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Part I - Mind, Memory, and Archetype Morphic Resonance and the Collective Unconscious

by Rupert Sheldrake

In this essay, I am going to discuss the concept of collective memory as a background for understanding Jung's concept of the collective unconscious. The collective unconscious only makes sense in the context of some notion of collective memory. This then takes us into a very wide-ranging examination of the nature and principle of memory-not just in human beings and not just in the animal kingdom; not even just in the realm of life-but in the universe as a whole. Such an encompassing perspective is part of a very profound paradigm shift that is taking place in science: the shift from the mechanistic to an evolutionary and wholistic world view.

The Cartesian mechanistic view is, in many ways, still the predominant paradigm today, especially in biology and medicine. Ninety percent of biologists would be proud to tell you that they are mechanistic biologists. Although physics has moved beyond the mechanistic view, much of our thinking about physical reality is still shaped by it-even in those of us who would like to believe that we have moved beyond this frame of thought. Therefore, I will briefly examine some of the fundamental assumptions of the mechanistic world view in order to show how it is still deeply embedded in the way that most of us think.

MECHANISM'S ROOTS IN NEO-PLATONIC MYSTICISM

It is interesting that the roots of the 17th-century mechanistic world view can be found in ancient mystical religion. Indeed, the mechanistic view was a synthesis of two traditions of thought, both of which were based on the mystical insight that reality is timeless and changeless. One of these traditions stems from Pythagoras and Plato, who were both fascinated by the eternal truths of mathematics. In the 17th century, this evolved into a view that nature was governed by timeless ideas, proportions, principles, or laws that existed within the mind of God. This world view became dominant and, through philosophers and scientists such as Copernicus, Kepler, Descartes, Galileo and Newton, it was incorporated into the foundations of modern physics.

Basically, they expressed the idea that numbers, proportions, equations, and mathematical principles are more real than the physical world we experience. Even today, many mathematicians incline toward this kind of Pythagorean or Platonic mysticism. They think of the physical world as a reification of mathematical principles, as a reflection of eternal numerical mathematical laws. This view is alien to the thinking of most of us, who the physical world as the "real" world and consider mathematical equations a man-made, and possibly inaccurate, description of that "real" world. Nevertheless, this mystical view has evolved into the currently predominant scientific viewpoint that nature is governed by eternal, changeless, immutable, omnipresent laws. The laws of nature are everywhere and always.

MATERIALISM'S ROOTS IN ATOMISM

The second view of changelessness which emerged in the 17th century stemmed from the atomistic tradition of materialism, which addressed an issue which, even then, was already deep-rooted in Greek thought: namely, the concept of a changeless reality. Parmenides, a pre-Socratic philosopher, had the idea that only being is; not-being is not. If something is, it can't change because, in order to change, it would have to combine being and not-being, which was impossible. Therefore,. he concluded that reality is a homogenous, changeless sphere. Unfortunately for Parmenides, the world we experience is not homogenous, changeless, or spherical. In order to preserve his theory, Parmenides claimed that the world we experience is a delusion. This wasn't a very satisfactory solution, and thinkers of the time tried to find a way to resolve this dilemma.

The atomists' solution was to claim that reality consists of a large number of homogenous, changeless spheres (or particles): the atoms. Instead of one big changeless sphere, there are a great many small, changeless spheres moving in the void. The changing appearances of the world could then be explained in terms of the movements, permutations, and combinations of the atoms. This is the original insight of materialism: that reality consisted of eternal atomic matter and the movement of matter.

The combination of this materialistic tradition with the Platonic tradition finally gave rise to the mechanical philosophy which emerged in the 17th century and produced a cosmic dualism that has been with us ever since. On the one hand we have eternal atoms of inert matter; and on the other hand, we have changeless, non-material laws which are more like ideas than physical, material things. In this kind of dualism, both sides are changeless-a belief that does not readily suggest the idea of an evolutionary universe. In fact, physicists have been very adverse to accepting the idea of evolution precisely because it fits so poorly with the notion of eternal matter and changeless laws. In modern physics, matter is now seen as a form of energy; eternal energy has replaced eternal matter, but little else has changed.

THE EMERGENCE OF THE EVOLUTIONARY PARADIGM

Nevertheless, the evolutionary paradigm has been gaining ground steadily for the past two centuries. In the 18th century, social, artistic, and scientific developments were generally viewed as a progressive and evolutionary process. The Industrial Revolution made this viewpoint an economic reality in parts of Europe and America. By the early 19th century there were a number of evolutionary philosophies and, by the 1840's, the evolutionary social theory of Marxism had been publicized. In this context of social and cultural evolutionary theory, Darwin proposed his biological theory of evolution which extended the evolutionary vision to the whole of life. Yet this vision was not extended to the entire universe: Darwin and the neo-Darwinians ironically tried to fit the evolution of life on earth into a static universe, or even worse, a universe which was actually thought to be "running down" thermodynamically, heading toward a "heat death."

Everything changed in 1966 when physics finally accepted an evolutionary cosmology in which the universe was no longer eternal. Instead, the universe originated in a Big Bang about 15 billion years ago and has evolved ever since. So we now have an evolutionary physics. But we have to remember that this evolutionary physics is only

just over 20 years old, and the implications and consequences of the Big Bang discovery are not yet fully known.

Physics is only just beginning to adapt itself to this new view, which, as we have seen, challenges the most fundamental assumption of physics since the time of Pythagoras: the idea of eternal laws. As soon as we have an evolving universe, we are confronted with the question: what about the eternal laws of nature? Where were the laws of nature before the Big Bang? If the laws of nature existed before the Big Bang, then it's clear that they are nonphysical; in fact, they are metaphysical. This forces out into the open the metaphysical assumption that underlay the idea of eternal laws all along.

LAWS OF NATURE, OR JUST HABITS?

There is an alternative, however. The alternative is that the universe is more like an organism than a machine. The Big Bang recalls the mythic stories of the hatching of the cosmic egg: it grows, and as it grows it undergoes an internal differentiation that is more like a gigantic cosmic embryo than the huge eternal machine of mechanistic theory. With this organic alternative, it might make sense to think of the laws of nature as more like habits; perhaps the laws of nature are habits of the universe, and perhaps the universe has an in-built memory.

About 100 years ago the American philosopher, C. S. Pierce, said that if we took evolution seriously, if we thought of the entire universe as evolving, then we would have to think of the laws of nature as somehow likened to habits. This idea was actually quite common, especially in America; it was espoused by William James and other American philosophers, and was quite widely discussed at the end of the last century. In Germany, Nietzsche went so far as to suggest that the laws of nature underwent natural selection: perhaps there were many laws of nature at the beginning, but only the successful laws survived; therefore, the universe we see has laws which have evolved through natural selection.

Biologists also moved toward interpreting phenomena in terms of habit. The most interesting such theorist was English writer Samuel Butler, whose most important books on this theme were Life and Habit (1878) and Unconscious Memory (1881). Butler contended that the whole of life involved inherent unconscious memory; habits, the instincts of animals, the way in which embryos develop, all reflected a basic principle of inherent memory within life. He even proposed that there must be an inherent memory in atoms, molecules, and crystals. Thus, there was this period of time at the end of the last century when biology was viewed in evolutionary terms. It is only since the 1920's that mechanistic thinking has come to have a stranglehold upon biological thought.

HOW DOES FORM ARISE?

The hypothesis of formative causation, which is the basis of my own work, starts from the problem of biological form. Within biology, there has been a long-standing discussion of how to understand the way embryos and organisms develop. How do plants grow from seeds? How do embryos develop from fertilized eggs? This is a problem for biologists; it's not really a problem for embryos and trees, which just do it! However, biologists rind it difficult to find a causal explanation for form. In

physics, in some sense the cause equals the effect. The amount of energy, matter, and momentum before a given change equals the amount afterwards. The cause is contained in the effect and the effect in the cause. However, when we are considering the growth of an oak tree from an acorn, there seems to be no such equivalence of cause and effect in any obvious way.

In the 17th century, the main mechanistic theory of embryology was simply that the oak tree was contained within the acorn: inside each acorn there was a miniature oak tree which inflated as the oak tree grew. This theory was quite widely accepted, and it was the one most consistent with the mechanistic approach, as understood at that time. However, as critics rapidly pointed out, if the oak tree is inflated and that oak tree itself produces acorns, the inflatable oak tree must contain inflatable acorns which contain inflatable oak trees, ad infinitum.

If, on the other hand, more form came from less form (the technical name for which is epigenesis), then where does the more form come from?

How did structures appear that weren't there before? Neither Platonists nor Aristotelians had any problem with this question. The Platonists said that the form comes from the Platonic archetype: if there is an oak tree, then there is an archetypal form of an oak tree, and all actual oak trees are simply reflections of this archetype. Since this archetype is beyond space and time, there is no need to have it embedded in the physical form of the acorn. The Aristotelians said that every species has its own kind of soul, and the soul is the form of the body. The body is in the soul, not the soul in the body. The soul is the form of the body and is around the body and contains the goal of development (which is formally called entelechy). An oak tree soul contains the eventual oak tree.

IS DNA A GENETIC PROGRAM?

However, a mechanistic world view denies animism in all its forms; it denies the existence of the soul and of any non-material organizing principles. Therefore, mechanists have to have some kind of preformationism. At the end of the 19th century, German biologist August Weismann's theory of the germ-plasm revived the idea of preformationism; Weissman's theory placed "determinants," which supposedly gave rise to the organism, inside the embryo. This is the ancestor of the present idea of genetic programming, which constitutes another resurgence of preformationism in a modern guise.

As we will see, this model does not work very well. The genetic program is assumed to be identical with DNA, the genetic chemical. The genetic information is coded in DNA and this code forms the genetic program. But such a leap requires projecting onto DNA properties that it does not actually possess. We know what, DNA does: it codes for proteins; it codes for the sequence of amino acids which form proteins. However, there is a big difference between coding for the structure of a protein-a chemical constituent of the organism-and programming the development of an entire organism. It is the difference between making bricks and building a house out of the bricks. You need the bricks to build the house. If you have defective bricks, the house will be defective. But the plan of the house is not contained in the bricks, or the wires, or the beams, or cement.

Analogously, DNA only codes for the materials from which the body is constructed: the enzymes, the structural proteins, and so forth. There is no evidence that it also codes for the plan, the form, the morphology of the body. To see this more clearly, think of your arms and legs. The form of the arms and legs is different; it's obvious that they have a different shape from each other. Yet the chemicals in the arms and legs are identical. The muscles are the same, the nerve cells are the same, the skin cells are the same, and the DNA is the same in all the cells of the arms and legs. In fact, the DNA is the same in all the cells of the body. DNA alone cannot explain the difference inform; something else is necessary to explain form.

In current mechanistic biology, this is usually assumed to depend on what are called "complex patterns of physio-chemical interaction not yet fully understood." Thus the current mechanistic theory is not an explanation but merely the promise of an explanation. It is what Sir Karl Popper has called a "promissory mechanism"; it involves issuing promissory notes against future explanations that do not yet exist. As such, it is not really an objective argument; it is merely a statement of faith.

WHAT ARE MORPHIC FIELDS?

The question of biological development, of morphogenesis, is actually quite open and is the subject of much debate within biology itself. An alternative to the mechanist/reductionist approach, which has been around since the 1920s, is the idea of morphogenetic (form-shaping) fields. In this model, growing organisms are shaped by fields which are both within and around them, fields which contain, as it were, the form of the organism. This is closer to the Aristotelian tradition than to any of the other traditional approaches. As an oak tree develops, the acorn is associated with an oak tree field, an invisible organizing structure which organizes the oak tree's development; it is like an oak tree mold, within which the developing organism grows.

One fact which led to the development of this theory is the remarkable ability organisms have to repair damage. If you cut an oak tree into little pieces, each little piece, properly treated, can grow into a new tree. So from a tiny fragment, you can get a whole. Machines do not do that; they do not have this power of remaining whole if you remove parts of them. Chop a computer up into small pieces and all you get is a broken computer. It does not regenerate into lots of little computers. But if you chop a flatworm into small pieces, each piece can grow into a new flatworm. Another analogy is a magnet. If you chop a magnet into small pieces, you do have lots of small magnets, each with a complete magnetic field. This is a wholistic property that fields have that mechanical systems do not have unless they are associated with fields. Still another example is the hologram, any part of which contains the whole. A hologram is based on interference patterns within the electromagnetic field. Fields thus have a wholistic property which was very attractive to the biologists who developed this concept of morphogenetic fields.

Each species has its own fields, and within each organism there are fields within fields. Within each of us is the field of the whole body; fields for arms and legs and fields for kidneys and livers; within are fields for the different tissues inside these organs, and then fields for the cells, and fields for the sub-cellular structures, and fields for the molecules, and so on. There is a whole series of fields within fields. The essence of the hypothesis I am proposing is that these fields, which are already

accepted quite widely within biology, have a kind of in-built memory derived from previous forms of a similar kind. The liver field is shaped by the forms of previous livers and the oak tree field by the forms and organization of previous oak trees. Through the fields, by a process called morphic resonance, the influence of like upon like, there is a connection among similar fields. That means that the field's structure has a cumulative memory, based on what has happened to the species in the past. This idea applies not only to living organisms but also to protein molecules, crystals, even to atoms. In the realm of crystals, for example, the theory would say that the form a crystal takes depends on its characteristic morphic field. Morphic field is a broader term which includes the fields of both form and behavior; hereafter, I shall use the word morphic field rather than morphogenetic.

MIGRANT BEARDED CHEMISTS

If you make a new compound and crystallize it, there won't be a morphic field for it the first time. Therefore, it may be very difficult to crystallize; you have to wait for a morphic field to emerge. The second time, however, even if you do this somewhere else in the world, there will be an influence from the first crystallization, and it should crystallize a bit more easily. The third time there will be an influence from the first and second, and so on. There will be a cumulative influence from previous crystals, so it should get easier and easier to crystallize the more often you crystallize it. And, in fact, this is exactly what does happen. Synthetic chemists find that new compounds are generally very difficult to crystallize. As time goes on, they generally get easier to crystallize all over the world. The conventional explanation is that this occurs because fragments of previous crystals are carried from laboratory to laboratory on beards of migrant chemists. When there have not been any migrant chemists, it is assumed that the fragments wafted through the atmosphere as microscopic dust particles.

Perhaps migrant chemists do carry fragments on their beards and perhaps dust particles do get blown around in the atmosphere. Nevertheless, if one measures the rate of crystallization under rigorously controlled conditions in sealed vessels in different parts of the world, one should still observe an accelerated rate of crystallization. This experiment has not yet been done. But a related experiment involving chemical reaction rates of new synthetic processes is at present being considered by a major chemical company in Britain because, if these things happen, they have quite important implications for the chemical industry.

A NEW SCIENCE OF LIFE

There are quite a number of experiments that can be done in the realm of biological form and the development of form. Correspondingly, the same principles apply to behavior, forms of behavior and patterns of behavior. Consider the hypothesis that if you train rats to learn a new trick in Santa Barbara, then rats all over the world should be able to learn to do the same trick more quickly, just because the rats in Santa Barbara have learned it. This new pattern of learning will be, as it were, in the rat collective memory-in the morphic fields of rats, to which other rats can tune in, just because they are rats and just because they are in similar circumstances, by morphic resonance. This may seem a bit improbable, but either this sort of thing happens or it doesn't.

Among the vast number of papers in the archives of experiments on rat psychology, there are a number of examples of experiments in which people have actually monitored rates of learning over time and discovered mysterious increases. In my book, A New Science of Life, I describe one such series of experiments which extended over a 50-year period. Begun at Harvard and then carried on in Scotland and Australia, the experiment demonstrated that rats increased their rate of learning more than tenfold. This was a huge effect-not some marginal statistically significant result. This improved rate of learning in identical learning situations occurred in these three separate locations and in all rats of the breed, not just in rats descended from trained parents.

There are other examples of the spontaneous spread of new habits in animals and birds which provide at least circumstantial evidence for the theory of morphic resonance. The best documented of these is the behavior of bluetits, a rather small bird with a blue head, that is common throughout Britain. Fresh milk is still delivered to the door each morning in Britain. Until about the 1950s, the caps on the milk bottles were made of cardboard. In 1921 in Southampton, a strange phenomenon was observed. When people came out in the morning to get their milk bottles, they found little shreds of cardboard all around the bottom of the bottle, and the cream from the top of the bottle had disappeared. Close observation revealed that this was being done by bluetits, who sat on top of the bottle, pulled off the cardboard with their beaks, and then drank the cream. Several tragic cases were found in which bluetits were discovered drowned head first in the milk!

This incident caused considerable interest; then the event turned up somewhere else in Britain, about 50 miles away, and then somewhere about 100 miles away. Whenever the bluetit phenomenon turned up, it started spreading locally, presumably by imitation. However, bluetits are very home-loving creatures, and they don't normally travel more than four or five miles. Therefore, the dissemination of the behavior over large distances could only be accounted for in terms of an independent discovery of the habit. The bluetit habit was mapped throughout Britain until 1947, by which time it had become more or less universal. The people who did the study came to the conclusion that it must have been "invented" independently at least 50 times. Moreover, the rate of spread of the habit accelerated as time went on. In other parts of Europe where milk bottles are delivered to doorsteps, such as Scandinavia and Holland, the habit also cropped up during the 1930s and spread in a similar manner. Here is an example of a pattern of behavior which was spread in a way which seemed to speed up with time, and which might provide an example of morphic resonance.

But there is still stronger evidence for morphic resonance. Because of the German occupation of Holland, milk delivery ceased during 1939-40. Milk deliveries did not resume until 1948. Since bluetits usually live only two to three years, there probably were no bluetits alive in 1948 who had been alive when milk was last delivered. Yet when milk deliveries resumed in 1948, the opening of milk bottles by bluetits sprang up rapidly in quite separate places in Holland and spread extremely rapidly until, within a year or two, it was once again universal. The behavior spread much more rapidly and cropped up independently much more frequently the second time round than the first time. This example demonstrates the evolutionary spread of a new

habit which is probably not genetic but rather depends on a kind of collective memory due to morphic resonance.

I am suggesting that heredity depends not only on DNA, which enables organisms to build the right chemical building blocks-the proteins-but also on morphic resonance. Heredity thus has two aspects: one a genetic heredity, which accounts for the inheritance of proteins through DNA's control of protein synthesis; the second a form of heredity based on morphic fields and morphic resonance, which is nongenetic and which is inherited directly from past members of the species. This latter form of heredity deals with the organization of form and behavior.

THE ALLEGORY OF THE TELEVISION SET

The differences and connections between these two forms of heredity become easier to understand if we consider an analogy to television. Think of the pictures on the screen as the form that we are interested in. If you didn't know how the form arose, the most obvious explanation would be that there were little people inside the set whose shadows you were seeing on the screen. Children sometimes think in this manner. If you take the back off the set, however, and look inside, you find that there are no little people. Then you might get more subtle and speculate that the little people are microscopic and are actually inside the wires of the TV set. But if you look at the wires through a microscope, you can't find any little people there either.

You might get still more subtle and propose that the little people on the screen actually arise through "complex interactions among the parts of the set which are not yet fully understood." You might think this theory was proved if you chopped out a few transistors from the set. The people would disappear. If you put the transistors back, they would reappear. This might provide convincing evidence that they arose from within the set entirely on the basis of internal interaction.

Suppose that someone suggested that the pictures of little people come from outside the set, and the set picks up the pictures as a result of invisible vibrations to which the set is attuned. This would probably sound like a very occult and mystical explanation. You might deny that anything is coming into the set. You could even "prove it" by weighing the set switched off and switched on; it would weigh the same. Therefore, you could conclude that nothing is coming into the set.

I think that is the position of modern biology, trying to explain everything in terms of what happens inside. The more explanations for form are looked for inside, the more elusive the explanations prove to be, and the more they are ascribed to ever more subtle and complex interactions, which always elude investigation. As I am suggesting, the forms and patterns of behavior are actually being tuned into by invisible connections arising outside the organism. The development of form is a result of both the internal organization of the organism and the interaction of the morphic fields to which it is tuned.

Genetic mutations can affect this development. Again think of the TV set. If we mutate a transistor or a condenser inside the set, you may get distorted pictures or sound. But this does not prove that the pictures and sound are programmed by these components. Nor does it prove that form and behavior are programmed by genes, if we find there are alterations in form and behavior as a result of genetic mutation.

There is another kind of mutation which is particularly interesting. Imagine a mutation in the tuning circuit of your set, such that it alters the resonant frequency of the tuning circuit. Tuning your TV depends on a resonant phenomenon; the tuner resonates at the same frequency as the frequency of the signal transmitted by the different stations. Thus tuning dials are measured in hertz, which is a measure of frequency. Imagine a mutation in the tuning system such that you tune to one channel and a different channel actually appears. You might trace this back to a single condenser or a single resistor which had undergone a mutation. But it would not be valid to conclude that the new programs you are seeing, the different people, the different films and advertisements, are programmed inside the component that has changed. Nor does it prove that form and behavior are programmed in the DNA when genetic mutations lead to changes in form and behavior. The usual assumption is that if you can show something alters as a result of a mutation, then that must be programmed by, or controlled by, or determined by, the gene. I hope this TV analogy makes it clear that that is not the only conclusion. It could be that it is simply affecting the tuning system.

A NEW THEORY OF EVOLUTION

A great deal of work is being done in contemporary biological research on such "tuning" mutations (formally called homoeotic mutations). The animal most used in the investigations is Drosophila, the fruitfly. A whole range of these mutations have been found which produce various monstrosities. One kind, called antennapedia, leads to the antennae being transformed into legs. The unfortunate flies, which contain just one altered gene, produce legs instead of antennae growing out of their heads. There is another mutation which leads to the second of the three pairs of legs in the Drosophila being transformed into antennae. Normally flies have one pair of wings and, on the segment behind the wings, are small balancing organs called halteres. Still another mutation leads to the transformation of the segment normally bearing the halteres into a duplicate of the first segment, so that these flies have four wings instead of two. These are called bithorax mutants.

All of these mutations depend on single genes. I propose that somehow these single gene mutations are changing the tuning of a part of the embryonic tissue, such that it tunes into a different morphic field than it normally does, and so a different set of structures arise, just like tuning into a different channel on TV.

One can see from these analogies how both genetics and morphic resonance are involved in heredity. Of course, a new theory of heredity leads to a new theory of evolution. Present-day evolutionary theory is based on the assumption that virtually all heredity is genetic. Sociobiology and neo-Darwinism in all their various forms are based on gene selection, gene frequencies, and so forth. The theory of morphic resonance leads to a much broader view which allows one of the great heresies of biology once more to be taken seriously: namely, the idea of the inheritance of acquired characteristics. Behaviors which organisms learn, or forms which they develop, can be inherited by others even if they are not descended from the original organisms-by morphic resonance.

A NEW CONCEPT OF MEMORY

When we consider memory, this hypothesis leads to a very different approach from the traditional one. The key concept of morphic resonance is that similar things influence similar things across both space and time. The amount of influence depends on the degree of similarity. Most organisms are more similar to themselves in the past than they are to any other organism. I am more like me five minutes ago than I am like any of you; all of us are more like ourselves in the past than like anyone else. The same is true of any organism. This self-resonance with past states of the same organism in the realm of form helps to stabilize the morphogenetic fields, to stabilize the form of the organism, even though the chemical constituents in the cells are turning over and changing. Habitual patterns of behavior are also tuned into by the self-resonance process. If I start riding a bicycle, for example, the pattern of activity of my nervous system and my muscles, in response to balancing on the bicycle, immediately tunes me in by similarity to all the previous occasions on which I have ridden a bicycle. The experience of bicycle riding is given by cumulative morphic resonance to all those past occasions. It is not a verbal or intellectual memory; it is a body memory of riding a bicycle.

This would also apply to my memory of actual events: what I did yesterday in Los Angeles or last year in England. When, I think of these particular events, I am tuning into the occasions on which these events happened. There is a direct causal connection through a tuning process. If this hypothesis is correct, it is not necessary to assume that memories are stored inside the brain.

THE MYSTERY OF MIND

All of us have been brought up on the idea that memories are stored in the brain; we use the word brain interchangeably with mind or memory. I am suggesting that the brain is more like a tuning system than a memory storage device. One of the main arguments for the localization of memory in the brain is the fact that certain kinds of brain damage can lead to loss of memory. If the brain is damaged in a car accident and someone loses memory, then the obvious assumption is that memory tissue must have been destroyed. But this is not necessarily so.

Consider the TV analogy again. If I damaged your TV set so that you were unable to receive certain channels, or if I made the TV set aphasic by destroying the part of it concerned with the production of sound so that you could still get the pictures but could not get the sound, this would not prove that the sound or the pictures were stored inside the TV set. It would merely show that I had affected the tuning system so you could not pick up the correct signal any longer. No more does memory loss due to brain damage prove that memory is stored inside the brain. In fact, most memory loss is temporary: amnesia following concussion, for example, is often temporary. This recovery of memory is very difficult to explain in terms of conventional theories: if the memories have been destroyed because the memory tissue has been destroyed, they ought not to come back again; yet they often do.

Another argument for the localization of memory inside the brain is suggested by the experiments on electrical stimulation of the brain by Wilder Penfield and others. Penfield stimulated the temporal lobes of the brains of epileptic patients and found that some of these stimuli could elicit vivid responses, which the patients interpreted as memories of things they had done in the past. Penfield assumed that he was actually stimulating memories which were stored in the cortex. Again returning to the

TV analogy, if I stimulated the tuning circuit of your TV set and it jumped onto another channel, this wouldn't prove the information was stored inside the tuning circuit. It is interesting that, in his last book, The Mystery of the Mind, Penfield himself abandoned the idea that the experiments proved that memory was inside the brain. He came to the conclusion that memory was not stored inside the cortex at all.

There have been many attempts to locate memory traces within the brain, the best known of which were by Karl Lashley, the great American neurophysiologist. He trained rats to learn tricks, then chopped bits of their brains out to determine whether the rats could still do the tricks. To his amazement, he found that he could remove over fifty percent of the brain-any 50%-and there would be virtually no effect on the retention of this learning. When he removed all the brain, the rats could no longer perform the tricks, so he concluded that the brain was necessary in some way to the performance of the task-which is hardly a very surprising conclusion. What was surprising was how much of the brain he could remove without affecting the memory.

Similar results have been found by other investigators, even with invertebrates such as the octopus. This led one experimenter to speculate that memory was both everywhere and nowhere in particular. Lashley himself concluded that memories are stored in a distributed manner throughout the brain, since he could not find the memory traces which classical theory required. His student, Karl Pribram, extended this idea with the holographic theory of memory storage: memory is like a holographic image, stored as an interference pattern throughout the brain.

What Lashley and Pribram (at least in some of his writing) do not seem to have considered is the possibility that memories may not be stored inside the brain at all. The idea that they are not stored inside the brain is more consistent with the available data than either the conventional theories or the holographic theory. Many difficulties have arisen in trying to localize memory storage in the brain, in part because the brain is much more dynamic than previously thought. If the brain is to serve as a memory storehouse, then the storage system would have to remain stable; yet it is now known that nerve cells turn over much more rapidly than was previously thought. All the chemicals in synapses and nerve structures and molecules are turning over and changing all the time. With a very dynamic brain, it is difficult to see how memories are stored.

There is also a logical problem about conventional theories of memory storage, which various philosophers have pointed out. All conventional theories assume that memories are somehow coded and located in a memory store in the brain. When they are needed they are recovered by a retrieval system. This is called the coding, storage, and retrieval model. However, for a retrieval system to retrieve anything, it has to know what it wants to retrieve; a memory retrieval system has to know what memory it is looking for. It thus must be able to recognize the memory that it is trying to retrieve. In order to recognize it, the retrieval system itself must have some kind of memory. Therefore, the retrieval system must have a sub-retrieval system to retrieve its memories from its store. This leads to an infinite regress. Several philosophers argue that this is a fatal, logical flaw in any conventional theory of memory storage. However, on the whole, memory theoreticians are not very

interested in what philosophers say, so they do not bother to reply to this argument. But it does seem to me quite a powerful one.

In considering the morphic resonance theory of memory, we might ask: if we tune into our own memories, then why don't we tune into other people's as well? I think we do, and the whole basis of the approach I am suggesting is that there is a collective memory to which we are all tuned which forms a background against which our own experience develops and against which our own individual memories develop. This concept is very similar to the notion of the collective unconscious.

Jung thought of the collective unconscious as a collective memory, the collective memory of humanity. He thought that people would be more tuned into members of their own family and race and social and cultural group, but that nevertheless there would be a background resonance from all humanity: a pooled or averaged experience of basic things that all people experience (e.g., maternal behavior and various social patterns and structures of experience and thought). It would not be a memory from particular persons in the past so much as an average of the basic forms of memory structures; these are the archetypes. Jung's notion of the collective unconscious makes extremely good sense in the context of the general approach that I am putting forward. Morphic resonance theory would lead to a radical reaffirmation of Jung's concept of the collective unconscious.

It needs reaffirmation because the current mechanistic context of conventional biology, medicine, and psychology denies that there can be any such thing as the collective unconscious; the concept of a collective memory of a race or species has been excluded as even a theoretical possibility. You cannot have any inheritance of acquired characteristics according to conventional theory; you can only have an inheritance of genetic mutations. Under the premises of conventional biology, there would be no way that the experiences and myths of, for example, African tribes, would have any influence on the dreams of someone in Switzerland of non-African descent, which is the sort of thing Jung thought did happen. That is quite impossible from the conventional point of view, which is why most biologists and others within mainstream science do not take the idea of the collective unconscious seriously. It is considered a flaky, fringe idea that may have some poetic value as a kind of metaphor, but has no relevance to proper science because it is a completely untenable concept from the point of view of normal biology.

The approach I am putting forward is very similar to Jung's idea of the collective unconscious. The main difference is that Jung's idea was applied primarily to human experience and human collective memory. What I am suggesting is that a very similar principle operates throughout the entire universe, not just in human beings. If the kind of radical paradigm shift I am talking about goes on within biology-if the hypothesis of morphic resonance is even approximately correct-then Jung's idea of the collective unconscious would become a mainstream idea: Morphogenic fields and the concept of the collective unconscious would completely change the context of modern psychology.

Part II - Society, Spirit & Ritual: Morphic Resonance and the Collective Unconscious

by Rupert Sheldrake

Rupert Sheldrake is a theoretical biologist whose book, A New Science of Life: The Hypothesis of Formative Causation, continues to evoke a storm of controversy. Following is the second in a series of articles wherein Sheldrake presents his ideas for amplifying Jung's concept of the collective unconscious and archetypal psychology. He concluded his first article with these words:

The approach I am putting forward is very similar to Jung's idea of the collective unconscious. The main difference is that Jung's idea was applied primarily to human experience and human collective memory. What I am suggesting is that a very similar principle operates throughout the entire universe, not just in human beings. If the kind of radical paradigm shift I am talking about goes on within biology ? if the hypothesis of morphic resonance is even approximately correct ? then Jung's idea of the collective unconscious would become a mainstream idea: Morphogenic fields and the concept of the collective unconscious would completely change the context of modern psychology.

SOCIETY AS SUPERORGANISM

In Part II of this essay, I want to explore some ideas about the social and cultural aspects of morphic fields and morphic resonance. A familiar comparison might be that of a hive of bees or a nest of termites: each is like a giant organism, and the insects within it are like cells in a superorganism. Although comprised of hundreds and hundreds of individual insect cells, the hive or nest functions and responds as a unified whole.

My hypothesis is that societies have social and cultural morphic fields which embrace and organize all that resides within them. Although comprised of thousands and thousands of individual human beings, the society can function and respond as a unified whole via the characteristics of its morphic field. To visualize this, it is helpful to remember that fields by their very nature are both within and around the things to which they refer. A magnetic field is both within a magnet and around it; a gravitational field is both within the earth and around it. Field theories thus take us beyond the traditional rigid definition of "inside" and "outside."

A superorganism concept of animal societies dominated behavioral biology until about the early 1960s. Then ? as Edward O. Wilson, the founder of sociobiology, notes in his book, The Insect Societies (1971) ? there was a general shift in paradigm in favor of mechanistic reductionism, which explained animal societies purely in terms of interactions among genetically?programmed individuals. The superorganism concept has not been forgotten, however, and forces itself again and again upon people who think about animal societies.

There is an inherent problem in the concept: if one says that the animal society is a kind of organism, then what kind of organism is it? What is it that can possibly

organize all the individual animals within it? I am suggesting that there is a morphic field which embraces all the animals, a field which literally extends around all the animals within it. This field coordinates their movements just as the morphic field of the human body coordinates the activities and movements of the cells and tissues and organs. This concept better describes the characteristic phenomena of animal societies than the idea that they are all individually interacting yet separate things.

MARAIS AND THE WHITE ANTS

For example, it explains how termites building columns which are adjacent yet separate know how to build arches so that the two sides meet at exactly the right place in the middle. Termites are blind, and the inside of the nest is dark, so they can't do it by vision. Edward O. Wilson considers it unlikely that they do it by hearing or acoustic methods, because of the constant background of sound caused by the movement of termites within the mound. The only hypothesis that Wilson, who represents the most hard?nosed reductionist school of thought, considers likely is that they do it by smell. And even he agrees that that seems farfetched.

If, in fact, the column construction is going on within a social morphic field which embraces the whole nest and which contains a "mold" of the future arch, then the termites' movements are coordinated by this field and it's much easier to understand how the columns can meet. If that is the case, it should be possible to investigate it experimentally.

In the 1920s, South African biologist Eugene Marais wrote The Soul of The White Ant, in which he described experiments investigating the effect of damaging South African termite mounds. Marais took a large steel plate several feet across and several feet deep and hammered it into the center of a termite mound. The termites repaired the mound on both sides of the steel plate, building columns and arches. Their movements were coordinated even though they approached the wall from different sides. Amazingly, the termites on opposite sides of the steel plate built arches that met at the steel plate at exactly the right position to join if the plate had not blocked their way. This seemed to demonstrate that there was some kind of coordinating influence which was not blocked by a steel plate. Obviously, this would be impossible to do by smell, as Wilson suggests, since even termites can't smell subtle odors through a steel plate.

Unfortunately, no one has ever repeated these experiments, even though it would not be difficult to repeat them in a country where termites are common. If Marais' result was replicated, it would ?strongly suggest that there was a field coordinating the actions of the individuals.

WAYNE POTTS AND THE MANEUVER WAVES OF BIRDS

As another familiar example of the superorganism concept, consider schools of fish: when predators swim into a school, the fish dart quickly to the side in a coordinated way in order to clear a path through the middle. They move very fast in response to quite unexpected stimuli, yet they do not bump into each other. The same is true of flocks of birds. A whole flock can bank as one without the birds bumping into each other.

Recently, studies investigating the banking of large flocks of dunlins by American researcher Wayne Potts have been conducted. He filmed their maneuvers at a very rapid rate of exposure, so that he could later slow the process down and examine it frame by frame. When he did so, he found that the rate of propagation of what he calls the "maneuver wave" is extremely fast: about 20 milliseconds from bird to bird. This is much faster than the birds' minimum reaction time to stimuli. He measured their startle reaction time using dunlins in the laboratory in dark or dim light. He set off photographic flashbulbs and measured how long it took the birds to react. He found that it took the individual birds about 80?100 milliseconds; that is, they reacted as individuals four to five times more slowly than the rate at which the maneuver wave moved from bird to bird. The banking maneuver could begin anywhere within the flock?at the front or back or at the side. It was usually initiated by a single bird or a small group of birds, and then propagated outwards much faster than could be explained by any simple system of visual cuing and response to stimuli.

THE COLLECTIVE BEHAVIOR OF HUMAN GROUPS

If one thinks of the flock as being coordinated by a morphic field and the "maneuver wave" as a wave in the morphic field, then this phenomenon is much easier to understand than it is when explained in terms of ordinary sensory physiology. The above examples illustrate a few of the areas in which actual empirical studies are possible ? areas which suggest the existence of group minds or group fields in the coordination of collective animal behavior. It has often been suggested that a similar phenomenon may be at work in human groups, especially in the behavior of crowds. A number of studies has been conducted by social psychologists on what they call "collective behavior," which includes the behavior of crowds, football hooligans, rioting mobs, and lynching mobs, as well as rapidly spreading social phenomena such as fashions, fads, rumors, crazes, and jokes. All such phenomenon would fit readily into the concept of group morphic fields.

In interviews, athletes on successful teams commonly compare their teams to a composite organism where everybody fits in and knows where their teammates are going to be. The team behaves more like a single organism than like a composite of separate individuals. Through practice together, teams build up this response to each other; words such as empathy or sixth sense are often used to describe the feeling they share.

If we think of societies and social groups as being coordinated by morphic fields, then we realize that the groups themselves come together and dissolve as teams do ? but their fields are more enduring. We are in these fields virtually all the time: family fields, or national fields, or local fields, the fields of various groups to which we belong. We are contained within these larger collective patterns of organization much of the time but because they are always present, we cease to be aware of them. We take them for granted, just as we take the air we breathe for granted, because the air is also always present. However, if we are held under water for a while, we no longer take the air for granted; we quickly become conscious of our need for it! Similarly, people placed in solitary confinement quickly become aware of the importance of social interaction.

Many anthropologists have commented on an almost indefinable "something" which holds the members of the society together. French sociologist Emile Durkheim spoke of this as the "conscience collective" (in French, the word conscience means both conscience and consciousness). He believed that one of the major functions of the "conscience collective" was to maintain the cohesion of the social group. It behaved similarly to a group field, and many of the activities of the group consciousness were concerned with maintaining and stabilizing the continued existence of the group field itself.

MCDOUGALL'S GROUP MIND AND THE SHADOW

In the 1930s William McDougall, who wrote The Group Mind (1920/ 1972) and several other books on social psychology, theorized that a group mind existed which included all members of a society and which had its own thoughts, its own traditions, and its own memories. If we think of such a group mind as an aspect of the morphic field of the society, it would indeed have its own memory since all morphic fields have in?built memory through morphic resonance.

The problem with ideas like this one is that it is not possible yet to define t what the group mind is or how it could be measured. Given the positivistic mood of sociology which prevailed then (and now), McDougal's concept of the group mind was not developed further. Traumatic social conditions then dampened any remaining receptivity to notions involving group forces. By the 1930s, the shadow side of collective consciousness had taken tangible form in Nazi Germany. Because this shadow side was all too real, most people were frightened of any concept suggesting group minds or group consciousness. Certainly we have all seen the shadow side of group consciousness only .too clearly in the last few decades. What we need to realize, however, is that there is much to be learned from thinking about the more positive side of group fields or group consciousness.

In more recent sociological and anthropological theory, a holistic approach to society has become quite common. In fact, compared with the biological and physical sciences which have been based on reductionist principles, a great deal of sociological and anthropological theory has taken a consistently holistic perspective. It was within this broader intellectual environment, characterized by Durkheim's conscience collective and McDougall's group mind, that Jung formulated his concept of the collective unconscious.

IS SOCIETY AN ORGANISM?

The idea that human society is an organism is extremely widespread; it is perhaps one of the most common metaphors extending throughout the history of Western thought. It exists in our language in phrases such as the body politic, head of state, arm of the law. These are organic metaphors which imply the unified, organic nature of society. The same notion is also common in religious metaphors, and is expressed in such descriptions of the Christian church as the mystical body of Christ. More specifically, Christ compared himself to the vine of which the people were the branches, again connoting an organic unity. Even in 17th?century political thought, which was far more atomistic in tone, philosopher Thomas Hobbes compared society to a leviathan, a great monster, using still another organic metaphor.

Although many of us still think of society as a form of collective, living organism, the earth is now considered to be dead. This wasn't always so; in Latin, mater means mother and materia means matter. Thus, in the Indo-European languages, matter comes from the same root as mother. Unfortunately, since the 17th century, Mother Nature in Western consciousness has been turned into dead matter; the mother has become unconscious, only preserved as a dim memory in the word matter. Instead, it is the economy that has become alive. We speak of a growing economy which can be sick or healthy, and which goes through cycles. Economies have all the attributes of giant living organisms, with an autonomy which even politicians, businessmen and bankers cannot control. The economy has become a self?regulating, self organizing system, very much alive in a supposedly dead world. Thus the economy has come to life at the expense of the earth, and that is one of the problems with which many people are currently grappling.

The concept of morphic fields containing in?built memory helps to explain many features of society: for example, there are traditions, customs, and manners which enable societies to retain their organizing principles ? their autonomy, pattern, structure, and organization ? even though there is a continuous turnover of individuals through the cycles of birth and death. This is similar to the way in which the morphogenetic field of the human being coordinates the entire body even though the cells and tissues within the body are continuously changing.

RITUALS: SPIRITUAL AND SECULAR

There are certain contexts in which social memory not only becomes conscious but is actually invoked in all societies; this is through ritual. Rituals are found in all societies all over the world, both in cultural and religious contexts. For example, in our own society the Jewish feast of Passover recalls the dreadful visitation of death throughout Egypt when all the first?born were killed, except the first born of the Jews who were protected by the ritual blood of sacrificial lambs smeared on the doorways of Jewish houses. In the Christian Mass, the ritual of Holy Communion, in which Christians drink the blood and eat the body of Jesus ? refers back to the primal Last Supper when the Passover feast was transformed and Jesus himself became the sacrificial victim.

In every society there are also hundreds of social and cultural rituals. In America, there is the national custom of the Thanksgiving dinner which commemorates the first Thanksgiving dinner offered by Pilgrims upon their safe settlement in New England. We also have many minor rituals of everyday life, such as the rituals of greeting and parting. Saying good?bye, for example, originally meant "God be with you." When we say good?bye, we give a ritualized blessing which retains some of the power of the original ritual, even though most people are no longer conscious of its original meaning. Similar ritual acts on large and small scales permeate even our modern "enlightened" societies.

What do people think they're doing in rituals? In major rituals, the ritual is usually associated with a story which refers back to a frequently forgotten primal event. For example, Guy Fawkes night is a secular ritual in England: every November 5th, bonfires are lit all over England, fireworks are set off, and effigies are burned over the bonfires. In this case, the ostensible story concerns a man named Guy Fawkes,

one of the Roman Catholic conspirators in the so?called "Gunpowder Plot" who tried to blow up the House of Parliament in the 17th century.

However, lying behind that supposed explanation is a much older ritual: the Celtic festival of the dead. On November 1st, the ancient Celtic pre-Christian festival of the dead was celebrated whereby the old year was burned in effigy, as effigies are burned on Guy Fawkes day. During this period, it was believed that there was a "crack in time" when the living and the dead, the past, the present, and the future all came together. The eve of the festival of the dead was Halloween, when the spirits and ghosts came out and the dead walked again. Similarly, in the Christian calendar, November 1st is "All Saints Day" and November 2nd is "All Souls Day," when the souls of the departed are commemorated and requiem masses are said in churches even today. So, behind our present?day celebrations lay a much older ritual background: a pattern behind a pattern. Many of these ancient rituals are alive and well in the modern world.

RITUALS AS MORPHIC RESONANCE WITH ANCESTORS

In general, rituals are highly conservative in nature and must be performed in the right way, which is the same way they have been performed in their past. If rituals involve language, the most important of them use sacred languages. For example, Brahmanic rituals in India use Sanskrit, a language which is no longer spoken except by Brahmins, and the Sanskrit phrases must be pronounced the correct way in order for the rituals to be effective. We find a similar practice in a Christian context. The Coptic church in Egypt dates back to ancient times when Coptic was the spoken language; so in modern Cairo, you can attend a Coptic service and the language you hear is the otherwise dead language of ancient Egypt. The survival of ancient Egyptian in the Coptic liturgy was one of the important clues that enabled the unraveling of the language of ancient Egypt with the help of the Rosetta Stone. Similarly, the Russian Orthodox church uses Old Slavic, and, until recently, the Roman Catholic church used Latin. There are hundreds of such examples.

Ritual acts must be performed with the correct movements, gestures, words, and music throughout the world. The same pattern is found from one country to another as participants perform the ritual in the same way it has been performed countless times in the past. When people are asked why they do this, they frequently say that this enables them to participate with their ancestors or predecessors. So rituals have a kind of deliberate and conscious evocation of memory, right back to the first act. If morphic resonance occurs as I think it does, this conservatism of ritual would create exactly the right conditions for morphic resonance to occur between those performing the ritual now and all those who performed it previously. The ritualized commemorations and participatory re-linking with the ancestors of all cultures might involve just that; it might, in fact, be literally true that these rituals enable the current participants to reconnect with their ancestors (in some sense) through morphic resonance.

MANTRAS AS SPIRITUAL TRANSMISSION

In light of this idea, various aspects of religious ritual can be viewed with a new significance. For example, consider the use of mantras in the Eastern traditions. Mantras are sacred sounds or words which often have no explicit meaning. The best

known of the Indian mantras is OM. A Christian mantra (and, in fact, it is also a Jewish and Muslim mantra) is AMEN. Although it translates literally as, "So be it," it has a much deeper significance as a mantric phrase. When chanted in its original form of AMEN, it was an extremely powerful mantra. It survives at the end of Christian prayers and hymns even though most people are unaware of why it is there.

In Tibetan and Hindu tradition, the mantra is communicated to the disciple by the guru (or master) as part of an initiation. Using the mantra, the disciple is able to connect with the guru as well as with the entire tradition that transmitted the mantra through the guru.? In Tibetan Buddhism there is often an actual visualization during the chanting of the mantra. The acolytes visualize the guru who has given it to them floating above their heads, and then visualize the entire lineage of masters and gurus behind him, right back to the Buddha himself. There are Tibetan pictures of people sitting and meditating with a tree growing out of their heads ? a tree filled with faces and figures. These are called "lineage trees," and they represent the spiritual lineage through which the transmission comes to the disciple.

Just as morphic resonance provides a more comprehensible explanation of the power of mantras, it also helps explain certain prohibitions that might not otherwise make sense. All religions have prohibitions on blasphemy (the wrong use of sacred words), such as the Judeo?Christian admonition not to take the Lord's name in vain. People are often instructed to use mantras only in the appropriate context and not to bandy the word around in casual conversation. I myself have heard Hindu gurus caution that inappropriate use will weaken the mantra. This makes impressive sense when explained in terms of morphic resonance: Instead of acting as a key tuning one into the meditative states of one's own past and of the past of the guru or lineage of gurus, the mantra would also tune one into all the casual conversations at which the word had been bandied around. Thus, extraneous influences which would dilute or weaken the intended effect of the mantra would be brought in via the phenomenon of morphic resonance.

RELIGIOUS "PATHS" AND ARTISTIC "SCHOOLS"

Other aspects and characteristics of religious traditions become clear when viewed in terms of morphic fields. Many religious teachers compare their way to a path, as in Christianity when Jesus says, "I am the Way," or as in Buddhism where there is the eight?fold path of the Buddha. The notion is that through a religious initiation, the individual is set on a path which the initiator of the path? Buddha or Christ?has trod before them, and on which many other people since then have also trod. The people who have gone along that path create a morphic field ? and not only those who established the initial path, such as Buddha or Christ, but all those who followed after them contribute to the morphic field, making the pathway easier to traverse. In Christianity the concept is explicitly stated in the Apostles' Creed through the doctrine of the "Communion of Saints." Those who follow the path of Jesus are not only aided by Jesus himself but also by the communion of saints ? all those who have trodden the path before.

If we take the notion of "schools of thought" or "schools of art," we have another area of traditions in which groups of people share in a common ideal and a common pattern of activity. Here again, artistic and philosophical traditions make more sense

when considered in terms of organizing and enduring morphic fields. Art historians write about the flow of influence from the Venetian school to the Flemish school, for example. This mysterious flow of influence could be understood as the result of the process of successive schools of art tuning into the morphic fields of the earlier schools. (I am indebted to Susan Gablik, 1977, for this idea.) If we think of paintings as having morphic fields for their actual structures, we can then see how a kind of "building up" occurs through morphic resonance. A painting in a given school is created; other people see it. Every time a new painting in that school is made, it alters the field of the school. There is a kind of cumulative effect. Just as an animal within a species draws upon the morphic fields of the species and, in turn, contributes to those same fields, a work of art produced within a school draws upon the morphic field of the style of the school and contributes to it, so that the style evolves.

KUHN'S SCIENTIFIC "PARADIGMS" AS MORPHIC FIELDS

A very similar analysis applies to the history of science. We can think of different schools of thought and different areas of inquiry in science as having their own morphic fields. In fact, we speak about the field of physics, the field of biology, the field of geophysics, the field of metallurgy, and so on. It is my opinion that we could take literally the very use of the word field in this context. Within each field of science there are sub?groups: in physics, for example, there are astrophysicists, quantum theorists, and so on, and sub?schools within those sub?groups. Entrants to each must go through the proper initiations; they must study and pass the right exams; and all have their own folklore, mythology, and founding fathers. This is essentially the insight of Thomas S. Kuhn in his great book, The Structure Of Scientific, Revolutions (1970). He says that science is a social activity, and that scientists are initiated into the professional group by the practicing group of scientists. These social groups are self?regulating and self?organizing, just like any other field structure. Scientists strongly resent it if outsiders come along and tell them how to run their outfit. Physicists, for example, feel that they are the best people to judge what should go on in physics. Even if governments want to regulate the science of physics to their own ends, then they do it with the help of physicists. They have to set up committees and grant?giving agencies on which physicists sit for peer group reviews.

We see the same pattern in other professional groups: in trade unions, in the American Medical Association, in groups of engineers, and so on. Kuhn pointed out that at any given time, there is a consensus within each group about the way reality operates and the way that problems should be solved. This is what he called a paradigm. In his book, Kuhn uses the word paradigm in two senses, as he makes clear in his second edition. The paradigm is not just a conceptual way of looking at things, a model; rather, it is a shared consensual view of reality upon which the professional group depends. In each group, the members recognize those they consider proper co?members of the professional group, and those whom they recognize as outsiders ? as not being within their group. This is the social aspect of paradigm.

But a paradigm also includes a model of the way problems can and should be solved. The Newtonian paradigm has a model of the way to solve physical problems;

Newton's gravitational equations are an example of such a model. As students progress through the stages undergraduate, graduate, and post?doctoral work, they are given increasingly difficult problems to solve. But they are always given examples of how these problems should be solved ? a "style" of doing the solving ? which is acceptable within the paradigm.

A shift in paradigm involves both a new way of solving problems (because there is a new way of thinking about the problems involved), and also the building up of a new social consensus among practitioners. Both Gablik and Kuhn have pointed out that the concept of paradigm in the sciences is similar to the notion of style in art: paradigms have the kind of cumulative, developmental, evolutionary quality that characterizes styles in artistic traditions. Indeed, Kuhn went so far as to model his theory of scientific development on art history. Previously, science had been treated as if it were a purely rational activity based on the cumulative building?up of knowledge, completely independent of the social and professional dimensions taking place within the scientific process. Kuhn demonstrated that the same kind of patterns which were accepted by many historians of art were also at work within the sciences.

A view of paradigms as morphic fields helps us to understand why they are so strongly conservative in nature, for once the paradigms are established, there is a large social group contributing to the consensual reality of the paradigm. A very powerful morphic resonance is evolved by this way of doing things; and that is why paradigm changes tend to be rather rare, and why they meet with strong resistance.

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Part III - Extended Mind, Power, & Prayer: Morphic Resonance and the Collective Unconscious

by Rupert Sheldrake

This is the third in our series of essays by Rupert Sheldrake on the implications of his hypothesis of Formative Causation for the psychology of C. G. Jung. The intense controversy this hypothesis generated with the publication of his first book, A New Science of Life (1981), has stimulated a number of international competitions for evaluating his ideas via experimental investigations. The results of these experimental tests are reported in his new book, The Presence of the Past (1988) wherein he writes:

In this book, which is less technical in style, I place the hypothesis of formative causation in its broad historical, philosophical, and scientific contexts, summarize its main chemical and biological implications, and explore its consequences in the realms of psychology, society, and culture. I show how it points towards a new and radically evolutionary understanding of ourselves and the world we live in, an understanding which I believe is in harmony with the modern idea that all nature is evolutionary.

The hypothesis of formative causation proposes that memory is inherent in nature. In doing so, it conflicts with a number of orthodox scientific theories. These theories grew up in the context of the pre-evolutionary cosmology, predominant until the 1960s, in which both nature and the laws of nature were believed to be eternal. Throughout this book, I contrast the interpretations provided by the hypothesis of formative causation with the conventional scientific interpretations, and show how these approaches can be test ed against each other by a wide variety of experiments. Sheldrake begins this essay with an interesting insight regarding the evolution of Jung's and Freud's conceptions of the unconscious out of the previous world view of Soul. He then explores a number of provocative ideas about "mind extended in time and space" that give us fresh perspectives on power, prayer, and consciousness.

We've all been brought up with the 17th century Cartesian view that our minds are located inside our brains. In this view, our minds are completely portable and can be carried around wherever we go, packaged as they are inside our skulls. Our minds, therefore, are essentially private entities associated with the physiology of each of our nervous tissues. This idea of the contracted mind, a mind which is not only rooted in the brain but actually located in the brain, is an idea that is so pervasive in our culture that most of us acquire it at an early age. It is not just a philosophical theory (although, of course, it is that); it is an integral part of the materialistic view of reality.

SOUL, MIND, AND CONSCIOUSNESS

Our understanding of the concepts of mind and soul is actually a question of how we define the word consciousness. I prefer to view the attribute of consciousness as being restricted to human beings and, perhaps, some of the higher order of animals in which one could say there was some kind of self consciousness. Much of the behavior which we consider to be mentally organized, however, actually arises out of

unconscious processes. Riding bicycles with great skill, for example, does not involve conscious memory; it does not involve conscious thought. Bike riding utilizes a body memory that involves a great deal of unconscious action and doing. We acquire many complex skills on an unconscious level skiing, swimming, piano playing, and so on.

Such learning is notoriously difficult to describe in words because it does not involve conscious thought in the normal pattern of thought as a directed intellectual activity. A more useful concept that is difficult for us to use nowadays because its meaning is obscure to most people is the concept of the soul. In Aristotle's system, animals and plants had their own kind of soul, as did nature as a whole. This was the animistic view: the idea that there was an "anima" or soul in all living things. (Inanimate matter did not have a soul.) The very word animal, of course, comes from the word anima, meaning soul: animals are beings with soul. Actually, prior to the 17th century, it was believed that all of nature, and the earth as a whole, had a soul; the planets all had a soul. But the concept of soul was banished by 17th century mechanistic science.

The older view of soul is, I think, a better concept than that of consciousness. The word closest to it in modern usage is mind. The modern usage of mind, however, is almost identical with the word consciousness; mind incorrectly implies consciousness. We then have to use the term, unconscious mind, as Jung and Freud did. This usage has appeared to be a contradiction in terms to the academic world, so they have tended to reject it (and Jung's and Freud's conceptions of it, as well). The concept of soul, however, does not necessarily imply consciousness. The vegetative soul, which is the kind of soul that organizes the embryo and the growth of plants, was not viewed as functioning on a conscious level. When we grow as embryos, we don't have any memory of the process. We don't consciously think out, "the heart comes here, and I know I'll develop a limb out there, teeth here," and so forth. These things just seem to happen in a way that is tacit, implicit, or unconscious but yet soul like in the way they are organized.

Until the time of Descartes, three levels of soul were conceived. The vegetative soul contained the form of the body and governed embryology and growth; all animals and plants were viewed as having it. Then there was the animal soul, which concerned movement, behavior, instincts, and so on; all animals as well as humans were seen as having this level soul. Over and above the vegetative and animal soul in human beings was the rational soul, which was experienced as the more intellectual, conscious mind.

Descartes contended that there was no such thing as vegetative or animal souls. All animals and plants were dead, inanimate machines. The body itself was viewed as nothing more than a machine. It did not have an animal soul governing unconscious instincts and patterns. Those processes were entirely mechanical in nature. The only kind of soul human beings had, on the other hand, was the rational, conscious soul: "I think; therefore I am." Thinking thus became the very model of conscious activity or mental activity, and in this way, Descartes restricted the concept of soul or spirit to the conscious, thinking, rational portion of the mind, which reached its highest pinnacle in the proofs of mathematics. Descartes' perspective left us with the idea that the only kind of consciousness worthy of the name was "rational consciousness" especially mathematical, scientific consciousness. In a sense, Descartes created the

problem of the unconscious, for within 50 years of his work, people started saying, "Wait a minute, there's more to us than just this conscious mind, because there are things that influence us that we are not conscious of." Thus the idea of the unconscious mind, which we generally regard as having been invented by Freud, was actually invented again and again and again after Descartes. By defining the mind as solely the conscious part and defining everything else as dead or mechanical, Descartes created a kind of void that demanded the reinvention of the idea of the unconscious side of the mind (which everyone before Descartes had simply taken for granted in the soul concept). (There is an excellent book on this subject by L.L. Whyte called The Unconscious before Freud, published by Julian Friedman, London, 1979.)

The problem we are encountering now is that, having eliminated the concept of soul in the 17th century, we are left with concepts such as mind which are not really adequate for what we mean. If we want to get closest to what people meant by soul in the past, the modern concept of field is the most accurate approximation. Prior to Isaac Newton's elucidation of the laws of gravity, gravitational phenomena were explained in terms of the anima mundi, the soul of the world or universe. The soul of the world supposedly coordinated the movements of the planets and stars and did al! the things that gravitation did for Newton. Now from Einstein, we have the idea of space time gravitational fields that organize the universe. In this concept of fields one can see aspects of the anima mundi (soul) as being of the universe. Souls were invisible, nonmaterial, organizing principles. Fields, especially morphic fields, are invisible, nonmaterial, organizing principles that do most of the things that souls were believed to do.

MIND EXTENDED IN TIME AND SPACE

In Jean Piaget's book, The Child's Conception of the World, he describes how by the age of about ten or eleven, children learn what he calls the "correct view" that thoughts, images, and dreams are invisible "things" located inside the brain. Before that age they have the "incorrect view" (as do so-called primitive people) that thoughts, images, and dreams happen outside the brain.

The Cartesian view of the mind as being located in the brain is so pervasive that all of us are inclined to speak of our minds and brains as if they were interchangeable, synonymous: "It's in my brain," rather than "it's in my mind." In the 20's and 30's, various philosophers and psychologists, particularly Koffka, Uhler, and Wertheimer of the Gestalt school challenged this view.

I want to argue that our minds are extended in several senses. In previous articles, we discussed how our minds are extended in both space and time with other people's minds, and with the group mind or cultural mind by way of their connection to the collective unconscious. Insofar as we tune into archetypal fields or patterns which other people have had, which other social groups have had, and which our own social group has had in the past, our minds are much broader than the "things" inside our brains. They extend out into the past and into social groupings to which we are linked, either by ancestry or by cultural transmissions. Thus, our minds are extended in time, and 't believe they are also extended in space.

Throughout this article, I want to make a simple point that is a very radical departure from traditional theory. The traditional theory of perception is that light rays reflected from objects travel through electromagnetic fields, are focused by the lens of the retina, and thereby produce an image on the retina. This triggers off electrical changes in the receptor cells of the retina leading to nerve impulses going up the optic nerve into the cerebral cortex. An image of an object somehow springs into being inside my cerebral cortex, and something or someone inside sees it. A "little man in my brain" somehow sees this image in the cerebral cortex and falsely imagines that the image is "out there," when, in fact, it is "in here." Personally, I find this explanation extremely implausible. In my experience, my image of an object is right where it seems to be: outside of me. If I look out the window, my perceptual field is not inside me but outside me. That is, the objects are indeed outside me, and my perception of them is also outside me. I'm suggesting that in our perceptual experience, the perceptual fields extend all around us. While, as the traditional view holds, there is an inward flow of light impulses which eventually lead up to the brain, I also experience an outward projection of the images from my mind. The images are projected out, t and in normal perception, the projection out and the flow in coincide, so that I see an image of an object where the object really is located.

In hallucinatory types of perception, I can see images whether they are there, in fact, or not. Consider "psychic blindness": people can be hypnotized so that they no longer see objects which are actually in their view. In such a case of "psychic blindness," the inward flow is present but not the outward projection. More normally, the movement out and the movement in coincide with each other as part of a coordinated process, creating a perceptual field that embraces both the observer and the object.

This idea of the extended mind is a matter of common belief in ancient and traditional societies. If this concept were true, it would mean that we could influence things or people just by looking at them. In India, for example, it is believed that a person who either looks on a holy man, or is himself looked on by the holy man, receives a great blessing. In many parts of the world, including India, Greece, and the Middle East, it is believed that if you look upon something with the eye of envy - the "evil eye" - you therefore blight it. People in many cultures still take great precautions against this so-called evil eye. In India, it is considered to be extremely unlucky for a childless woman to admire a baby who belongs to another woman (whereas in our society, this is merely good manners). This is because she is assumed to be envious of the baby. Once a childless woman breaks this taboo, rituals must be performed (such as making a circle of salt around the baby and reciting various mantras) to exorcise the harmful influence.

When new buildings go up in India, scarecrows are fixed on the buildings; similarly, when there is a good crop of wheat or rice, scarecrows are placed in the field. These scarecrows are not intended to "scare away crows" literally, but rather to attract the evil eye of people who might otherwise blight the crop by looking upon it with envy. The scarecrows act as "lightning conductors" because anything with a human figure attracts the eye. The Indian people also put out round pots with huge white spots stuck on sticks; the eyes are drawn to the pots because the white spots took like eyes. For similar reasons, people throughout the Middle East wear talismans which contain eyes; in Egypt, the eye of Horus serves a similar function. All this is done to protect against the evil eye.

If we do affect things or people by looking at them, then can people perceive when they are being looked at, even when they cannot actually see some one looking at them. In both realms of fictional literature and real-life experience, many people claim to have had the experience of knowing they were being watched and then turning round and seeing someone staring at them. As undergraduates at Cambridge, some of us had read a Rosicrucian advertisement about the power of the mind. It said something about, "Try this simple experiment: look at the back of someone's neck and see if they will turn round after a few minutes." During boring lectures we acted as suggested, and it often worked; we found that we could fix our attention on the back of someone's neck and after a minute or two, the person often looked uncomfortable and turned round.

Although there is a great deal of anecdotal evidence that people sense when they are being watched, there is almost no scientific investigation of this phenomenon. The entire world literature on the subject that I've been able to find consists of three papers: one written in 4896, the next one in 1910, and a final paper in 1953. Two of the papers show positive effects, although they were both done on very small subject populations.

I've done some simple preliminary experiments over the last few months in workshops. The way we conducted the experiment was very simple. Four people volunteered and sat at one end of the room, with their backs turned toward the audience. We put each person's name on his or her back by way of identifying them. Then, in a series of trials, I would hold up cards in a random sequence containing the name of the person the audience was to watch. For example, if I had selected "Tom," I would hold up a card reading, "Trial 1, Tom," and everyone in the audience would stare at the back of Tom's neck for fifteen seconds. At the end of each trial, all four subjects would write down whether or not they thought they were being looked at during that time period. At the end of the series of trials, we compared when the volunteers thought they were being looked at, with whether or not they really were being observed.

My results so far indicate that people vary tremendously in their degree of sensitivity to being watched. In one workshop I conducted in Amsterdam, there was a woman who was 100 percent accurate; she knew each time she was being watched. She was the best subject I've encountered. When I asked if she knew why she had done so well, she said that as a child she used to play this game with her brothers and sisters. They practiced and she got very good at it; she had volunteered because she was sure she'd still be able to do it, even though she hadn't done it for 20 or 30 years.

A friend of mine has been conducting this experiment in one-on-one trials with friends and colleagues. In over 600 trials ping 65 - 70% of the time, which is statistically significant. indicate that there is an outgoing influence from the eyes or from the mind; perhaps mental influence does extend beyond the boundaries of the physical body. It has been suggested that this might be a telepathic rather than a visual influence. There is a simple method of checking that out. In some trials, the people doing the looking could turn around so that they are facing away from the volunteers and just think about the designated volunteer rather than look at him or

her. If there was greater effect when the volunteers were actually being looked at than when they were being thought about, then one could be type was functioning.

A variation of this experiment is to examine the effect of distance on the perception of the subjects. Have the person being looked at located at a considerable distance from those looking at him (binoculars could be used) and then see if the effect still works. If it does, then set up trials using video or closed circuit television. Imagine an experiment in which there were four people in a studio (or even in different studios), with cameras running continuously, and a randomized switching device so that the person being looked at in each trial is randomly determined. Imagine a typical television audience of millions of viewers. Now, what if the subjects could distinguish when they were being looked at by other people over television. There one would have a massive, large-scale demonstration of extended mind in a way that could be conclusive.

This format, too, could be extended. You could have people looking at subjects in the Soviet Union via satellite linkups; one could elaborate this pattern indefinitely. What happens to actresses and actors, to prominent political figures, when they are looked at by millions of people? Are they affected by being in people's minds?

Large-scale experiments to test hypotheses could do more to bring about a paradigm shift than any amount of lecturing about the limitations of the mechanistic theory. Our perceptual fields may reach far beyond our physical brains; when we look at the stars, our minds may literally reach to the stars. There may be almost no limit on how far this process can extend.