

CONSCIOUS EXISTENCE

by

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Introduction

In trying to understand the reality of our human existence we can approach the problem from a number of different directions.

The **mundane** approach is the practical, commonsense way of taking the world as we find it and learning to live in it, and with our neighbors, by trial and error.

The **philosophical** approach tries to probe beneath the surface of our sense impressions and discover the reality and meaning of conscious existence by pure reason.

The **scientific** approach grew out of the philosophical and has largely replaced it by adding to reason the rigour of mathematical systems and experimental verification.

The **mystical** approach allows consciousness to express itself by providing the conditions, such as meditation, for consciousness to expand and flower.

The **religious** approach concentrates upon enlightenment from the source of conscious existence, the 'ground of all being'.

I believe that all these approaches are valid and necessary to advance our knowledge. But all too often the devotees of one approach have tended to ignore or even to be antagonistic to others. This has been exemplified particularly by the separation of science and religion since the days of Descartes which prevents serious dialogue even today.

It is remarkable that religion in the west managed to survive the nineteenth century. Science was so confident that Newton and Darwin had sorted out nearly everything, while religion, with the Churches unable to escape from the shackles of dogmatism, seemed ever less relevant. But there were still a few scientific loose ends to be tied up, so that when Einstein addressed himself to them, he produced a sensation in our confident world. Things were not what they seemed. Time was not the inexorable, unalterable measure of our progress through life. It all depended where you were and how fast you were travelling. As for space, it was no longer the infinite void in which the planets and the stars were set to perform their eternal and predictable gyrations; time was relative and space was curved.

Then Einstein was followed by the quantum physicists and, at the other end of the scale, our comfortable picture of atoms - the ultimate building blocks of matter, solar systems in miniature, with little hard specks of matter called electrons revolving round somewhat larger specks called nuclei - was also shattered. The predictions of quantum theory have proved astonishingly accurate but have left our nineteenth century picture of reality in complete confusion. All matter seems to have dissolved into a shimmering ocean in which packets of energy waves perform the dance of Shiva.

For a long time the success of science as the basis of technology has overshadowed the other pathways to truth, but that success itself has now led to a new understanding of how much there is still to learn. At the same time there has been some growing together of the scientific and mystical visions of reality, at least at the fringes of each field. Today, alongside a continuation of the classical scientific viewpoint, we seem to have a new appreciation that physics, and perhaps biology, cannot get much further without attempting to penetrate the boundary region between subjective and objective experience. There have been some initial skirmishes in that area but it seems to me that the time has come for a little less diffidence in discussing what value the insights of religion and science have for one another.

Schumacher's Hierarchy and Popper's Worlds

E.F. Schumacher, the author in 1973 of *Small is Beautiful*, was an economist, journalist and entrepreneur. Above all he was a man of great clarity of perception. In *Small is Beautiful* Schumacher made the following interesting observation:

I do not think . . . (man). . . can be led out of the darkness of his metaphysical confusion . . . unless he quite consciously accepts - even if only provisionally - a number of metaphysical ideas which are almost directly opposite to the ideas (stemming from the nineteenth century) that have lodged in his mind. I shall mention (an) example.

While the nineteenth-century ideas deny or obliterate the hierarchy of levels in the universe, the notion of an hierarchical order is an indispensable instrument of understanding. Without the recognition of 'Levels of Being' or 'Grades of Significance' we cannot make the world intelligible to ourselves nor have we the slightest possibility to define our own position, the position of man, in the scheme of the universe. It is only when we can see the world as a ladder, and when we can see man's position on the ladder, that we can recognize a meaningful task for man's life on earth. Maybe it is man's task - or simply, if you like, man's happiness - to attain a higher degree of realization of his potentialities, a higher level of being or 'grade of existence' than that which comes to him 'naturally': we cannot even study this possibility except by recognizing the existence of a hierarchical structure. To the extent that we interpret the world through the great, vital ideas of the nineteenth century, we are blind to these differences of level, because we have been blinded. (1973-78)

Schumacher's second book, *A Guide for the Perplexed*, published in 1977 shortly after his death, expands on this statement. Schumacher sees as his task, "to look at the world and to see it whole". His hierarchy is based upon the 'Chain of Being', understood by our ancestors as being divided into the four 'kingdoms' of mineral, plant, animal and human. The lowest level 'mineral' is that dealt with by physics and chemistry. At each

of the higher levels something is added about which physics and chemistry can tell us nothing. To the mineral kingdom is added factor x, life, to give us the plant kingdom; to the latter factor y, consciousness, to reach the animal kingdom; and then factor z, self-awareness to achieve mankind. He says -

The universe (is) a great hierarchic structure of our markedly different Levels of Being. Each level is obviously a broad band, allowing for higher and lower beings within the band, and the precise determination of where the lower band ends and the higher band begins may sometimes be a matter of difficulty and dispute. The existence of the four kingdoms however, is not put into question by the fact that some of the frontiers are occasionally disputed. (1977-28)

Schumacher analyses these factors x, y, and z and notes various 'progressions' which they signify such as from 'passivity' to 'activity', from 'necessity' to 'freedom', and a movement towards greater integration and unity. He notes that in spite of these progressions even mankind is neither completely active nor completely free;

*A large weight of passivity remains even in the most sovereign and autonomous human being; while he is undoubtedly a subject, he remains in many respects an object - dependent, contingent, pushed around by circumstances. Aware of this, mankind has always used its imagination, or its intuitive powers, to complete the process, to extrapolate (as we might say today) the observed curve to its completion. There was thus conceived a Being, wholly active, wholly sovereign and autonomous; a **Person** . . . above all circumstances and contingencies, entirely in control of everything; a **personal** God the 'Unmoved Mover'. The four Levels of Being are thus seen as pointing to the invisible existence of a Level (or Levels) of Being above the human. (1977-37)*

Schumacher's hierarchy is biological but it is clear that what gives each level its character is not the substance of which the population is made, but the level of consciousness which they manifest. Furthermore the level of consciousness in mankind does not appear as yet to have reached its limit of potential. But it is evident that when Schumacher extrapolates the hierarchy of consciousness to reach the level of a conscious God with no material body, this is implying two things: firstly that when the Bible says we are made in the image of God that refers to the nature of our consciousness, however relatively primitive ours may be, and secondly that consciousness does not require a physical brain for its existence.

Human beings apparently live in two worlds at the same time. There is the outer objective world which we explore with the aid of our senses, a world of material substances and objects separated from one another within a framework of time and space, moving and changing in response to physical forces. Then there is the inner subjective world of consciousness and emotion, of spiritual, ethical and other values, of knowledge, will, imagination and purpose.

According to Bryan Magee, the philosopher Karl Popper designated these World 1 and World 2 and also distinguished a World 3. This was "a world of objective structures which are the products, not necessarily intentional, of minds or living creatures; but which, once produced, exist independently of them". (1973-60). Not all of these objective structures of World 3 are physical for they include forms of social organization and patterns of communication, ideas, art, science, language, ethics and institutions - the whole cultural heritage in fact, but only in so far as it is encoded and

preserved in World 1 objects such as books, machines, or films. World 3 is what World 2, the world of consciousness, has made out of World 1, the objective world.

There is a great deal of confusion as to the respective meanings of such words as consciousness, mind, intelligence and thought. It would not be useful to attempt an actual definition of these, but it may help to avoid some of the difficulties if I explain that I am using 'consciousness', in a wide sense, to mean all the subjective mental phenomena, as distinct from the physical phenomena which we can identify as such in the brain. Consciousness then, is equivalent to Popper's World 2. As the 'software' of a computer is complementary to the 'hardware', so is consciousness complementary to the material brain, and when linked in operation together the brain and consciousness, I am assuming, form the mind.

Hierarchy and Wholes in Creation

My dictionary gives two definitions of 'hierarchy'. The general definition is "a body classified in successively subordinate grades". But the first definition says "the collective body of angels grouped in three divisions and nine orders of different power and glory". Evidently the concept of hierarchy has roots in religious doctrine as a principle of the organization of spiritual power.

Schumacher sees hierarchy as follows:

In a hierarchic structure, the higher does not merely possess powers that are additional to and exceed those possessed by the lower; it also has power over the lower, the power of organising the lower and using it for its own purposes. Living beings organise and utilise inanimate matter; conscious beings can utilise life, and self-aware beings can utilise consciousness. (1977-35)

There is little difficulty in recognising that human consciousness is to a substantial degree an organizing and regulating force today within Popper's Worlds 1 and 3 of this earth. But we need to look well beyond this to the organization and control of the universe as a whole, to times and places which never have seen and never will see a conscious human being. Regulation is certainly not restricted to the man-made structures of World 3. It is evident that very many of the physical parts and processes of the universe are naturally regulated, and the mechanism of many of the systems of regulation are understood. But whether they are, or could be, all themselves connected into one integrated system of regulation, capable of being controlled by a conscious controller as a 'whole', is another matter.

A 'whole' differs from a mere collection of separate parts in that the whole and all the parts serve a common purpose, the achievement of which depends upon the coordinated contributions of them all. A hierarchy is a structure of purpose and power through which a collection of parts may be coordinated and become a whole. A whole may also be influenced by many things in its environment from where, in particular, it may be controlled, that is, given a purpose or an objective.

The biological hierarchy on this earth appeared in succession from the lower to the higher levels, by the process of evolution. If the purpose and the process were the result of conscious decisions, a cosmic consciousness would have had to be in existence before it became manifest on earth. Rather than to imagine human consciousness as a by-product of advanced forms of life, it then makes more sense to suppose that what we experience as consciousness in ourselves or in others, is an abstraction of that cosmic consciousness, albeit constrained and limited by our incomplete physical evolution.

Each separate consciousness of ours would thus be a part of a whole with the cosmic consciousness. The purpose of fragmenting and placing consciousness into association with matter in life forms, might then be to form a hierarchy for regulating Popper's World 1, enabling more efficient communication between the cosmic consciousness and the unconscious material world.

Modes of Consciousness

When we believed that the earth, much as we know it today and including mankind, was all literally created in seven days, the act of creation and the subsequent control of earth's inhabitants by God were regarded as two quite different matters separated in time. Now it is evident that creation is an ongoing process, this distinction is no longer necessary. But there is another which should take its place, and that is the distinction between planning the purpose and process of creation on the one hand, and supervising the acting out of the process on the other. These two activities of consciousness continue alongside one another and comprise the regulating force of the universe.

Amongst the potentialities of consciousness are those of thought and creative imagination. I suggest that consciousness has two modes of operation in its production of images - 'linear', and 'free-play'. In linear consciousness the images of three-dimensional things and events are selected in real-time sequence, and largely from the wealth of information provided by the physical senses. They are selected for their meaning for immediate action. Linear consciousness therefore is typical of waking experience and of consciousness during observation or the supervision of our own or others' physical activities.

When we are not following events of the world outside, thought and imagination may be idle or random, searching for meaning, or it may be organised around some objective as when an artist contemplates the creation of a new picture, or a production engineer the production of a piece of machinery. Then thought and imagination are likely to lean towards the free-play varieties.

In free-play consciousness, the images of things and events are selected for their relevance to a future or past event rather than present action. They are therefore largely drawn from recorded knowledge and memory. The images received unbidden from the senses are ignored as far as possible, as an interference. Real time is relevant only as it may be related to the end product of the process, as it is to the plan when planning. Free-play consciousness therefore seeks to be free from concentration upon the present moment and ranges over time, remembering the past and anticipating the future. It is typical of dreaming, planning, or thinking through problems.

When planning to produce something, one normally begins with a provisional image of the final objective. Then various stages of production between the commencement and the final objective will be envisaged as subordinate objectives, followed by stages intermediate to them with still shorter term objectives, until the artist or engineer has in his mind's eye an impression of the whole plan of work in considerable detail. It will be necessary to go backwards and forwards between longer and shorter term objectives, revising the former when they prove inconsistent with the possibilities found open for the latter, even though the former must always govern the latter. Thus the process of planning involves a hierarchy of decision levels, corresponding to objectives for various periods of time ahead. Only when the plan is judged sufficiently advanced and viable, will the artist begin to paint or the engineer produce his series of working drawings in real time.

In everyday life both modes of consciousness must work in harmony. Plans are never completed in every detail before operations are commenced, because some necessary information will be lacking, while planned operations must be abandoned for improvisation from time to time to deal with unexpected hitches. All plans can be analysed into successions of actions, into cause and effect; all consciously willed actions have their own objectives. At the moment of action, planning and supervision coalesce.

Regulation and Control

If there is a God, the Creator, in the image of whose cosmic consciousness ours is in some sense made, it is perhaps to the institutions which mankind itself has created that we should look for clues to the organizational methods used for the creation of the universe. Let us consider therefore how our human consciousness organizes and regulates human institutions.

All the instruments and materials involved when we consciously affect the physical world would undergo change in course of time even if we left them alone. Apart from other people around who may use or alter them, natural forces can be relied upon to produce change and decay. All our conscious plans and subsequent actions therefore should rightly be regarded as regulating the anticipated course of events in the world for our own purposes, rather than initiating those events.

Whenever a process is being used to achieve a particular end and, for any reason, it is likely to be subject to unanticipated disturbances, the remedy may be to employ what is called 'negative feedback regulation', by which errors developing in the planned progress of the work are detected in the early stages and correction applied in the opposite direction to the error.

A common example of a simple controlled system regulated by 'negative feedback' is given by a heating installation employing a thermostat which, by turning the heating on and off in response to small movements away from some preferred temperature, maintains the actual temperature of a room within narrow limits. The system is 'controlled' by the selection of a preferred temperature as an objective for the thermostat which is the 'regulator'.

This distinction between control and regulation helps to identify boundaries of sub-systems contained within more complex systems, or parts within wholes, for a regulator is a component of the system it regulates, whereas a controller is outside the system it controls and may be the regulator of a larger containing system.

All systems organized, designed or made by people, and which are therefore the products of the human mind and belong to Popper's World 3, are controlled, and possibly regulated as well, by conscious minds. Consciousness enables judgements of value to be introduced into decisions, in addition to judgements of fact to which computers and other machines are confined, and it has indeed been suggested by Professor Roger Penrose that this may be the actual purpose of consciousness.

A good example of regulation and control by conscious minds on a larger scale is given by the management of a manufacturing enterprise involving large numbers of people. Such a management organization is not a physical part of the enterprise as are the departments and their physical contents. It is a system for planning and supervising (or controlling and regulating) the work of all the physical bodies, buildings, plant, machinery, tools and so on, so that they behave as parts and sub-parts of the whole enterprise, an artifact of World 3. A feature of the system is that its subsystems and sub-sub-systems form a hierarchy of control levels such that each level constrains, but does

not finally determine, the behaviour of the level below. This hierarchical form is required by the mode of consciousness called for in planning a 'tree' of objectives to ensure that the ultimate purpose of the enterprise is accomplished, to which all objectives must be subordinate. Each step upwards in the level of hierarchical control adds, so to speak, another 'dimension' to the activity of planning the whole.

But this may be more than just a figure of speech. Many scientists have seriously suggested that the universe in reality may have more than the three dimensions of space and one of time, to which we have been accustomed. Some sixty years ago a Cambridge mathematician, J.W. Dunne, suggested that there might exist an infinite number of hierarchically arranged time dimensions. In recent years David Bohm, a leading theoretical physicist and the author of *Wholeness and the Implicate Order* and, with F. David Peat, *Science, Order and Creativity*, has also proposed that the world we live in is both multi-dimensional and hierarchical. In his introduction to the first of these books Bohm says:-

*My main concern has been with understanding the nature of reality in general and consciousness in particular as a coherent whole, which is . . . in an unending process of movement and unfoldment . . . As a child I was fascinated by the puzzle, indeed the mystery, of what is the nature of movement. Whenever one **thinks** of anything, it seems to be apprehended either as static or as a series of static images. Yet, in the actual experience of movement, one senses an unbroken, undivided process of flow, to which the series of static images in thought is related as a series of 'still' photographs might be related to the actuality of a speeding car. (1960-IX)*

He goes on to develop a theory of the whole of reality, including both consciousness and external reality, consisting of a hierarchy of orders of movement, which we may perhaps visualize as dimensions of space and time or levels of consciousness. It seems therefore not inconsistent with Bohm's ideas that the mechanism for conscious control of physical activity should exhibit this same hierarchical form.

Although, like Bohm and Dunne, Schumacher clearly points to the existence of an indefinite number of levels superior to self-consciousness, and leading perhaps to the consciousness of a supreme Being, he says little about these higher levels, believing that we have to raise our own levels of consciousness before we can know anything about them. Bohm's series of 'implicate orders', on the other hand, are considered in relation to the way in which they organize our conscious perceptions in this life and seek to give a scientific understanding to the philosophical insights of writers like Schumacher.

Some Further Scientific Opinion

One thing which comes out clearly in Schumacher's writing is his view that the contribution that science can make to the study of consciousness is severely limited. He makes the point that the 'instructional' sciences like physics can deal only with the lowest level of Being, mineral, where x, y and z - life, consciousness, and self-awareness - do not exist.

*What we need to grasp . . . is this: since physics and the other instructional sciences base themselves only on the dead aspect of nature, **they cannot lead to philosophy, if philosophy is to give us guidance on what 'life' is all about.** Nineteenth century physics told us that life was a cosmic accident, without*

meaning or purpose. The best twentieth-century physicists take it all back and tell us that they deal only with specific, strictly isolated systems, showing how these systems work, or can be made to work, and that no general philosophical conclusions can (and should) ever be drawn from this knowledge. . . . There is a significant movement towards closing the infinitely harmful rift between natural science and religion. Some of the most advanced modern physicists would even agree with Renee Guenon's claim that "the whole of nature amounts to no more than a symbol of transcendent realities." (1977-122/3)

But all this was written some fourteen years ago, before many of the more significant modern books on physics and on the implications of quantum mechanics in particular had appeared, and in the meantime some scientists have moved still further to close the rift. David Bohm in particular has, as already mentioned, fully realised the existence of hierarchy in *Wholeness and the Implicate Order*. But, for too many, the meaning of the mysteries of the quantum world are unimportant compared with the fact that they have practical applications.

Paul Davies, Professor of Theoretical Physics at the University of Newcastle upon Tyne, is a pioneer in explaining the new physics to a wider audience. He ends his book *God and the New Physics* as follows:

What I have sought to do is to expand the context in which the traditional religious issues are discussed. The new physics has overturned so many commonsense notions of space, time and matter that no serious religious thinker can ignore it.

. . . It is my deep conviction that only by understanding the world in all its many aspects - reductionist and holist, mathematical and poetical, through forces, fields, and particles as well as through good and evil - that we will come to understand ourselves and the meaning behind this universe, our home. (1983-229)

Between knowledge of God and knowledge of the physical universe stands the human mind, and the outstanding characteristic of mind is its consciousness. Infinitely many as are the different ways in which we may imagine God, it is not possible to think of a Deity as not being conscious. Furthermore, at the very least, that consciousness must include all that we know our own to be. As already mentioned in connection with Schumacher's hierarchy, it follows that, if there is a God, consciousness must exist independently of a physical human body. Is there any evidence of this? To quote Davies again:

It would be foolish to deny that many of the traditional religious ideas about God, man and the nature of the universe have been swept away by the new physics. But our search has turned up many positive signs too. The existence of mind, for example, as an abstract, holistic, organizational pattern, capable even of disembodiment, refutes the reductionist philosophy that we are all nothing but moving mounds of atoms. (1983-229)

Paul Davies also argues that there are definite organizing principles in nature which emerge at successive levels of complexity, and that the universe as a whole possesses a tendency to develop towards progressively higher levels of complex organization.

Two mainstream physicists of repute, Professor Stephen Hawking of Cambridge and Professor Roger Penrose of Oxford, illustrate the present orthodox attitude of science to philosophy and religion. Many scientists are now looking towards the possibility of a complete unified scientific theory of the objective universe. A complete unified theory is clearly the hope of Professor Stephen Hawking as expressed in *A Brief History of Time*. Yet Hawking himself admits that this will be only the first step towards a complete understanding of the events around us, and of our own existence. He concludes his book thus:

*Up to now, most scientists have been too occupied with the development of new theories that describe **what** the universe is to ask the question **why**. On the other hand, the people whose business it is to ask **why**, the philosophers, have not been able to keep up with the advance of scientific theories. In the eighteenth century, philosophers considered the whole of human knowledge, including science, to be their field and discussed questions such as: Did the universe have a beginning? However, in the nineteenth and twentieth centuries, science became too technical and mathematical for the philosophers, became too technical and mathematical for the philosophers, or anyone else except a few specialists. Philosophers reduced the scope of their inquiries so much that Wittgenstein, the most famous philosopher of this century, said "The sole remaining task for philosophy is the analysis of language." What a comedown from the great tradition of philosophy from Aristotle to Kant!*

However if we do discover a complete theory, it should in time be understandable in broad principle by everyone, not just a few scientists. Then we shall all, philosophers, scientists, and just ordinary people, be able to take part in the discussion of the question of why it is that we and the universe exist. If we find the answer to that, it would be the ultimate triumph of human reason - for then we would know the mind of God. (1988-174)

In the meantime Hawking has little or nothing to say about consciousness. In an interview with Renee Weber, reproduced in *Dialogues with Scientists and Sages*, he describes mysticism as 'a cop-out' and thinks that people who have ideas about mysticism in physics are people who really can't understand the mathematics. Although he keeps a scientifically open mind about the possible existence of a God he seems to be leaning towards an eventual theory of the universe which would not need to evoke a God, or any sort of God-like principle, which he considers would be 'a much more natural and economical theory'.

Professor Roger Penrose, however, who has done much work with Hawking and clearly respects and agrees with him in scientific matters generally, appears to place quite a different emphasis on the contribution of science to our wider understanding of existence. The Emperor's new Mind is concerned with computers, minds and the laws of physics. It explores relativity and quantum mechanics in considerable depth in order to refute the claims of some proponents of artificial intelligence, that our thinking is basically the same as the action of some very complicated computer.

Penrose believes that the resolution of the out-standing puzzles of quantum theory require the discovery of a new law which will allow us to understand how the sub-microscopic level of things, where quantum theory holds sway, merges into the macroscopic level of classical physics. He believes that we shall need this new law, if

we are to understand minds, because he considers that neither classical nor quantum mechanics can ever explain the way we think.

The Penrose view is that a computer-like brain deals unconsciously and automatically with the regulation of a great deal of bodily activity, as effectively as its programming and its input of information allow. But, although it is programmed to solve problems, and to take action on results that are ethically neutral, consciousness is able, when appropriate, to take control of thinking to ensure that, when deciding upon action, judgements of value, which consciousness alone can make, play their part in decision making.

In contrast to Hawking, Penrose does not hesitate to discuss the role and relevance of consciousness. Therefore his book is useful in defining for the scientific layman the scope for speculation upon this subject consistent with reasonable respect for modern scientific knowledge. But in the end Penrose says very little about the nature of consciousness itself beyond acknowledging its importance, denying that it can be regarded as a mere side effect of complicated computation, and suggesting its probable connection with the problems of quantum physics that still remain to be solved.

The Causal Interpretation of Quantum Theory

Although we have become accustomed to the idea that 'energy' is real because of its obvious effectiveness in lighting our lamps and heating our houses, we have no idea of what it 'really' is. Paul Davies describes it as a 'purely abstract quantity, introduced into physics as a useful model with which we can short-cut complex calculations'. (1986-26) On the other hand we have a very definite idea of what matter is. It is the substance of the tables and chairs, land and oceans of our everyday experience. Nevertheless science has already demonstrated that matter and energy are different aspects, or phases, of the same thing and are convertible into each other.

In quantum mechanics today physicists have also found that electrons and other elementary 'particles', of an order of magnitude many times smaller than an atom, behave in experiments sometimes like particles of matter and sometimes like waves, reminiscent of the more familiar radio waves. They affect one another by exchanging energy in discrete packages called 'quanta'. It is difficult to see how particles can also be waves at the same time, but the behaviour of quantum particles is very strange indeed and in many ways unlike the way we understand things work in our normal world. However there seems little doubt of the mathematical accuracy of the theory even though the meaning of it all remains obscure. In his 'causal interpretation' of quantum theory David Bohm has proposed that the quantum waves/particles affect each other not only according to the strength or intensity of the energy exchanged, but depending also upon their wave form. This effect Bohm calls the 'quantum potential' to distinguish it from a 'classical potential' which relates to the effects of wave strength only. He provides the following illustration of his idea:

Think of a ship that sails on automatic pilot, guided by radio waves. The overall effect of the radio waves is independent of their strength and depends only on their form. The essential point is that the ship moves with its own energy but that the information within the radio waves is taken up and used to direct the much greater energy of the ship. In the causal interpretation, the electron moves under its own energy, but the information in the form of the quantum wave directs the energy of the electron. (1987-90)

This model illustrates two other important ideas of Bohm's causal interpretation of quantum theory, namely that the form of the wave carries encoded 'information' in place of energy and that because of this it is able, with the expenditure of very little or no energy itself, to 'regulate' much larger quantities of energy. This Bohm refers to as 'active information'. Three further quotations will help to clarify these points:

*Consider a radio wave whose form carries a signal - the voice of an announcer, for example. The energy of the sound that is heard from the radio does not in fact come from this wave but from the batteries or power plug. This latter energy is essentially 'unformed', but takes up its form from the information within the radio wave. This information is **potentially** active everywhere but only **actually** active when its form enters into the electrical energy of the radio.*

*The basic idea of active information is that a **form**, having very little energy, enters into and directs a much greater energy. This notion of an original energy form acting to 'inform', or put form into, a much larger energy has significant applications in many areas beyond quantum theory.*

*The analogy with the causal interpretation is clear. The quantum wave carries 'information' and is therefore **potentially** active everywhere but only **actually** active when its form enters into the energy of the particle. (1987-93)*

Nonlocality

David Bohm's theories of quantum mechanics based upon his 'causal interpretation', and including his concept of 'active information', have raised particular objections from some scientists because they imply the possibility that particles, separated by great distances, can affect one another instantaneously, that is, in less time than it would take a light signal to travel the distance between them. This effect is known as 'nonlocality'. Bohm comments upon the matter as follows:

Nonlocality . . . is strongly at variance with the whole spirit of classical mechanics. . . . Nonlocality implies an instantaneous connection between distant events, and this appears to violate the basic principle of relativity that no signal can travel faster than light. However . . . there is suggestive evidence that rather than violating physical laws, nonlocality does in fact operate in nature. (1987-98)

Bohm is referring here to the experiments carried out recently in Paris by one Alain Aspect which confirmed the discovery of 'superluminal communication', a most startling and significant development in the history of the new physics. It is fully discussed by Zukav in *The Dancing Wu Li Masters*. The story begins with Bell's theorem which J.S. Bell, a physicist in Switzerland, produced in 1964 when working on the strange 'connectedness' which had been noticed amongst quantum phenomena. This theorem appeared to prove that either the statistical predictions of quantum theory, or the principle of local causes (the principle that implies that nothing in the universe can travel faster than light), must be false, "and that at a deep and fundamental level the separate parts of the universe are connected in an intimate and immediate way". When

it was confirmed that the statistical predictions of quantum theory were correct, it followed that the principle of local causes was under threat.

So by 1975 physicists were beginning to "consider the possibility of a fundamental unity lying deeper than quantum theory and relativity, which somehow allowed faster-than-light connections between apparently separate 'parts' of physical reality". (1979-310)

The possibility of this appears now to have been confirmed by Alan Aspect's experiments. If such power of communication exists between elementary particles it is conceivable that every part of the universe could play a part in the efficient regulation of every event in it. This seems to dispose of a principal obstacle to the possibility of cosmic regulation at the sub-atomic level, and is of very great significance for the concept of the wholeness of the universe.

The connection between fields, form and information is taken up also by Dr. Rupert Sheldrake, the biologist, in his theory concerning morphogenetic fields. These fields, which can be thought of as not unlike those we meet surrounding magnets, and exerting forces of attraction and repulsion on metal objects, influence the formative process of an embryo, a concept said to be widely used in biology. What Sheldrake has done is to start from the assumption that morphogenetic fields have the same degree of reality as fields have in physics, and that "each kind of cell, tissue, organ, and organism has its own kind of field". He proposes that "these fields shape and organize developing micro-organisms, plants and animals, and stabilise the forms of adult organisms". He then claims that what is new in his hypothesis is that the structure of these fields results from the actual forms of previous similar organisms, in other words on what has happened before. So that morphogenetic fields of a species represent a kind of pooled or collective memory of the species (1988-108). Sheldrake and Bohm appear to have agreed that their two theories relating respectively to biology and physics, are compatible.

Cosmic Consciousness

David Bohm is a very eminent physicist, but he has already invited criticism from his colleagues for proposing theories which hold out no immediate hope of verification. He and his fellow scientists can hardly be expected to indulge publicly in metaphysical speculation to a greater extent than they have already. But those of us who are not scientists need not feel so restricted, provided that we do not claim our amateur speculations to be any more than that.

Current scientific opinion tends to the belief that the universe came into existence with the 'Big Bang' between 10 and 20 thousand million years ago, when quantities of energy exploded into physical material, and time and space, as we conceive them, were born. Just what this energy is, that underlies and powers all physical phenomena, is a mystery. So also is the nature of consciousness. Consciousness has power as does energy, although it is of a more subtle kind. (The pen they say is mightier than the sword.) It is also like matter, in that with it can be created, in imagination, a whole world of its own. Both energy and consciousness interact with matter but the latter, so far as we know, only in an obscure way through the mediation of well developed brains.

So that when matter is shown to be a form of energy, and energy is indefinable, surely it is not stretching imagination too far to give to consciousness at least an equal status in reality. Far from being a side effect of matter, may not consciousness be, with matter and energy, yet another phase or metamorphosis of an underlying substance, or

even that substance itself? The fact that we only normally meet with consciousness in our own restricted minds, is no reason to suppose that it does not exist apart from us - has always existed. Of course it is difficult to imagine consciousness apart from bodies, but religion and mysticism have always managed it.

I am, however, not thinking so much here of individual souls as of a substance, for want of a better word, which like matter and energy fields, or better still like Sheldrake's morphogenetic fields, can take form and organize itself and matter and energy as well. I do not see why, if it were possible to analyze it, consciousness should not have waves or particles of similar nature to those of ordinary matter. I feel sure that at the subatomic level there is plenty of room for more 'particles' of all kinds which are not detected because, having little energy, they do not normally react strongly with those of matter, by virtue of their mass or electric charge, but perhaps by low intensity wave form modulation. This, as seems implicit in the hypotheses of both Bohm and Sheldrake, would permit of the possibility of some regulation of systems of matter and energy in World 1 at the subatomic level.

What is being suggested is a conscious, very low-energy, form of matter and it becomes necessary to be more precise as to what this implies for the respective functions of consciousness and brain in the human mind. I envisage consciousness as dominant and the brain only capable of performing its special functions under the control and regulation of consciousness, which, moreover, does not need the brain in order to function for itself in many of the ways we have supposed to belong to World 1. These include thinking and calculating, implying that consciousness is highly organized. So what is the function of the brain? The brain is there I suggest for two purposes. The first is to act like a robot or super computer in handling all the unconscious bodily functions and the body's sensory and motor apparatus. The second is, as a material amplifier, to provide a two way macro-link with its conscious regulator, having more energy-power and efficiency to affect the material world than is available at the subatomic scale.

Continuing to speculate wildly, it may be that interaction for a lifetime between the subtle substance of consciousness and physical matter, not only allows consciousness to affect the behaviour of the animal brain, but that the latter, subject to the extent of its evolutionary development, also restricts the normal properties of its conscious partner. In particular, association in this way could temporarily block the access of each living human being to the memories of a collective consciousness until death removed the blockage. If the storage of long term memories were to be found within the substance of consciousness, it would account for our inability to discover it in the substance of the brain. Clearly all this raises again the spectre of a life force or 'elan vital' abandoned many years ago by science for lack of evidence. But why not? Science is obliged to disapprove of what cannot be demonstrated but has not, so far as I am aware, proved that a life force cannot exist. Occam's razor (the principle that all unnecessary facts and constituents should be eliminated from the subject being analysed) is a useful tool for science but a poor master.

Cosmic Purpose

Is there a God and does the universe exist for a purpose? The two questions are closely related for if the universe has no purpose there seems no reason for God. But if there is an ultimate purpose for creation, and we define God as the source of it, this still leaves possible very many different versions of what the concept of 'God' implies.

If there is a purpose what can it be? The Creation story as it appears in Genesis provides no clue and seems to assume creation a mere chance whim of God, refuting perhaps Einstein's famous contention that God does not play dice. Although Genesis suggests that God's purpose for mankind was to have dominion over the earth and all within it, this was presumably to be according to God's plans and under his direct supervision, as the acquisition of a 'knowledge of good and evil' was not part of the original intention. In spite of all this, history shows that most people act as if to create the human race, and to keep it happy, were adequate justification for everything, including a God to see we get our 'rights'.

I find it more credible however that humanity should have evolved for the universe not the universe for humanity, and the indications are that our task is to be one of regulation within a hierarchy of control. It may well be that we have not yet attained the perfection of consciousness necessary to understand the more distant objectives for the universe, but we have certainly reached the stage where we can do an immense amount of damage to this earth, unless we understand and accept what our immediate role should be. Indeed, if through ignorance or lack of conviction, we should fail to play our part, I can see no reason why the whole human race should not expect to vanish from the scene, as the dinosaurs did, and be replaced by something more effective.

But why, in that case, is it not made perfectly clear to us what are the objectives for the earth, and what is our purpose in it? Perhaps it is that, as a race, we are still as children, and have the power but have not yet acquired the wisdom to handle our full responsibilities. However not to know what they are, greatly increases the danger of our position. So perhaps the truth is within our grasp, but we refuse to see it and to accept its consequences.

When the cosmic plan was ripe for implementation, the material of the universe sprang into existence at the Big Bang. The planners were able to arrange for ample supplies of energy, the initial conditions and the natural laws to set creation into motion, together with many self-regulating systems. Perhaps these were so accurate as to guarantee the progress of the universe, in accordance with the plan, up to the appearance of life. But I think it more likely that there may exist a linkage, yet to be discovered, whereby consciousness and elementary particles of matter can interact nonlocally, and within the limits of quantum uncertainty, so that a minimum of conscious control became possible to keep creation on course at that stage.

The purpose of this first stage seems to have been not only to lay down the material substances required for the ultimate purpose of the universe, whatever that may be, but to produce also the conditions for the emergence of life, from which more effective systems for regulation could be developed. The appearance of the plant kingdom, which utilised the material kingdom, and introduced self-reproduction, also introduced the great regulatory system of natural selection for producing new and more efficient 'live' regulators. This guided life through the evolution of the animal kingdom to consciousness and the self-consciousness of the human race.

The purpose of a regulating hierarchy of consciousness would be to distribute responsibility for the determination of action. This implies that the constraints of a superior level should leave a degree of freedom to each subordinate level to make independent regulatory decisions from judgements of fact and value. I suggest that the effective transition from consciousness to self-consciousness is marked by this degree of freedom from the imperative of instinct, that is to say, free-will.

The importance of this step to self-consciousness is shown by the fact that natural selection is no longer either an effective or a necessary regulator of mankind's further evolution. The environment of the planet no longer dominates us for it is

dominated by us and we are in sight of the technology to control and regulate the future of the race for ourselves, just as we can both control and construct regulators for our own use. The power to regulate the planet as a whole is therefore greatly increased in efficiency, but it seems that the freedom necessary to equip us for this level of control also enables us to rebel against those levels which transcend the system of regulation on earth.

The scientific method of theory, experimental verification, and constant revision in the light of new data, has always contrasted strongly with the commitment to an established doctrine which religious faiths generally expect. It is not really surprising that some truths yield to the scientific method, while others have to be discovered in the recesses of the mind, when Popper's World I and World 2 each exist in such very different ways.

People brought up within a culture where a particular faith is predominant, the more easily accept its traditional doctrine, but today in the modern western world we expect to have freedom to make up our own minds, and are too exposed to alternative faiths, and to no faith at all, not to feel that it is absurd for any one of them to claim sole possession of the truth. But once doubt creeps in, where does one draw the line? Perhaps it is better to suspend all judgement and hope that science will one day provide all the answers? But science cannot by its nature and remit provide the answer to questions such as whether or not our existence and that of the earth and the universe have purpose, and what that may be. Few physicists today would claim that science can or ever will discover all truth, but only those truths for which the scientific method is appropriate. This is not always understood by those who have lost, or never sought, faith in an established religion. So that with the abandonment of religion goes all logical reason for continuing to live by the spiritual values, which alone can ensure that we are all moving in the same direction, are pursuing the same ultimate purpose, if there is one. Surely very many of our troubles of today are traceable to the neglect of these spiritual values.

Basically the problem has always been that neither science, nor religion, nor philosophy have been able to show convincingly how Popper's Worlds I and 2 can possibly interact with one another, as they so obviously do, and so this has provided a natural boundary between science and religion behind which both have found it necessary and convenient to withdraw. But now from the theories of Bohm and Sheldrake, and others identified with the new physics, we seem to glimpse a picture of the 'form' of energy, as distinct from its 'intensity', encoding information to be used, by a hierarchy of orders of consciousness, for the regulation of the behaviour of matter throughout the universe.

Science may never be able to prove or disprove the existence of a God or to give answers to spiritual questions. But I suggest that what many people feel they need to make them receptive to religious belief is an assurance that it is not actually refuted by the immense amount of reliable physical knowledge which science has acquired. This assurance, I feel, the new physics is now able to provide.

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