systems, and the one great problem becomes the understanding of the great central organic principle that develops all things. However much we may be staggered by the grandeur and simplicity of the thought of the solar and other systems being ultimately resolvable into the action of mighty single organic principles, each acting always in a definite way and line of direction, anyone acquainted with such elementary scientific phenomena as the lines of force in a magnetic field, and the arrangement of iron filings under their influence, will be familiar with the conception. And those who further remember that the same force of gravitation moulds alike the dewdrop and the great masses of the heavenly bodies will find no insuperable difficulty in the suggestion that in such magnetic lines of force we have, on a microscophic scale, a phenomenon parallel to that observable in the immensities of the Universe.

THE PRINCIPLE OF THE UNIVERSE.

XII.

THE PRINCIPLE OF THE UNIVERSE.

IT will be convenient now to summarize the arguments and conclusions we have reached. Two main lines of thought have been simultaneously developed. One deals with the principles of human progress; the other with the explanation of development through the Ages, including human progress. From different departments we have seen that the true lines of development of social communities are mainly four: (*a*) Independence of the units. (*b*) Interdependence among the units. (*c*) Co-ordination of the units for common purposes. (*d*) The care of the weak by the ministration of the strong.

These lines of development are becoming increasingly manifest in our social life. Along them we are already beginning to realize the meaning of brotherhood. It is significant also that in the developments of the Ages these lines also appear. In the earliest manifestations of life, the law of activity—self-preservation—emphasizes and isolates the individual. The basis for the after ages is laid in organisms that in all their life reveal their independence of one another. This principle enters in as the lowest element of richer natures afterwards.

In the correlations of the natural world, largely controlled by instincts, is developed the interdependence of the parts on one another, while in the social communities of ants, bees, etc., the first glimpse is caught of the co-ordination of parts for common purposes. In all these lower stages, however, no value attaches to the individual life apart from its immediate and present existence. With man, value is attached to the individual, and the last law, the care of the weak by the ministration of the strong, is manifested. We have also seen these were the lines laid down for the life of the early churches, and that running on those lines a brotherhood was realized in the first centuries not equalled since.

Rigorous Science cannot forbear from drawing certain conclusions from the coincidences. Religion will be seen to consist, not in magical superstitions and clerical impositions, but in the realization of the highest form of social brotherhood possible. The early church polity will be realized to have been complete in itself. The so-called developments of the centuries—the incoming of Priestcraft in the third century, of State Churchism in the fourth, and of the modified perpetuation of these in the centralization of religious denominations—will be seen not to have been developments at all, but variations from type which in due course will have to be cast off and thrown aside as hindrances to the realization of social brotherhood. Anglo-Saxon history will take on new meaning. The whole of Western Europe having been thrown off the true lines of progress by Sacerdotalism, it will be realized that the struggles of the past centuries have been the returning, by slow degrees, to true lines of development. The struggles for liberty and independence in the past, and now for the solution of the problems of interdependence, have been the undoing of the mischief wrought in past centuries.

The one supreme stronghold of all retrogression has been a fundamentally sacerdotal State Church. Nor is it difficult to forecast the meaning of present difficulties. The purposes of God are delayed, but not frustrated. It seems now as if we have come to the death-grapple. In the fight for education, Sacerdotalism has revealed its true inwardness. It seems filled with the prescience that it is its last desperate chance. The ages of clericalism seem drawing to a close. In laying its clutch upon the throat of education, Sacerdotalism has overreached and broken itself. Now, in England at least, in the very hour of apparent triumph, its day of doom is near at hand. The Education Bill of 1896 has paved the way for disestablishment.

The fundamental conceptions of the day have brought this centuries-old conflict to a head. The marvellous facts and laws established by Science are all in line with the teachings of Evangelicalism, but the materialistic conception of Evolution has favoured the externalisms of Sacerdotalism. When rigorously examined that hypothesis reveals its inherent weakness. It is at issue with the method and the rate of human progress. It has no explanation to give of the highest reaches of life. It is confronted with insuperable difficulties in its own department. It can make nothing of instinct. It has no place for beauty in the world. The definite working out of great purposes are excluded. It gives an imperfect conception of variation. It disturbs all chronological computations. It has nothing to say concerning origins, and great ranges of facts embedded in the geological records challenge its validity. By shifting the centre of explanation from God to matter, Darwin enunciated an hypothesis, which, philosophically, scientifically and religiously, is proving itself a rotten tree, and is bearing terrible fruit to-day in the confusion into which it has cast all human life.

Thus is fulfilled that prophecy of the Book of The

Revelation of the beast who had power to give life to the image of the previous beast, and to cause that all the world should worship it. Nor is it difficult to recognize, in the language of the prophecy: "And he causeth all, the small and the great, and the rich and the poor, and the free and the bond, that there be given them a mark on their right hand, or upon their forehead; and that no man should be able to buy or to sell, save he that hath the mark, even the name of the beast, or the number of his name," a significant forecast of the disgraceful and inhuman modern counterpart of the barbarous persecutions and martyrdoms of a coarser age—the Social Ostracism of Dissent.

But it is useless to fight against God.

The developments of the Ages are rather to be expressed in terms of the unfolding principles that spring from ever deeper centres of Being as the Ages pass. The nature created by the principle is the most important factor in the development of any organism. From age to age the conditions of existence persist, but the relation of the nature to its conditions varies. All previous stages have been preparatory to the creation of a being able at last to control the conditions under which he lives his life.

We shall need to reverse Darwin's presentation of direct and indirect action on organisms. The action of the Creator will be seen to be the more important. Action on the nature of the organism by principle will be His direct action; action through the conditions by the agency of man will be indirect action, the co-operation of the two producing the highest development of which any organism is capable.

Creation by Principle gives us a standpoint from which a solution may be found for the long standing dispute between realism and nominalism. Both may be seen to have in them elements of harmonious truth. The

great Creator will be seen to be the real source of all things. The outwardly manifested world of actuality will be seen to have its source in the varied creative principles of the Universe. Yet personality inheres in the individual. The great creative Being and the created beings both are. The old philosophers quoted by Paul may not have been so very far wrong when they said: "We are also his offspring."

In the light of Creation by Principle, man is seen to be the crowning achievement of the Creator; all the previous stages have been preparatory to his appearance. The varied stages of development represent the gradual correlated unfolding of the principles that enter harmoniously into his nature under the supreme sway of the moral element. Into the cycle of each man's life there is thus focussed the varied stages of the developments of previous Ages.

Acting in the inert primitive nebulosity, the creative principle of inorganic movement laid the foundation for his coming by giving consistency and form to the world. Affinities between the differentiated elements are revealed by chemistry. With the touch of life, its self-multiplying power, and its first law of activity—self-preservation—is revealed. Nearest to the material we here touch the lowest element in man's nature, and that, moreover, whereby through Heredity the human race is linked together into an organic whole. Elements of feeling are next unfolded in the lower animal world. Elements of intellect appear in the vertebrata. With the appearance of man these are all co-ordinated together into harmonious human nature as they are taken up, banded together, and utilized in the rich endowment of a created being with will, and consequent personality and responsibility. All is Divine, and promises greater glory yet. For as the principle of each stage is enlarged and fulfilled by the unfolding of the principle of the stage above,

moral life itself, after probation, points to its own enlargement and fulfilment by the unfolding of the spiritual, to pass on at length with the casting off of the material at death into the stage of glorified existence, to stand unabashed, face to face with Him from Whom it all proceeds, and in Whom, by Whom and for Whom, it all gloriously consists.

The great composite principle of the Universe remains the same throughout, but by the movement of rotation of the varied systems upon themselves, they, by analogy with the solar system, are brought into ever varying and graduated relationship with the principle. The elements of the principle come into operation at definite, successive periods, depending chiefly on the incidence of the plane of the orbit of a planet to the central principle. As illustrated by the cone of forces, each system passes through a cycle of developments, returning to its original condition after a given period, as far as its material structure is concerned, and as each individual life also reproduces that series of possible developments within the cycle of its own earthly existence, the cone of forces makes possible in the future a reliable and scientific astrology.

Questions of chronology are simplified by this theory, and by its aid astronomers may at length be able to determine with some exactitude the answer to the vexed question: What is the age of the earth?

At each stage of development we have traced out a centre, a central and a centralizing principle. These vary as development proceeds. Acting at first within narrow limits, they are largely subject to and controlled by the conditions of existence. As the unfolding proceeds, organisms are created with wider scope of life, greater amplitude of powers, corresponding flexibility of being, more complex correlations, more variety, increasing dominance and guidance by life principles, less

and less subjection to mechanical conditions. Emancipation from the material proceeds. The nature is enriched and developed, and correlated and harmonized functions appear.

Each principle is wrought out along its own line of development. Clear and well-defined characters are thus manifested in nature, enabling the scientist to classify organisms with wonderful precision. In the future, however, it would seem as if classification would be determined from the standpoint of nature. The developments of mental qualities in animals, and of moral qualities in man, rather than of structure, will yield the essential principles of division. And the creation of an organism by a composite principle, capable of acting variously within limits, gives flexibility to the whole Universe. A wonderful variety is thus manifested in nature, as well as clearly marked definiteness.

Creation by Principle points to the scientific study of the twentieth century devoting its strength to the elucidation of the principles creative of varied organisms. We shall thus get down to a deeper level of study than has been previously reached. Such truths as "The life is more than the meat, and the body than the raiment," "What shall a man give in exchange for his soul?" will receive new meaning. The conception, and meaning, and beauty of life will be enlarged in all directions. Matter will be seen to be the screen on which the unfolding principles are displayed, the element in which they manifest their creative energy. The conditions of existence will receive further attention, not indeed, as now, because by their modification it is hoped to modify the life of those who live under them, but because the unfolding principle demands conditions for the life of the individual in accordance with his nature, and that the development of the nature be not impeded. All things will be seen from the standpoint of the inner life, which

demands scope to mould the outer to a new and glorious transfiguration, in accordance with the necessities of its own nature.

Throughout all nature there is a great struggle for principle. It dominates all life. The inner fights for mastery. At each stage the organisms, living in accordance with their natures, struggle to gratify their natures. But the principles and hence the natures in the different stages of development vary. The way in which the struggle for principle will present itself to any observer will, therefore, depend on what stage of development he examines. In the lowest stage of organic development the law of activity is self-preservation. No moral consideration enters in. Pain and suffering do not mean the same as in higher stages of development. The organism is developed under the domination of the conditions of its existence. Here the struggle for principle takes the form of struggle for existence. These were the stages Darwin examined, and this the conclusion he drew. But he generalized from insufficient data when he assumed that to be the law of all life. In the higher stages moral considerations come into play. The law of activity is right, and in the spiritual stage, love. The struggle for principle here is not a struggle for self or a struggle for existence. The history of the Free Churches is one long record of patient struggle for principle. In the past it has largely been by patient endurance, sometimes by aggressive assertive war upon the strongholds of opposing principles. The day for waging the fight on the level of political life is fast passing. The deeper struggle on the level of spiritual principles comes. "We fight not against flesh and blood, but against principalities and powers." But throughout all nature we note the same struggle for principle. It is a law that includes within itself as a special example in a particular department Darwin's law of the struggle for existence. True of the lowest

organisms, and of the lower elements in man's nature, it is eminently untrue of the higher elements that are meant to control his life. Moral life is most highly developed by the law of self-sacrifice. We rise on our dead lower selves to reach to higher things. He who has given us the supreme illustration of the highest life said: "He that saves his life shall lose it, and he that loses his life for My sake shall save it."

It should not cause any difficulty that Creation by Principle points to the existence of different elemental principles united together in the one great central principle of the Universe, nor that we must regard each principle as active in its own way, along its own line of development. Light comes to us white and strong, yet we know it to be compounded of different elemental rays of varied colours, and as it strikes upon some object it is manifested by manifesting the object. Human nature contains emotional, intellectual, and volitional elements. They are distinct, yet compounded together into an organic whole. Scientists have examined the tangle of the world, and by marvellous and patient skill have presented it to us as an ordered and regular unity. By the Atomic theory we regard the varied developments around us as built up of infinitesimal atoms. Creation by Principle supplements and crowns the Atomic theory. The elemental atom will have been created by the elemental principle. The whole ordered life around us opens up a vision of an ordered unseen universe of spiritual principles, that project themselves into and incarnate themselves in matter, creating phenomena and organisms. There will be affinities and dissimilarities among them, enabling or preventing them from operating together directly, though compounded and held together in the great central principle. And these will also be projected into the world of actuality, with its separated species and modified varieties, with its chemical affinities, organic

hybridities, and sympathies and antipathies of character.

What then is Infinity? In connection with the composition of principles, I gave a very simple case, by way of diagram. 3465 is the least common multiple of of 5, 7, 9, 11. Infinity is the least common multiple of all numbers. The infinite principle is the least common multiple of all principles.

The mathematician says if you divide unity by infinity, the quotient is infiinitesimal. He denotes it by the symbol for nothing. The infinitesimal multiplied by infinity gives unity. The infinite principle operates in primitive nebulosity, and creates the infinitesimal atom. Multiply this by infinity, and you get unity. Unity is the characteristic ratio of the parabola symbolic of of man's moral life. Man is the unit of the Universe. The solar system was created for him. "What is man, that Thou art mindful of him, or the son of man, that thou visitest him. . . . Thou has put all things under his feet."

The solar system is but a part of the Universe. What are angels, ministering spirits, Seraphim, the Devil? Are there parts of the Universe in which these are born, and pass through the cycle of a probationary existence? What other sheep have to be gathered in, that there may be one fold and one Shepherd?

All must be unfolded from the one great central principle.

But if we ask what is the supreme manifestation of principle, there can be only one answer. The supreme element in man is his personality, his will. Personality has not been created by an impersonal principle. We must perforce predicate personality of the great principle of the Universe. The whole ordered developing Universe resolves itself into the unfolding of Himself by the great and mighty God.

Science and Religion have often seemed opposed to

each other. The opposition is apparent only. Science has always dealt with Creation as manifested. Religion has regarded it from the standpoint of the creative God. Of the two, the God who works in matter He has Himself created is supreme. The day is perhaps not far distant when Science and Religion will join hands and bow together before Him. Then will they accept as at once strictly scientific and reverently religious the statement of an old, time-worn, but loved and trusted Book: "In the beginning God created the heavens and the earth."

FINIS.

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