Part I: Mind, Memory, and Archetype: Morphic Resonance and the Collective Unconscious
by Rupert Sheldrake (Psychological Perspectives, 1997)

Rupert Sheldrake is a theoretical biologist whose book, A New Science of Life: The Hypothesis of Formative Causation (Tarcher, 1981) evoked a storm of controversy. Nature described it as "the best candidate for burning, " while the New Scientist called it "an important scientific inquiry into the nature of biological and physical reality. " Because his work has important implications for Jung's concepts of the archetype and the collective unconscious, we have invited Sheldrake to present his views in a series of four essays which will appear in successive issues of PSYCHOLOGICAL PERSPECTIVES. These essays will be updates of his presentation on "Morphic Resonance and the Collective Unconscious, " which he gave in May of 1986 at the Human Relations Institute in Santa Barbara. Audio recordings were made by Alpha Omega Cassette Enterprises of Pasadena, California.

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.