

FRAGMENTATION AND WHOLENESS IN RELIGION AND IN SCIENCE

by David Bohm

Abstract. This paper starts with a discussion of the nature of religion and of science, viewing them both as embodying a search for wholeness, although each does so in its own way. Attention is called to the fact that science and religion have both become fragmented and that this fragmentation has a deeper origin in the structure of the ego itself. The source of fragmentation in the ego is discussed. Finally, a possible way for the religious attitude and the scientific attitude to work together is proposed, which involves a common approach to ordering the fragmentary divisive structure and activity of the ego.

I would like to begin by discussing what I regard as the essence of religion. Some clue as to what this is may be obtained by considering the derivation of the word, which is either from the Latin, *religare*, meaning "to bind together," or from *relegere*, meaning "to gather together" (this latter includes observation as "gathering with the eye," as well as "paying attention"). It is also relevant here to consider the word *holy*, whose root meaning is "whole" along with the word *heal* which means "to make whole." All of this indicates that religion is concerned primarily with the *wholeness of life*, as well as of the universe, of humanity, of the individual, and so on (e.g., in terms of qualities, such as integrity). The notion that God has created and sustains the world is one way of explaining this wholeness and gives it some kind of metaphysical foundation. But then, there are other religions (e.g., Buddhism and Vedanta) which are not based on beliefs in God. They are, however, still concerned with wholeness.

Why is there a special need to emphasize wholeness? A similar question is Why do we need departments of health, that is, departments of wholeness? This paradox arises because there has been a prevalence of disease and illness which indicate lack of physical whole-

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ness. Similarly, over the ages, in the psychological, communal, and spiritual spheres, there has been a serious and sustained breakdown of wholeness. Typically, this has taken the form of widespread fragmentation between nations, races, religions, ideologies, and so on, going on down to smaller groups, including the family. Indeed, even the individual is fragmented. This is yet another paradox. For the word *individual* means "undivided." Yet, each human being is divided into conflicting interests, passions, aims, loyalties, motivations, and so on, to the point of neurosis, and even of psychosis. Perhaps such a person could better be called a "dividual" rather than an individual, being a combination of all sorts of contradictory features that are picked up from the collective mixture in the surrounding society.

Throughout history, fragmentation has produced severe and destructive conflict on every level. This now threatens the possibility of maintaining civilization throughout the world and, indeed, ultimately even the very existence of humanity. It is not that our human species is now fundamentally different from what it was. It is only that with modern technology, we now have the power to destroy each other altogether, and yet we have not ceased to respond to each other with divisive ways of thinking that have continued since the Stone Age.

Religion has aimed basically at *healing* this fragmentation, that is, at making us *whole*. In doing this, it has generally appealed to particular beliefs in the nature of God, or in whatever may be regarded as replacing God, as a source of wholeness in the world. This gave rise to differences that could not be reconciled, for each belief has the absolute as its content. So it cannot yield, in a discussion with other beliefs. The result is absolute division or fragmentation. Each religion in turn tends to fragment into subgroups, splinters, and so on, which are ultimately almost as irreconcilable as religions are that differ in basic beliefs. So, humanity's attempts to attain wholeness through religion has, in this way, contributed considerably to its fragmentation.

Humanity has developed another approach to wholeness through science, which is organized knowledge tested by experience and experiment as well as by logical criticism of its internal coherence. This began to challenge religion seriously at the beginning of the Modern Era. Thus, for Roger Bacon in the late Middle Ages, science was primarily a study of the work of God as revealed in nature. However, for Frances Bacon, several centuries later, science was a way to gain knowledge of autonomous matter, giving power over nature, to be used for the benefit of humanity. This was an example of a new current in human affairs, which aimed at the perfection of humanity through secular activities. It was thought that such activities would lead to unending progress based on science, technology, industry, political changes, and

so on, leading ultimately to the oneness of humanity. This was a new kind of faith, and some sign of its earlier significance still survives in the Great Seal of the United States of America, which contains in its motto "the new secular order." Indeed, I can remember that as a child and as a young man, I believed in this notion strongly, as did most of those around me. But now, a short 50 years or so later, this faith has collapsed. Few, if any, seriously believe in it. Nowhere in film, drama, literature, art, or anywhere else does one see an optimistic outlook toward the future. All are gloomy, predicting destruction through nuclear war, through breakdown of ecological balance and exhaustion of natural resources, through economic collapse, through moral decay, through social and psychological disorder, and so on.

It must thus be said that neither religion as we have known it nor science as we have known it has produced wholeness. This is a tremendous challenge to all humanity. I am convinced that if we are to survive as a species, we have to meet this challenge successfully. Indeed, if we think of a thousand years, which is a short period in human history, we will find it hard to believe that a worldwide catastrophe can be avoided if we carry on as we have been doing without a fundamental change, in which our pervasive fragmentation would at least start to heal.

Let us begin to consider this challenge, even if only in a preliminary way, by looking at how science and religion may be related, so that at least the fragmentation between these two basic responses of humanity to the whole of existence may be ended. At present, this relationship is, of course, largely one of antagonism. Science has made much of religion's metaphysics and cosmology seem highly implausible. It has offered an alternative metaphysics and cosmology which is mainly what may be called mechanistic materialism. This is clearly in contradiction with what would be required in any religious approach that one can think of.

The current scientific self-world view is very fragmentary in its ultimate implications. One form that it takes is to assume that all is made of atoms, or of still smaller elementary particles (e.g., quarks). All of reality is determined by the movements of these independently existent particles according to preassigned interactions. The whole is regarded as nothing more than an abstract notion, a convenient way of talking of how the particles interact. It is farther implied, of course, that this holds also for human beings, who are constituted of such particles. This includes body, mind, society, and everything also that is relevant to human beings. Evidently, such a view implies the need to try to break things up into what one thinks are their fundamental parts, treated as constituting a gigantic universal mechanism. Health is equated with

undisturbed functioning of the mechanism of the body, of the mind, of society, and so on. (Indeed, some of the more advanced thinkers along such lines project a time in which all this may be achieved with the aid of computers.)

However, such a view of the self and the world as a gigantic mechanism ignores the fact that in modern physics, the revolutionary new developments of relativity and quantum theory call for a very different approach. There is no time to go into a detailed description of these developments here. I shall only list a few of their key features.

First, according to Albert Einstein's theory of relativity, the basic nature of the universe is not that of a set of interacting constituent particles. Rather, it may be described as a universal field, whose most essential quality is unbroken wholeness in flowing movement. One may here use the image of a set of vortices on a fluid, such as water. Each vortex is a pattern of movement—one that is stable and recurrent, but nonetheless, just a form in the movement of the fluid as a whole. Such a form may be abstracted in the mind as if it were a separately existent vortex, but actually it has no such separate existence. The movement patterns of two or more vortices merge and fuse, with no sharp breaks between them. This gives some notion of how the so-called elementary particles are to be regarded as abstract patterns of movement in a field, covering the entire universe. Since this suggests that the whole is a primary notion, while the parts are abstractions from the whole, the traditional mechanistic notion of the constitution of the world out of separately existent parts is turned upside down.

Second, the quantum theory implies that there are indivisible links of action between each object and its environment. This holds also for the observing instrument and what is observed. This means that ultimately, the distinction between observer and observed, which is necessary for a mechanistic view, cannot be maintained, *not even in inanimate matter* (and, ipso facto, even less in animate and conscious beings).

Third, the whole cannot be analyzed into separate parts with preassigned interactions. Rather the whole organizes and even creates the parts. This behavior is evidently closer to organism than to mechanism.

All of this implies a thoroughgoing breakdown of the old mechanistic view of separately and independently existent parts with preassigned interactions that determine the whole mechanically. The quantum theory, even more than relativity, leads in an especially radical meaning to such changes. This was realized, even from the very beginning, in the basic pioneering work of Niels Bohr, Werner Heisenberg, Erwin Schrödinger, Wolfgang Pauli, and others. Each in his own way emphasized the revolutionary new implications of wholeness that are in the quantum theory. However, since that time, science in general

and physics in particular have become much more positivist and empiricist in character. An essential feature of the development is a widespread tendency to deny that philosophical questions have any relevance in science at all. Rather, there is a wish to establish a sharp distinction between these two fields. In physics, this shows up in the commonly accepted belief that the essential content of a theory is a mathematical formalism that enables us correctly to predict the results of experiments and thus ultimately to gain control over nature for our own ends. Questions such as wholeness versus fragmentation have little or no place in such an approach, and so are generally ignored. Of course, from a broader point of view, one can see that to do this is to establish a yet further fragmentation in the human mind, between its scientific and its philosophical interests. But from the point of view of modern science, with its emphasis on "hard" facts and mathematical formalism, all that is being done is to exclude "soft" philosophical content that does not belong in scientific research. It need therefore be hardly surprising that the latest generation of physicists, who for the most part have little interest in such questions, would tend to deny the scientific significance of the implications of wholeness in the quantum theory that were so strongly perceived by its founders.

One can obtain a certain kind of intuitive understanding of this quantum wholeness through the notion of enfoldment. This notion may be illustrated by considering a piece of paper that has been folded many times, into a very small space. If a sharp instrument is used to make marks in all parts that are in contact, and the paper is then unfolded, a complex pattern will appear. What is essential here is that the whole pattern unfolds from something else, in which the order of the pattern is not manifest. What I am proposing is that the quantum properties of matter can be understood in terms of a somewhat similar process of unfoldment (and enfoldment). All that is manifest in the world is to be considered as unfolding from a deeper, more subtle nonmanifest order. In this process, each part of the universe enfolds the whole and therefore it enfolds all the other parts. This enfoldment is *active*, and not merely passive. That is to say, the movement, activity, and internal nature of each part is an expression of the whole. The whole thus creates, sustains, and determines its parts (which should perhaps rather be called *subwholes*). In this way, mechanism is basically denied. But the unfoldment is such that in large areas of experience, the parts behave with relative independence and autonomy. Hence, the world has a *mechanical aspect or side*. But this is not actually an independent basis. Rather, it arises in unfoldment from an undivided whole. This mechanical side is what is manifest (i.e., according to the Latin derivation of the word, "what can be held in the hand"). There-

fore, in terms of the notion of unfoldment, the mechanical ultimately arises out of a *subtle* level that is not mechanical. *The subtle is thus what is basic in matter*, while the mechanical (i.e., the manifest) is derived from the subtle.

Such a view of matter makes it rather similar to what we experience as *mind*. Mind is, indeed, generally felt to be much more subtle than matter. Yet, in mind we have a process of unfoldment similar to what has just been described in connection with the quantum theory. For example, thoughts are said to be *implicit*. According to its Latin root, *implicit* means enfolded. Such thoughts unfold from some deeper levels of consciousness that are too subtle normally to be seen. There is therefore a close analogy between what happens with matter and what happens with mind. They are thus similar enough to be intimately related.

What is the basis of this relationship? I would suggest that this is in some ground deeper and more subtle than are either mind or matter and that they both enfold from this ground, which is the beginning and ending of everything.

What is the nature of this ground? At least for the present science is not able to say much about it. However, as I indicated before, different religions have generally been based on different beliefs concerning this ground and these differences have led to fragmentation. Perhaps the one thing that almost all religions would have in common is to imply that this ground of all being enfolds a supreme intelligence (which is regarded as the source of extraordinary order present in the universe, an important example of which is our own bodies and brains). Also, perhaps with less clear evidence, they have in common the feeling that this supreme intelligence is penetrated by love and compassion. But to go further in defining this seems always to lead to fragmentation.

I think that it is relevant to add here that modern physics is not incompatible with a religious approach, considered in these broadest possible terms. On the contrary, it is more compatible with this than it is with a mechanistic approach. So, at least fragmentation between science and religion may perhaps thus be capable of being healed.

Nevertheless, I feel that our scientific and religious self-world views are not the main source of fragmentation. Something much more powerful and pervasive is the identification of self or ego as absolutely separate and distinct from others. What is relevant here is not only the individual ego, but also the collective ego in the form of family, profession, nation, political or religious ideology, and so on. Fundamentally, all human conflicts arise in the attempt to protect such ego interests, which are generally regarded as supreme, over-riding everything else, and not open to discussion or rational criticism. (Indeed, even the

fragmentation due to scientific and religious self-world views can be seen to arise ultimately because the ego, individual or collective, takes such views as a secure basis for absolutely certain knowledge about itself.)

It has been the aim, tacit or explicit, of all religions to change the ego so as to end fragmentation. Ideally this would be accomplished, for example, by "healing the sin-sick soul." But failing this, there is generally an attempt at least to control the ego and limit its destructive effects. Science, in the form of psychology, has also tried to accomplish similar aims, but with psychotherapeutic techniques and with the aid of drugs produced by modern chemical technology. But as we have seen, neither of these approaches has gotten very far, even on such an evident and obvious problem as the ultimate extinction of mankind that is implicit in our generally fragmentary way of life.

It seems important therefore to inquire more deeply into why the ego is such a "hard nut" to crack. In such an inquiry, several questions arise immediately. Why is the ego, individual or collective, so important? Why must it be considered to be essentially perfect and always right? Why do people explode into violence and anger when they are insulted personally, or even more, when family, religion, nation, or ideology are treated in what they regard as an outrageous way?

To discuss this adequately would require a great deal of time. But I would like to suggest something relevant, drawn from the story of Moses in the Old Testament. In doing this, it is not my intention to make any statements about theology, nor is it even to try to add in some way to scientific knowledge. Rather, I hope that what I say about Moses can at least for our purposes here be regarded as nothing more than a story that can help give rise to a certain kind of insight into the ego.

As you may recall, Moses spoke with a voice in the burning bush. When the voice spoke to Moses, it said, "I am that I am" and when Moses asked who he should say sent him unto the Children of Israel, the voice said, "You shall say that 'I am' sent you." From this, it is clear that the voice was saying that "I am" is the name of God.

One can see what this means by considering that in Moses' times, there was still a fairly strong survival of humanity's primitive animism; that is, a tendency to see everything as a manifestation of a living soul or spirit. This view implies that all life is one and that something of this spirit of each thing is enfolded in that of the other (as each person enfolds something of the spirit of others in his consciousness). So, in a way, everything would call itself "I am," if it could talk. But *a particular thing* is characterized by attributing *predicates* to "I am" (e.g., I am here, I am a human being, I am strong, weak, rich, poor, etc.). If no predicate is attributed to "I am," then this can mean only the universal spirit

creating and underlying everything. But this is also most deeply just what is meant by the word God.

I regard this as a very deep perception by Moses. What it implies is that no image can be made of the universal "I am" as this would attribute predicates. Indeed, the ancient Hebrews had strong injunctions against such idolatry and went further, saying that even the name of God was too sacred to be used, except possibly for the most holy purposes. But unfortunately as times went on, they attached to this name a vast range of attributes, such as "great," "wonderful," "magnificent," "powerful," "merciful," and so on.

Why is it dangerous to attribute specific qualities to "I am"? This is because "I am" without predicates *already* means the universal intelligence and energy on which all depends and which must sweep all before it. To attribute this energy to any kind of predicate is to try to put a limit on what the original "I am" still means, at least implicitly, and thus to create a contradiction. This contradiction, which bears on what is of supreme significance, will have a powerful disruptive effect on the mind, hence on the brain. Disorder and eventually subtle brain damage will result from this.

Actually, however, it is not in religion (nor in science) that this problem is most acute. Rather, it is in man's attempt to *identify* himself. He does this by saying "I am X." But, as has been stated earlier, whether he likes it or not, "I am" signifies the universal energy, and X signifies something particular and limited. So the value of the unlimited is tacitly attributed to the limited. This is, as one can see, the essence of egotism, individual and collective. Thus we have seen, it has seemed very puzzling why the immediate interests of the ego so often seem to override everything, even things that people indirectly regard as extremely precious such as life, love, happiness, and so on. The explanation implicit here is that we generally behave as if the ego were regarded as the universal "I am," beyond all limits of time, space, and condition. (E.g., if the honor of one's nation is attacked, one may be ready to respond ultimately with nuclear bombs, risking the destruction of the planet and even of one's nation itself. But somehow, what is eternally right will have been vindicated.) Such behavior is implied to be absolutely necessary, when any particular predicate is identified with "I am."

It is not easy to change all this, for it is deeply imprinted in the brains of some 4,500 million human beings. Merely to exhort people to do otherwise has little meaning. For to do this would be to try just to *superimpose* a contradictory meaning on top of one that is ancient, subtle, pervasive, and deeply held. It would thus tend to increase fragmentary egotism, rather than ending it. The challenge is to dis-

solve this old pattern of thought and perception, rather than to try to contradict it, to control it, or destroy it by force or by will.

In addressing this question, we have to inquire without fixed pre-suppositions or beliefs. In a way, this is a scientific approach to the basically religious question of wholeness. It is scientific, not in the sense of basing itself on scientific knowledge. Rather it raises the question Can religion, that is, wholeness, be the subject of a free and unbiased inquiry? We have the *proposal* before us that there may be a universal energy pervaded with intelligence and love, which is the ground of everything. Whether we *believe* in this or not is beside the point, since there seems to be no way of knowing for certain what is the case (at least there is no way so self-evident that, for example, members of different religious faiths, as well as those who do not profess any religious beliefs, can all agree about it). In addition, belief gets in the way as it tends strongly to bias our observation and experience.

So, let us return to our proposal for inquiry. Relevant to this proposal is the suggestion that the name "I am," without predicates, may be what generally signifies (i.e., points to) this energy. Is it possible for a human being (or a group of human beings) actually to come into contact with this energy and perhaps even to be aware of himself (or themselves) as a manifestation of it? If this is possible, then egotism will clearly go. The problem of the ego will, as it were, be dissolved, rather than *resolved*.

In such an inquiry, religious and scientific attitudes are merged into one undivided whole. Thus, there is no fragmentation between the two. Thus I regard this as a fundamental requirement for the ending of fragmentation in mankind.