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the wall. That the outcasts of England are our brethren in Christ, and the victims of our social system are children of God as well as we. We have cared far too much for this world's wealth and this world's fashions, and even the good gifts of culture and learning have too often helped to puff up our pride. It is not enough to offer them charity, or justice, or political rights. Nothing will suffice but a welcome in Christ which the man of the world will never give; and nothing short of this will heal the discords of the State, and avert the war of classes which darkens the horizon of the whole civilized world. So much of the Spirit's message we can safely read by the Light of Scripture and history, and the rest will be revealed to us in due time, if we are willing to receive it. When we turn to history, we find that God seems to reveal Himself to nations chiefly in their trouble and distress.

But why is this? Let us look to history again and see. It is on a stubborn and rebellious generation that the affliction comes. If men prefer their sin to the Spirit's teaching, that sin will find them out. They are quite free to disobey if they like. Meanwhile God gets His work done whether we are willing to be labourers with Him or not; and if we refuse, the loss is ours. If the Jews of our Lord's time had been willing to put away their hatred of the Gentile, Jerusalem need not have been destroyed. Had the Romans chosen to overcome their scorn of the barbarian, he would have been proud to serve their glorious Empire. So too, if we refuse to lay aside our pride and lose our class divisions and our party hatreds in the love of Christ, England also will have to go the way of Israel and Rome, for there is no respect of persons with God.

Once more, the thoughts of God are not our thoughts, neither are our ways His ways. Our systems are like the stately icebergs that plough their way for awhile through the sea, glittering with rainbow colours in the sunshine. But the waters pour down their sides in cold cascades, and soon they shall vanish away, and the face of the deep shall know them no more. The thoughts of God are infinite and changeless as the azure sky. The covenant of the Lord is from everlasting, and His counsel shall endure for ever. It is He that rules the tossing sea of this world's wickedness, and causes the Pharaohs and Sennacheribs to do His will, and accomplish the thing He would have done, and to sum up not all men only, but all things in Christ, from whom they came, in whom they consist, and to whom they are moving as their final end. And His will is to have mercy on all men.

May He of His infinite mercy strengthen *us* to hear His voice and serve His will in our own generation.[1]

[1] H. M. Gwatkin, *The Sacrifice of Thankfulness*, 15.

The New Physics and Religious Thought.

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Weyl, in his great mathematical treatise on *Space, Time, and Matter*, says, 'In our time there has been unloosed a cataclysm which has swept away space, time, and matter, hitherto regarded as the firmest pillars of natural sciences, but only to make place for a view of things of wider scope and entailing a deeper vision.'[2] These words are no exaggeration, but a sober description of the cataclysmic change which has taken place. If one may use the expression, physics has begun a new innings, and all the signs indicate that it is going to be a big innings.

This revolution is destined to have a profound influence in every field of thought, though it will take years, probably generations, to work out all its bearings. Professor Muirhead has expressed regret[3] that idealist philosophers, having in general had no training in physics, are but ill-equipped to deal with the situation which has arisen, and it will be freely granted that theologians are in no better case. None the less, it is incumbent on us to endeavour as best we may to attune our thinking to the new modes of thought, lest haply some day we wake up to find that we are using terms which have grown obsolete and categories which have been discarded.

Special points of interest in the new physics may be said to gather round Relativity and the Quantum Theory, mysterious words which have

[2] P. 2.

[3] *Contemporary British Philosophy*, i. 320–2.

begun to make their way into the popular speech, without conveying much meaning to ordinary minds. The former deals with the structure of the world; the latter is concerned with the ultimate stuff of which the world is made. Let me venture a few elementary remarks on each.

I. Relativity.

Relativity, as applied to Einstein's work, is somewhat of a misnomer, for his whole effort is to get rid of relativity. Relativity simply means that things look different when viewed from different standpoints, and especially when the observer and the object are in motion relatively to one another. A penny looked at sideways appears not a circle but a narrow strip. The telegraph poles move in swift procession past the carriage window; the sun and stars circle through the sky. This individual element enters into all our perceptions, and we learn, in a rough and ready way, to correct it in some degree. Einstein's endeavour, to put it in a nutshell, was to cancel out this element, and to find a way of stating physical laws in a form common to all observers. And this he brilliantly accomplished.

The most interesting of all points would be to determine just whereabouts we are in the universe, and how we are moving. The famous Michelson-Morley experiment was an ingenious attempt to find this out. The velocity of light is known, and is a constant. That is, a ray of light never slows down like a spent arrow. Well then, let us measure the speed with which it strikes on us, and we may discover whether we are moving towards the light or away from it, and at what speed. The experiment was sufficiently refined to have served its purpose, but nothing could be detected. Under all conditions light came along at the same velocity. The consequence of this is that there is no possibility of telling at any moment how we are moving relatively to the ether. Nobody can say to his neighbour in an absolute sense, 'I am at rest. It is you who are moving.' Nobody's standpoint, except in some restricted sense, is superior to anybody else's. All our standpoints are equally relative.

To explain the negative result of the Michelson-Morley experiment, Fitzgerald suggested that bodies in motion suffer a certain contraction of length varying with their velocity, and Lorentz worked out a formula to express exactly this assumed contraction. This, of course, was just an *ad hoc* solution, unsupported by any reasoning, but simply adopted for practical purposes. It fell to Einstein to confer upon it a new and startling significance. For the first part of his epoch-making work was to take the formula of Lorentz and to show that it is demonstrably true of all uniform motion, though in the case of slow motion it cannot be detected by experiment. His proof is sufficiently simple to be followed by any one who has an elementary knowledge of geometry. The result may be very roughly put in this way. If a body is in motion its length is multiplied by one minus a fraction, the numerator of which is the square of its speed and the denominator the square of the speed of light. Obviously the speed of light is so incomparably great that in most cases the fraction becomes infinitely small and is negligible. The diminution in length, it should be added, is exactly balanced by an increase in time according to the same formula. This would mean, to use an illustration of Eddington, if a man were flying overhead in an aeroplane at one hundred and sixty-one thousand miles a second (five-sixths the speed of light), he would appear about three feet long, and his time about twice as slow as ours, 'as though time had forgotten to go on.' Eddington[1] has some interesting reflections as to what would happen if one could attain to travel with the speed of light. Both the space-unit and the time-unit become infinite. The traveller waits for the next minute, which never comes. 'So long as he travels with the speed of light he has immortality and eternal youth.'

What Einstein had so far accomplished was to provide a formula which would give the same measurement for all observers, no matter how they were moving, so long as their motion was uniform and in straight lines. This is his Restricted Principle of Relativity, which was made public in 1905.

It will be observed that when motion is included, the idea of time is necessarily brought in. It was there from the first, only we chose to ignore it for certain purposes, and in so doing, as it now appears, we grievously erred. 'Time and space are never separated in nature, and we have no right to separate them in our theories which are supposed to represent nature.'[2] The consequences of this are far-reaching. Henceforth we must deal, not with *things* but with *events*. The unit of reality is not a point in space but a minimal event in space-time.

To the mathematician Minkowski belongs the honour of working out in detail the laws of the four-

[1] *Space, Time, and Gravitation*, 26.
[2] Bolton, *The Theory of Relativity*, 7.

dimensional space-time continuum, and Einstein has acknowledged that without his work 'the general theory of relativity would not have got beyond long clothes.'[1] Measurements in three-dimensional space are made in terms of the square of the length plus the square of the breadth plus the square of the height. Minkowski was able to show that the four-dimensional continuum required the addition of the square of the time, *but introduced under a minus sign.* Accordingly, to put his co-ordinates on all fours, he assumes an imaginary time, which is equal to real time multiplied by the square root of minus one. 'It is not very profitable,' Eddington remarks,[2] 'to speculate on the implications of the mysterious factor $\sqrt{-1}$, which seems to have the property of turning time into space.' But one cannot help regarding it with the greatest possible curiosity, especially as Eddington himself admits that 'that minus sign is the secret of the differences of the manifestations of time and space in nature.' It is becoming customary to say that time is the fourth dimension. It might be truer to say with Maeterlinck[3] that eternity is the fourth dimension. Time is our imperfect way of conceiving the fourth dimension, it is the shadow cast by the fourth dimension upon our three-dimensional world. Any three-dimensional body passing through a plane would be represented on the plane as a time-like succession of events, which would be the only way in which a two-dimensional being could represent a solid to himself. So it would appear that time is the only way in which the fourth dimension is apprehensible to three-dimensional beings like ourselves, and the surd $\sqrt{-1}$ may be the mathematical way of expressing the fact that the fourth dimension is essentially inconceivable by us.

We come now to the general principle of relativity, which Einstein published in 1915. Under the restricted principle he had dealt only with straight lines and uniform motion. But obviously the world is full of all sorts of curves, and its principal motions are not uniform but accelerated, as in gravitation and the rotation of planets. To reduce all these to one system was an immensely more difficult task. In this task Einstein was aided by the work of certain great mathematicians of the nineteenth century, particularly Riemann, who had shown that space might be spherical. Einstein, basing himself on Riemann's geometry, was able, by a superhuman effort of mathematical genius, to work out a set of equations which would produce complete unity of measurement, eliminating all relativity. In other words, if two observers, no matter where they stand or what their motions are relatively to one another, make each his own independent measurements, then if these two sets of measurements be corrected according to Einstein's formula, the answer will be the same in both cases. We thus at last reach a figure which is completely independent of the individual standpoint. It should be borne in mind that time is involved in this calculation as well as space, so that we have now a formula for connecting any two events in the space-time continuum.

We shall not attempt here to elucidate the mystery of the space-time continuum, in which matter is represented as a wrinkle, so that in the neighbourhood of matter space is non-Euclidean but becomes a curve in the first degree as it approaches infinity. We may pass by Einstein's argument that space is spherical, unbounded but not infinite. These speculations may be left to the mathematicians. But we, at least, must accustom ourselves to this new view of the universe as an indissoluble complex of space and time. The world is not static but dynamic, a world in flux. It is continually on the move, with an inconceivably intricate power of self-adjustment. If our perceptions were fine enough, we should see that, whenever we make the slightest movement, the whole world readjusts itself to meet the new situation. This is not fancy but sober science, and it is extraordinarily suggestive.

II. The Quantum Theory.

The Quantum Theory, though considered by those most competent to judge to be even more revolutionary than relativity, may perhaps be treated more briefly. As is now generally known, the old idea of the solid indestructible atom has completely vanished. The atom is now resolved into its constituents of positive and negative electricity. The phenomena connected with radio-activity could only be explained by the break up of the atom and the radiation of its enormous electrical energy. The molecules of the different chemical elements are constructed of these electrical units held together in equilibrium according to various patterns of complexity. The limit of complexity seems to have been reached in uranium, and the phenomena connected with radium indicate a breaking down from uranium towards lead, that is, from the more complex to the less. It is as if the inorganic world had reached in uranium a

[1] Einstein, *Relativity*, 56.
[2] *Op. cit.* 48. [3] *The Life of Space*, 85.

degree of complexity which it could not continue to maintain, as if the tide of inanimate nature had touched high-water mark and was now on the ebb. This is a deeply significant fact which should be carefully noted, for it reveals a process of devolution in the inorganic world, the opposite of evolution. To this we shall return presently.

Bohr's theory of the architecture of the atom is generally accepted. According to it, the atom consists of a nucleus of positive electricity balanced by negatively charged electrons which revolve round it in various orbits. This theory has been worked out in great detail and is supported by many exquisite experiments. A complication arose when it was discovered by Planck that an atom does not radiate energy uniformly but in little spurts or pulsations, which are always multiples of a certain fixed quantity known as Planck's constant. To meet this new fact Bohr adapted his theory by postulating that whenever an atom receives or radiates energy, it means that an electron instantaneously jumps the rails to a wider or a narrower orbit.

On this theory two remarks may be made. People are beginning to get into the habit of saying that the architecture of the atom is a model on a small scale of the solar system. This is very loose talk. If the earth, besides revolving round the sun, were to change its orbit erratically, jumping suddenly inwards towards the sun till we were scorched, then jumping instantaneously outwards to an immense orbit where we were frozen solid, and if all the other planets behaved in the same way, then you would have something resembling what is supposed to go on inside the atom. The second remark is that Bohr's theory with its orbits and its jumps, beautifully constructed and strongly supported as it is, begins to be too intricate to be credible. It has the appearance of an *ad hoc* theory, like the Ptolemaic system with its ten crystal spheres. One is therefore disposed to look favourably on the recent theories of Heisenberg and Schrödinger, who postulate a sub-æther in which the electron is a kind of diffused presence capable of manifesting itself at various points. The atom, according to this view, is simply a mysterious, utterly unexplored *locus* out of which there come measurable spurts of energy or *quanta* of action.

Now the disconcerting thing about the Quantum Theory is that it seems to contradict continuity. It loosens all the joints of the framework of the world, and throws the very elements into a mad dance. Nothing is left but vibrations, as impalpable as a musical note, as evanescent as a colour. Nature, it used to be said, never makes a jump. Now, it would appear she makes nothing else. Nor can any one predict just when or where or why she will make the next jump. Even Bertrand Russell concedes that the Quantum Theory 'seems to show that nature has a kind of foresight, and also knows the integral calculus,'[1] and again that 'one might, more or less fancifully, attribute even to the atom a kind of limited free will.'[2] Eddington's weightier conclusion is that 'in this reconstruction all the determinism is removed from the laws of physics, the apparent determinism is found to be merely high probability. . . . The new quantum mechanics contains only laws which decide the odds; it apparently has no cognizance of any factors deciding what actually will happen. In the old conflict between free will and predestination, it has hitherto seemed that physics comes down heavily on the side of predestination. The quantum theory has entirely removed this bias.'[3]

III. Some Reflections.

What influence are these new theories likely to have upon the thought of our time? That is an exceedingly difficult question. It will take years to work out the implications of these theories, and generations to root them in the common mind. Yet ultimately they will become part of our mental furniture, just as the Copernican system has done. That is to say, just as we are now able without difficulty, contrary to all the evidence of our senses, to imagine the earth revolving round the sun, so men will come in time to think of the world in terms of *quanta* of action in a space-time continuum. With what results in human thought, who can tell? One could well imagine that the idea of relativity, if it came to obsess the public mind as evolution has done, might become a powerful weapon of scepticism, leading men to argue that there is no absolute truth, no one standpoint superior to any other, but each one relative to the observer. One could also imagine that the new theory of matter might lead the materialist to argue that matter is so wonderfully constituted as, by its own inherent power, to be capable of anything. Doubtless the most diverse systems of thought will continue to be built up. One may perhaps venture to indicate, very tentatively, some directions in which thought seems to be moving.

(*a*) A most notable change is taking place in the

[1] *ABC of Atoms*, 151.
[2] *Outline of Philosophy*, 311.
[3] Eddington in *Nature*, 26th Feb. 1927, p. 328.

attitude of the scientific mind. It is no longer, as in the nineteenth century, confident and dogmatic, but is humble, reverent, expectant. The wonder of things is felt to be infinitely magnified, the mystery of the world deepened. 'It is impossible,' says Whitehead, 'to meditate on time and the mystery of the creative passage of nature without an overwhelming emotion at the limitations of human intelligence.'[1] The physicist does not know what he is dealing with. He is striving to master the conception of a world of four dimensions, and he knows that very possibly the world is of *n* dimensions. He has carried his analysis of matter almost beyond the limit of human imagination, yet he comes no nearer to the end. He measures certain things, but he has no means of knowing how much is escaping through the meshes of his net. 'The problem of matter,' says Weyl, 'is still wrapped in deepest gloom.'[2] The observer can note certain effects, but what the thing itself is completely eludes him. His knowledge, says Eddington, is only an empty shell, like the knowledge one might get of chess by reading a list of figures representing the moves without having any idea of what a chess-board and chessmen were like. It is, says Bertrand Russell, such poor knowledge as one might get of music by reading the score without ever having heard a note.

(*b*) Natural law has fallen from its high estate. It has been stripped of its authority and exposed as 'a concealed convention, plastered on to nature by our love of what we, in our arrogance, choose to call rational.'[3] Bertrand Russell remarks sarcastically, 'The theory of relativity has shown that most of our traditional dynamics, which was supposed to contain scientific laws, really consisted of conventions as to measurement, and was strictly analogous to the "great law" that there are always three feet to a yard.'[4] Whitehead is no less severe. He speaks of scientists framing arbitrary laws of Nature which 'were empirically observed, but for some obscure reason were known to be universal. Any one who in practice or theory disregarded them was denounced with unsparing vigour. This position on the part of scientists was pure bluff.'[5] Elsewhere he says, 'The simple security of the old orthodox assumptions has vanished. . . . Heaven knows what nonsense may not to-morrow be demonstrated truth.'[6] This may seem a disquieting conclusion, and obviously it might be made the instrument of a devastating agnosticism, but religiously it is a liberating gospel. Too long and too abjectly have we bowed to the dogmatism of the scientist, as if his latest theory were the final truth. It is time we stood erect upon our own feet. 'Interfering with natural law' simply means interfering with our imperfect notions of how the world is constituted, and when that is understood it becomes amusing to assert dogmatically that our notions must not be interfered with. What law has been more confidently asserted to be universal than the law of gravitation, yet to a four-dimensional being gravitation, as we know it, would simply not exist. He might not even be conscious that we had formulated such a law, and if it came to his knowledge he would doubtless think it ridiculously crude. If Newton had been born in a non-gravitational field (inside Einstein's box, for instance) the problem of the falling apple would never have arisen, though probably his genius would have formulated some entirely different law to explain why the apple did *not* fall. We cannot escape the conviction, doubtless, that there must be some impressive orderliness of the universe which manifests itself to our minds as natural law, but how far the validity of these laws reaches, how far they may be modified, or even to our minds abrogated, in higher spheres we have no means of knowing, and to make dogmatic assertions is, as Whitehead says, '*pure bluff*.'

(*c*) The old dogmatic materialism has been hard hit by the new physics. It was a bold creed, amounting in brief to the assertion that there is nothing in the world but what can be measured by a footrule and a clock. It had its citadel in physics, and now it would seem the citadel has been evacuated. 'What is the use of talking about materialism,' says Eddington, 'when you don't know what material is?'[7] And similarly Whitehead, 'What is the sense of talking about a mechanical explanation when you do not know what you mean by mechanics?'[8] Strange language for physicists! This would appear to be the most kaleidoscopic change in the whole picture, the most dramatic overturn in the history of modern thought.

Matter, as formerly conceived, has evaporated. Instead of the hard little bricks of which the world was built, the tiny billiard balls called atoms, we are left with nothing but infinitesimal whirlpools of electricity. And it cannot be too clearly under-

[1] *Concept of Nature*, 73.
[2] *Space, Time, and Matter*, 311.
[3] Bertrand Russell, *ABC of Relativity*, 227.
[4] *Op. cit.* 170.
[5] *Science and the Modern World*, 227–8.
[6] *Op. cit.* 166.
[7] *Gifford Lectures*, 1.
[8] *Science and the Modern World*, 24.

stood, there is nothing *solid* (in the old sense) at the heart of them. 'Elementary particles of matter,' says Einstein, 'are in their essence nothing else but condensations of the electro-magnetic field.'[1] And Weyl says, 'There is no longer a meaning in speaking of the same portion of matter at different times. . . . The electron is an energy-knot which propagates itself in empty space in a manner no different from that in which a water wave advances over the surface of the sea. There is no one and the same substance of which the electron is composed at all times.'[2] In other words, the existence of a piece of solid matter is like the playing of a tune, or the vibrations which cause a colour or a light to shine. A stone is nothing but an aggregate of electrical energy, held in superb equilibrium, with pulsations that never cease.

From this, it is obvious that the problem of the relation of matter and mind, body and spirit, has been fundamentally altered. It used to be supposed that mind and matter were essentially and eternally diverse. Matter had the attribute of extension, mind the attribute of thought. To that extent men on either side assumed that they knew what they were talking about. Now the physicists have made the revolutionary declaration, 'We do not know what matter is, but as far as we can see it cannot be expressed in terms of extension but in terms of energy.' It would be vain for mental philosophers and theologians to go on talking as if this tremendous concession had not been made. If matter is now defined in terms of energy, how else is mind to be defined? It would seem as if the gap between mind and matter were being filled up. Eddington says, 'The 19th century physicist felt that he knew just what he was dealing with when he used such terms as matter and atom. . . . Now, we see that physics has nothing to say as to the inscrutable nature of an atom. . . . There is nothing to prevent the assemblage of atoms forming the brain from being itself a thinking machine *in virtue of that nature which physics leaves undetermined and undeterminable*. Because we see that our precise knowledge of certain aspects of the behaviour of atoms leaves their intrinsic nature as transcendent and inscrutable as the nature of mind, so the difficulty of interaction of matter and mind is lessened. We create unnecessary difficulty for ourselves by postulating two inscrutables instead of one.'[3]

This points in the direction of the idealism which maintains that mind and matter are not two different things arbitrarily joined, but are aspects of the same reality on different planes. It would appear to have a direct bearing on the doctrine of the Resurrection. Some theologians, whose thinking is more Greek than Christian, would fain leave no place for anything but pure spirit in the kingdom of God. To them the body is an offence, the bodily resurrection of our Saviour incredible, human destiny is to be expressed only in terms of the immortality of the soul, and the eternal world is a state where all suns and stars have been obliterated. 'A generation ago it was customary to say that heaven was a state and not a place, the implication being that the life after death was in time and not in space. Einstein has, however, demonstrated that space and time form a single complex, which we arbitrarily break up in our thought. We have no right to postulate that in the world to come part of this complex will be destroyed while the other part remains intact.'[4] Personally, the writer has always instinctively resented the view that God's wonderful world of Nature would in this summary way be scrapped. Now he feels he has the support of physics itself in firmly repudiating it. Nobody knows what potencies are hid in matter, or how far it is capable of being etherialized; nobody can tell how close is the link that binds together body and soul, nor how necessary to the fullness of the soul's life the body may be. Nobody can set limits to the transformations which the body may undergo; nobody is qualified in the name of science to challenge the great hope that the Lord Jesus Christ 'shall change our vile body that it may be fashioned like unto His glorious body, according to the working whereby He is able even to subdue all things unto Himself.'

(*d*) Finally, a few words may be added about the process by which the world has come to be. It is evident that the theory of evolution will require to be profoundly modified in the light of the new physics. Professor J. A. Thomson says, 'The prodigious recent advances in chemistry and physics have not yet had their full effect on biology, which must cease to be so orthodoxly Daltonian. Thus it is beginning to be suspected that X-rays may have played, and may still play, their part in provoking variations in organisms. As the standard of scientific scepticism has risen, the evolutionists have become more and more dissatisfied with the genealogical tree that grew luxuriantly in the warmth of early Darwinian enthusiasm.'[5]

[1] *Side Lights on Relativity*, 22.
[2] *Space, Time, and Matter*, 202.
[3] Eddington in *Science, Religion, and Reality*, 208.
[4] Bishop Barnes, *Speech at Church Congress*, 5th Oct. 1928.
[5] *Glasgow Herald*, July 1928.

Professor Soddy, perhaps the greatest authority on chemistry, has pointed out that there is not the slightest trace of an upward evolution in the inorganic world. On the contrary an opposite process of devolution is going on, and 'we know more about the devolution of matter,' says Soddy, 'than we know about the evolution of species.' To extend the ideas of orderly progressive evolution to the inanimate world is 'the merest obsession,' it is to 'stultify the fruits of learning and make of real knowledge a fantastic whim.'[1] Any theory of the world-process worth considering must account for the descent of uranium to lead, as well as for the ascent of the amœba to the vertebrate. The breakdown of the chemical elements suggests to Bertrand Russell the speculation that 'perhaps the universe has long cycles of alternate winding up and running down. If so, we are in the part of the cycle in which the universe (or at least our portion of it) runs down.'[2] Whatever may be thought of such speculation, the facts have to be accounted for, and not ignored.

Turning for a moment to the future, the confidence with which the religious exponent of evolution assures us of a glorious upward destiny of the human race and an unbroken evolutionary march through all the ages of eternity, is a thing to marvel at. Heaven save us from making gods of the work of our own minds. These laws of unbroken evolution and everlasting continuity are of human origin, but now they tyrannize over the mind of man and stifle independent thought. Let it be firmly asserted that there is simply no scientific evidence as to what the future course and ultimate end of things will be. If all the science in the world cannot foretell when a single atom will make its next jump, is it to be thought competent to foretell what the whole travail of creation will bring forth? There may come a sudden change, as easily as a thaw comes in spring. Some mighty force utterly beyond our ken may at any moment intervene. There may be a cataclysmic end of this present world, as the New Testament forecasts. Science has not a word to say in contradiction. And to profess a knowledge of the conditions of a future life, to assume that there is a law compelling life for evermore to shape itself according to our ideas of continuity, is merely an idle dream.

The revolutionary upheaval of the new physics is a summons to liberate our minds from the grooves of conventional thinking. This is a far more wonderful world than was formerly supposed. Dead matter has come alive in the physicist's hands. The very stones are pulsing with energy. Their existence is an amazing equilibrium, maintained by an inconceivable rapidity of motion. It is a world where nothing can be counted impossible, for it is the august scene of a ceaseless Divine activity. It would almost seem as if the world were created afresh every moment, for the *quanta* of action, the mysterious pulsations which constitute existence, appear to spring direct from the will of God. We may fitly say of them, as Abt Vogler says of the invisible vibrations which make up the world of music:

> here is the finger of God, a flash of the will that can,
> Existent behind all laws, that made them and, lo, they are!

It is a world, also, where the will of man counts, and may become really creative. It is not rigid but plastic, capable of taking on the impress of spirit to an unknown degree. There is, of necessity, a certain firmness in the framework, limiting the scope of man's activity, and frustrating the rebellious. But a great mistake was made when man's environment was conceived as a cast-iron frame within which frail mortals were imprisoned, and doomed to beat their wings against the bars. 'During the last three generations,' says Whitehead, 'the exclusive direction of attention to this aspect of things has been a disaster of the first magnitude.'[3] Now we are learning to conceive of the environment as not utterly alien to the organism, but itself sensitive and responsive to a degree hitherto undreamed of. It is fluid, not rigid. Man in his environment is like a swimmer in the sea rather than a prisoner in a cage. The water bears the swimmer up and responds to his every motion. It has its own laws, and woe betide the swimmer who fails to obey them, for then the whole environment becomes an avalanche of destruction. But when the swimmer conforms to the laws and boldly uses them, then the whole environment conspires together for his help, bears him up and speeds him on. This would seem to open up tremendous possibilities of action to the spirit that is in tune with the universe and dares to draw on its resources. Does it not point in the direction of our Lord's great saying, 'All things are possible to him that believeth'?

[1] *Evolution in the Light of Modern Knowledge*, 402–4.
[2] *ABC of Atoms*, 123–4.
[3] *Science and the Modern World*, 295.