

Excerpt from: 'A new theory of the relationship of mind and matter'.
PHILOSOPHICAL PSYCHOLOGY, VOL. 3, NO. 2, 1990, pp. 271-286

By David Bohm

“

Implications for mind

It follows from the above that the possibilities for wholeness in the quantum theory have an objective significance. This is in contrast to what happens in classical physics, which must treat a whole as merely a convenient way of thinking about what is considered to be in reality nothing but a collection of independent parts in a mechanical kind of interaction. On the other hand, in the quantum theory, the 'ballet-like' behaviour in superconductivity, for example, is clearly more like that of an organism than like that of mechanism. Indeed, going further, the whole notion of active information suggests a rudimentary mind-like behaviour of matter, for an essential quality of mind is just the activity of form, rather than of substance. Thus, for example, when we read a printed page, we do not assimilate the substance of the paper, but only the forms of the letters, and it is these forms which give rise to an information content in the reader which is manifested actively in his or her subsequent activities. A similar mind-like quality of matter reveals itself strongly at the quantum level, in the sense that the form of the wave function manifests itself in the movements of the particles. This quality does not, however, appear to a significant extent at the level at which classical physics is a valid approximation.

Let us now approach the question from the side of mind. We may begin by considering briefly some aspects of the nature of thought. Now, a major part of the significance of thought is just the activity to which a given structure of information may give rise. We may easily verify this in our subjective experience. For example, suppose that on a dark night, we encounter some shadows. If we have information that there may be assailants in the neighbourhood, this may give rise immediately to a sense of danger, with a whole range of possible activities (fight, flight, etc.). This is not merely a mental process. But includes an involuntary and essentially unconscious process of hormones, heart-beat, and neurochemicals of various kinds, as well as physical tensions and movements. However, if we look again see that it is only a shadow that confronts us, this thought has a calming effect, and all the activity described above ceases. Such a response to information is extremely common (e.g. information that X is a friend or an enemy, good or bad, etc.). More generally, with mind, information is thus seen to be active in all these ways, physically, chemically, electrically, etc.

Such activity is evidently similar to that which was described in connection with automatic pilots, radios, computers, DNA, and quantum processes in elementary particles such as electrons. At first sight, however, there may still seem to be a significant difference between these two cases. Thus, in our subjective experience action can, in some cases at least, be mediated by reflection in conscious thought, whereas in the various examples of activity of objective information given here, this action is immediate. But actually, even if this happens, the difference is not as great as might appear. For such reflection follows on the suspension of physical action. This gives rise to a train of thought. However, both the suspension of physical action and the resulting train of thought follow immediately from a further kind of active information implying the need to do this.

It seems clear from all this that at least in the context of the processes of thought, there is a kind of active information that is simultaneously physical and mental in nature. Active information can thus serve as a kind of or 'bridge' between these two sides of reality as a whole. These two sides are inseparable, in the sense that information contained in thought, which we feel to be on the 'mental' side, is at the same time a related neurophysiological, chemical, and physical activity (which is clearly what is meant by the 'material' side of this thought).

We have however up to this point considered only a small part of the significance of thought. Thus, our thoughts may contain a whole range of information content of different kinds. This may in turn be surveyed by a higher level of mental activity, as if it were a material object at which one were 'looking'. Out of this may emerge a yet more subtle level of information, whose meaning is an activity that is able to organize the original set of information into a greater whole. But even more subtle information of this kind can, in turn, be surveyed by a yet more subtle level of mental activity, and at least in principle this can go on indefinitely. Each of these levels may then be seen from the material side. From the mental side, it is a potentially active information content. But from the material side, it is an actual activity that operates to organize the less subtle levels, and the latter serve as the material' on which such operation takes place. Thus, at each level, information is the link or bridge between the two sides.

The proposal is then that a similar relationship holds at indefinitely great levels of subtlety. I am suggesting that this possibility of going beyond any specifiable level of subtlety is the essential feature on which the possibility of intelligence is based.

It is interesting in this context to consider the meaning of subtle which is, according to the dictionary 'rarefied, highly refined, delicate, elusive, indefinable'. But it is even more interesting to consider its Latin root, sub-texere, which means 'finely woven'. This suggests metaphor for thought as a series of more and more closely woven nets. Each can 'catch' a certain content of a corresponding 'fineness'. The finer nets can not only show up the details of form and structure of what is 'caught' in the coarser nets; they can also hold within them a further content that is implied in the latter. We have thus been led to an extension of the notion of implicate order, in which we have a series of inter-related levels in which the more subtle- e.g. 'the more finely woven' levels including thought, feeling and physical reactions - both unfold and enfold those that are less subtle (i.e. 'more coarsely woven'). In this series, the mental side corresponds, of course, to what is more subtle and the physical side to what is less subtle. And each mental side in turn becomes a physical side as we move in the direction of greater subtlety.

An extension of the quantum theory

Let us now return to a consideration of the quantum theory. What is its relationship to the interweaving of the physical and the mental that has been discussed above? First, let us recall that because the quantum potential may be regarded as information whose activity is to guide the "dance" of the electrons, there is a basic similarity between the quantum behaviour of a system of electrons and the behaviour of mind. But if we wish to relate mental processes to the quantum theory, this similarity will have to be extended. The simplest way of doing this is to improve the analogy between mental processes and quantum processes by considering that the latter could also be capable of extension to indefinitely great levels of subtlety.

To bring this about, one could begin by supposing, for example, that as the quantum potential constitutes active information that can give form to the movements of the particles, so there is a superquantum potential that can give form to the unfoldment and development of this first order quantum potential. This latter would no longer satisfy the laws of the current quantum theory, which latter would then be an approximation, working only when the action of the superquantum potential can be neglected.

Of course, there is no reason to stop here. One could go on to suppose a series of orders of superquantum potentials, with each order constituting information that gives form to the activity of the next lower order (which is less subtle). In this way, we could arrive at a process that would be very similar to that to which we have been led in the consideration of the relationship of various levels of subtlety in mind.

One may then ask: what is the relationship of these two processes? The answer that I want to propose here is that there are not two processes. Rather, I would suggest that both are essentially the same. This means that that which we experience as mind, in its movement through various levels of subtlety, will, in a natural way ultimately move the body by reaching the level of the quantum potential and of the 'dance' of the particles. There is no unbridgeable gap of barrier between any of these levels. Rather, at each stage some kind of information is the bridge. This implies, that the quantum potential acting on atomic particles, for example, represents only one stage in the process.

The content of our own consciousness is then some part of this over-all process. It is thus implied that in some sense a rudimentary mind-like quality is present even at the level of particle physics, and that as we go to subtler levels, this mind-like quality becomes stronger and more developed. Each kind and level of mind may have a relative autonomy and stability. One may then describe the essential mode of relationship of all these as participation, recalling that this word has two basic meanings, to partake of, and to take part in. Through enfoldment, each relatively autonomous kind and level of mind to one degree or another partakes of the whole. Through this it partakes of all the others in its 'gathering' of information. And through the activity of this information, it similarly takes part in the whole and in every part. It is in this sort of activity that the content of the more subtle and implicate levels is unfolded (e.g. as the movement of the particle unfolds the meaning of the information that is implicit in the quantum field and as the movement of the body unfolds what is implicit in subtler levels of thought, feeling, etc.).

For the human being, all of this implies a thoroughgoing wholeness, in which mental and physical sides participate very closely in each other. Likewise, intellect, emotion, and the whole state of the body are in a similar flux of fundamental participation. Thus, there is no real division between mind and matter, psyche and soma. The common term psychosomatic is in this way seen to be misleading, as it suggests the Cartesian notion of two distinct substances in some kind of interaction (if not through the action of God, then perhaps in some other way).

Extending this view, we see that each human being similarly participates in an inseparable way in society and in the planet as a whole. What may be suggested further is that such participation goes on to a greater collective mind, and perhaps ultimately to some yet more comprehensive mind in principle capable of going indefinitely beyond even the human species as a whole. (This may be compared to some of Jung's (1981) notions.)

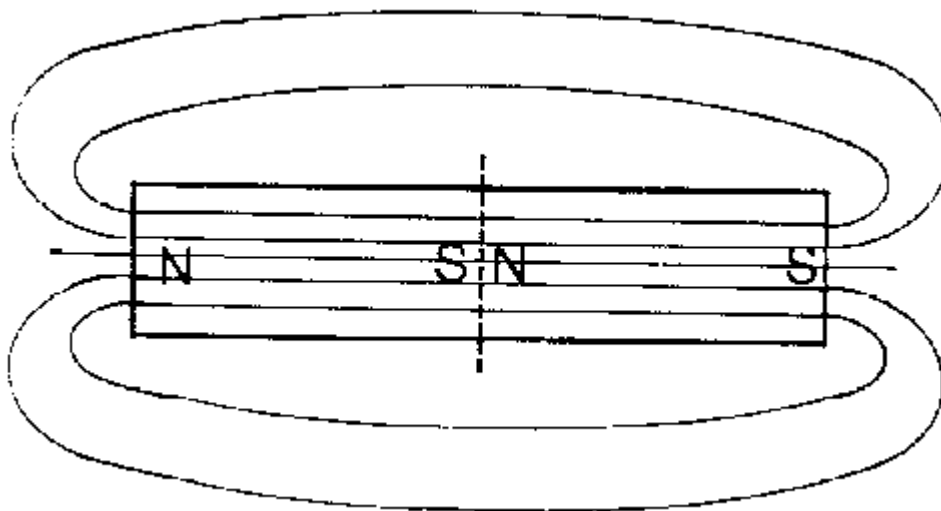


FIG. 5. Magnetic poles as abstractions from an overall magnetic field.

Finally, we may ask how we can understand this theory if the subtle levels are carried to infinity. Does the goal of comprehension constantly recede as we try to do this? I suggest that the appearance of such a recession is in essence just a feature of our language, which tends to give too much emphasis to the analytic side of our thought processes.

To explain what is meant here, one may consider the analogy of the poles of a magnet, which are likewise a feature of linguistic and intellectual analysis, and have no independent existence outside such analysis. As shown in Fig. 5, at every part of a magnet, there is a potential pair of north and south poles that overlap each other. But these magnetic poles are actually abstractions, introduced for convenience of thinking about what is going on, while the whole process is a deeper reality—an unbroken magnetic field that is present over all space.

Similarly, we may for the sake of thinking about the subject abstract any given level of subtlety out of the unbroken whole of reality and focus our attention on it. At each such level, there will be a 'mental pole' and a 'physical pole'. Thus as we have already implied, even an electron has at least a rudimentary mental pole, represented mathematically by the quantum potential. Vice versa, as we have seen, even subtle mental processes have a physical pole. But the deeper reality is something beyond either mind or matter, both of which are only aspects that serve as terms for analysis [1]. These can contribute to our understanding of what is happening but are in no sense separate substances in interaction. Nor are we reducing one pole to a mere function or aspect of the other (e.g. as is done in materialism and in idealism). *The key point is, however, that before the advent of the quantum theory, our knowledge of matter as gained from the study of physics would have led us to deny that it could have a mental pole, which would enable it to participate with mind in the relationship that have been described here. We can now say that this knowledge of matter (as well as of mind) has changed in such a way as to support the approach that has been described here. To pursue this approach further might perhaps enable us to extend our knowledge of both poles into new domains.*

.....”