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MORPHIC FIELDS

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Ervin Laszlo's concept of the Akashic Field includes the idea of a cosmic memory. This field is a universal field, and Laszlo's (2004) scientific starting point is the physics of the vacuum underlying space itself. A similar idea of a memory in nature arises from the hypothesis of formative causation, with its central concept of morphic fields. This hypothesis arose from biology rather than physics. Morphic fields help to explain embryology, biological development, habits, memories, instincts, telepathy, and the sense of direction. They have an inherent memory. In its most general form this hypothesis implies that many of the so-called laws of nature are more like habits.

KEYWORDS: Akashic Field, formative causation, habit, morphic fields.

THE FIELDS OF MORPHOGENESIS

My interest in these fields first developed while I was doing research on the development of plants at Cambridge University. To start with, I was concerned only with one particular kind of morphic field, namely morphogenetic fields.

How do plants grow from spores or seeds into the characteristic form of their species? How do the leaves of ferns, oaks and bamboos take up their shapes? These are questions to do with what biologists call *morphogenesis*, the coming-into-being of form (Greek: *morphe* = form; *genesis* = coming into being), one of the great unsolved problems of biology.

The naive approach is simply to say that morphogenesis is genetically programmed. Different species just follow the instructions in their genes. But a few moments' reflection shows that this reply will not do. All the cells of the body contain the same genes. In your body the same genetic program is present in your eyes, kidneys and fingers. If they are all programmed identically, then how do they develop so differently?

Thanks to the great triumphs of molecular biology, we know what genes actually do. Some code for the sequence of amino acids in proteins; others are involved in the control of protein synthesis. They enable organisms to make particular proteins. But these alone cannot account for form. Your arms and your legs are chemically identical. If ground up and analyzed biochemically, they would be

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indistinguishable. But they have different shapes. Something other than the genes and the proteins they code for is needed to explain their form.

Biologists who study the development of form in plants and animals have long been aware of these problems, and since the 1920s many have adopted the idea that developing organisms are shaped by fields called *morphogenetic fields*. These are rather like invisible blueprints that underlie the form of the growing organism. But they are not, of course, designed by a architect, any more than a "genetic program" is supposed to be designed by a computer programmer. They are fields: self-organizing regions of influence, analogous to magnetic fields and other recognized fields of nature.

But no one knows what these fields are or how they work. Most biologists assume that they will at some time in the future be explained in terms of regular physics and chemistry. This is no more than an act of faith.

After ten years of research in developmental biology, I came to the conclusion that these fields were not just a way of talking about standard mechanistic processes, but something really new.

This was the starting point for my own development of the hypothesis of morphic fields, first proposed in my book *A New Science of Life* (Sheldrake, 1981) and further developed in *The Presence of the Past* (Sheldrake, 1988a).

THE HYPOTHESIS OF MORPHIC FIELDS

All self-organizing systems are wholes made up of parts, which are themselves wholes at a lower level, such as atoms in molecules and molecules in crystals. The same is true of organelles in cells, cells in tissues, tissues in organs, organs in organisms, organisms in social groups. At each level, the morphic field gives each whole its characteristic properties, and interconnects and coordinates the constituent parts.

The fields responsible for the development and maintenance of bodily form in plants and animals are called morphogenetic fields. In animals, the organization of behavior and mental activity depends on behavioral and mental fields. The organization of societies and cultures depends on social and cultural fields (Sheldrake, 1981). All these kinds of organizing fields are morphic fields (Sheldrake, 1988a).

Morphic fields are located within and around the systems they organize. Like quantum fields, they work probabilistically. They restrict, or impose order on, the inherent indeterminism of the systems under their influence. Thus, for example, a protein field organizes the way in which the chain of amino acids (the "primary structure," determined by the genes) coils and folds up to give the characteristic three-dimensional form of the protein, "choosing" from among many possible structures, all equally possible from an energetic point of view. Social fields coordinate the behavior of individuals within social groups, for example the behavior of fish in schools, or birds in flocks (Sheldrake, 1988a).

The mathematician René Thom has created mathematical models of morphogenetic fields in which the end-point toward which systems develop are defined as *attractors* (Thom, 1975, 1983). In the branch of mathematics known as dynamics, attractors represent the limits toward which dynamical systems are drawn. They

provide a scientific way of thinking about ends, purposes, goals, or intentions. All morphic fields contain attractors.

The most controversial feature of this hypothesis is that the structure of morphic fields depends on what has happened before. They contain a kind of memory. Through repetition the patterns they organize become increasingly probable, increasingly habitual. The force these fields exert is the force of habit.

Whatever the explanation of its origin, once a new morphic field, a new pattern of organization, has come into being, through repetition the field becomes stronger. The same pattern becomes more likely to happen again. The more often patterns are repeated, the more probable they become. The fields contain a kind of cumulative memory and become increasingly habitual. Fields evolve in time and form the basis of habits. From this point of view nature is essentially habitual. Even the so-called laws of nature may be more like habits.

The means by which information or an activity-pattern is transferred from a previous to a subsequent system of the same kind is called morphic resonance. Morphic resonance involves the influence of like on like, the influence of patterns of activity on subsequent similar patterns of activity, an influence that passes through or across space and time from past to present. These influences do not to fall off with distance in space or time. The greater the degree of similarity, the greater the influence of morphic resonance.

Morphic resonance gives an inherent memory in fields at all levels of complexity. Any given morphic system, say a squirrel, "tunes in" to previous similar systems, in this case previous squirrels of its species. Through this process each individual squirrel draws on, and in turn contributes to, a collective or pooled memory of its kind. In the human realm, this kind of collective memory corresponds to what the psychologist C. G. Jung called the "collective unconscious."

Morphic resonance should be detectable in the realms of physics, chemistry, biology, animal behavior, psychology, and the social sciences. But long-established systems, such as zinc atoms, quartz crystals, and insulin molecules are governed by such strong morphic fields, with such deep grooves of habit, that little change can be observed. They behave *as if* they are governed by fixed laws.

By contrast, new systems should show an increasing tendency to come into being the more often they are repeated. They should become increasingly probable; they should happen more easily as time goes on. For example, when a new chemical compound is synthesized by research chemists and crystallized, it may take a long time for the crystal to form for the first time. There is no pre-existing morphic field for the lattice structure. But when the first crystals form, they will make it easier for similar crystals to appear anywhere in the world. The more often the compound is crystallized, the easier it should be to crystallize.

In fact new compounds do indeed tend to crystallize more easily the more often they are made. Chemists usually explain this effect in terms of crystal "seeds" from the new crystals spreading around the world as invisible dust particles in the air, or chemists learning from others how to do it. But the hypothesis of morphic fields predicts that this should happen anyway under standardized conditions, even if dust particles are filtered out of the air.

CONNECTIONS WITH QUANTUM PHYSICS

Experiments to test for the spatial aspects of morphic fields imply a kind of non-locality that is not at present recognized by institutional science. Nevertheless, it may turn out to be related to the non-locality or non-separability that is an integral part of quantum theory, implying connections or correlations at a distance undreamt of by classical physics. Albert Einstein found the idea of "spooky action at a distance" implied by quantum theory deeply distasteful; but his worst fears have come true (Davies and Gribbin, 1991). Recent experimental evidence shows that these connections lie at the heart of physics.

Several physicists have been intrigued by the possible connections between morphic fields and quantum theory, including John Bell (of Bell's theorem) and David Bohm, whose theory of the implicate order, based on the non-separability of quantum systems, turned out to be extraordinarily compatible with my own proposals (Bohm and Sheldrake, 1997). These connections have also been explored by the American quantum physicist Amit Goswami (1997) and by the German quantum physicist Hans-Peter Dürr (1997). Ervin Laszlo's idea of the Akashic Field would imply a connection between the memory processes in the quantum vacuum field and morphic resonance.

But it is still not clear exactly how morphic field might fit in with quantum physics, if only because the implications of quantum theory for complex systems like cells and brains are still obscure.

MORPHIC RESONANCE IN BIOLOGY

The hypothesis of morphic fields is a scientific hypothesis, and as such is experimentally testable. There are several possible ways in which it can be, and has been, investigated by experiment. Some of these tests attempt to detect the fields as they link together different parts of a system in space; other tests look for the effects of morphic resonance over time. I will first discuss research on morphic resonance, then on the fields themselves.

The build-up of habits can be observed experimentally only in the case of new patterns of development and behavior.

There is already evidence from observations on fruit flies that morphic resonance effects may be occurring in the realm of morphogenesis. When fruit fly eggs were exposed to a chemical (diethyl ether), some of them developed abnormally, turning into flies with four wings instead of two. When this treatment was repeated generation after generation, more and more flies developed four wings, even if their ancestors had never been exposed to the chemical (Sheldrake, 1988a).

There is also much circumstantial evidence that animal behavior can evolve rapidly, as if a collective memory is building up through morphic resonance. In particular, large-scale adaptations have occurred in the behavior of domesticated animals all over the world.

One example concerns cattle guards (known as cattle grids in Britain). Ranchers throughout the American West have found that they can save money on

cattle guards by using fake ones instead, consisting of stripes painted across the road. Real cattle guards are made of a series of parallel steel tubes or rails with gaps in between, which make it difficult for cattle to walk across them, and even painful to try. However, present-day cattle do not usually even try to cross them. The illusory grids work just like the real ones. When cattle approach them, they "put on brakes with all four feet," as one rancher expressed it to me.

Is this just because calves learn from older cattle that they should not try to cross? Apparently not. Several ranchers have told me that herds not previously exposed to real cattle grids will avoid the phoney ones. And Ted Friend, of Texas A & M University, has tested the response of several hundred head of cattle to painted grids, and has found that naive animals avoid them just as much as those previously exposed to real grids (Sheldrake, 1988b). Sheep and horses likewise show an aversion to crossing painted grids. This aversion may well depend on morphic resonance from previous members of the species that have learned to avoid cattle grids the hard way.

There are many such examples. There are also data from laboratory experiments on rats and other animals that such effects occur. The best known involves a series of experiments in which subsequent generations of rats learned how to escape from a water maze. As time went on, rats in laboratories all over the world were able to do this quicker and quicker (Sheldrake, 1988a).

MORPHIC RESONANCE IN HUMAN LEARNING

Morphic resonance has many implications for the understanding of human learning, including the acquisition of languages. Through the collective memory on which individuals draw, and to which they contribute, it should in general be easier to learn what others have learned before.

This idea fits well with the observations of linguists like Noam Chomsky, who propose that language learning by young children takes place so rapidly and creatively that it cannot be explained simply in terms of imitation. The structure of language seems to be inherited in some way. In his book *The Language Instinct* Steven Pinker gives many examples to support this idea.

One of the few areas in which detailed quantitative data are available over periods of decades is in the scores of IQ (Intelligence Quotient) tests. If morphic resonance occurs, average performance in IQ tests should be rising not because people are becoming more intelligent, but because IQ tests should be getting easier to do as a result of morphic resonance from the millions who have done them before. This effect is now well known, and is called the Flynn effect, after its discoverer, James Flynn.

Large increases in IQ test scores have occurred in many different countries, including the U.S., Japan, Britain, France, Germany, and Holland (Flynn, 1987). Many attempts have been made to explain this "Flynn effect," but none have succeeded (Horgan, 1995; Neisser et al., 1996). Flynn himself describes it as "baffling" (in Horgan, 1995). But morphic resonance could provide a natural explanation.

THE MORPHIC FIELDS OF SOCIAL GROUPS

The easiest way to test for morphic fields directly is to work with societies of organisms. Individual animals can be separated in such a way that they cannot communicate with each other by normal sensory means. If information still travels between them, this would imply the existence of interconnections of the kind provided by morphic fields. The transfer of information through morphic fields could help provide an explanation for telepathy, which typically takes places between members of groups who share social or emotional bonds.

When I started looking for evidence of fieldlike connections between members of social groups, I found that I was moving into realms very little understood by science. For example, no one knows how societies of termites are coordinated in such a way that these small, blind insects can build complex nests with an intricate internal architecture (Sheldrake, 1994). No one understands how flocks of birds or schools of fish can change direction so quickly without the individuals bumping into each other (Sheldrake, 1988a). Likewise, no one understands the nature of human social bonds.

One particularly promising area for this kind of research concerns telepathy between people and domesticated animals, as discussed in my book*Dogs That Know When Their Owners Are Coming Home* (1999).

Telepathy literally means "distant feeling," and typically involves the communication of needs, intentions, and distress. Sometimes the telepathic reactions are experienced as feelings, sometimes as visions or the hearing of voices, and sometimes in dreams. Many people and pets have reacted when people they are bonded to have had an accident, or are dying, even if this is happening many miles away.

There is an analogy for this process in quantum physics: if two particles have been part of the same quantum system and are separated in space, they retain a mysterious connectedness. When Einstein first realized this implication of quantum theory, he thought quantum theory must be wrong because it implied what he called a "spooky action at a distance." Experiments have shown that quantum theory is right and Einstein wrong. A change in one separated part of a system can affect another instantaneously. This phenomenon is known as quantum non-locality or non-separability.

Educated people have been brought up to believe that telepathy does not exist. Like other so-called psychic phenomena, it is conventionally dismissed as an illusion. There is a taboo against taking telepathy seriously, a taboo dating back at least as far as the Enlightenment at the end of the 18th century.

I first became interested in the subject of telepathy some fifteen years ago, and started looking at evidence for telepathy in the animals we know best, namely pets. I soon came across numerous stories from owners of dogs, cats, parrots, horses, and other animals that suggested that these animals seemed able to read their minds and intentions.

Through public appeals I have built up a large database of such stories, currently containing more than 3,500 case histories. These stories fall into several categories. For example, many cat owners say that their animal seems to sense when they are planning to take them to the vet, even before they have taken out the carrying

basket or given any apparent clue as to their intention. Some people say their dogs know when they are going to be taken for a walk, even when they are in a different room, out of sight or hearing, and when the person is merely thinking about taking them for a walk. Of course, no one finds this behavior surprising if it happens at a routine time, or if the dogs see the person getting ready to go out, or hear the word "walk." They think it is telepathic because it seems to happen in the absence of such clues.

One of the most testable claims about dogs and cats is that they know when their owners are coming home, in some cases anticipating their arrival by ten minutes or more. In random household surveys in Britain and America, my colleagues and I have found that approximately 50% of dog owners and 30% of cat owners believe that their animals anticipate the arrival of a member of the household. Many dogs and cats seem to know when their owners are coming home when no one at home knows when they are coming. The animals seem to be responding telepathically to their owners' intentions (Sheldrake and Smart, 2000a, 2000b)

Through hundreds of videotaped experiments, my colleagues and I have shown that dogs react to their owners' intentions to come home when they are many miles away, even when they return at randomly chosen times, and even when they travel in unfamiliar vehicles such as taxis. Telepathy seems the only hypothesis that can account for the facts. (For more details, see my book *Dogs that Know When their Owners Are Coming Home, And Other Unexplained Powers of Animals* [1999].)

The unsolved problems of animal navigation, migration, and homing may also depend on invisible fields connecting the animals to their destinations (Sheldrake, 1999). In effect, these could act like invisible elastic bands linking them to their homes. In the language of dynamics, their home can be regarded as an *attractor* (Sheldrake, McKenna, and Abraham, 1998).

HUMAN TELEPATHY

Morphic fields link together members of social groups in the human realm, just as they do in animal societies. They act as channels for the transfer of information between separated members of the group.

Laboratory studies by parapsychologists have already provided significant statistical evidence for human telepathy (Radin, 1997). But most laboratory research has given rather weak effects, probably because most participants and "senders" were strangers to each other, and telepathy normally depends on social bonds.

In the course of my research on unexplained powers of animals, I heard of dozens of dogs and cats that seemed to anticipate telephone calls from their owners. For example, when the telephone rings in the household of a noted professor at the University of California at Berkeley, his wife knows when her husband is on the other end of the line because Whiskins, their silver tabby cat, rushes to the telephone and paws at the receiver. "Many times he succeeds in taking it off the hook and makes appreciative miaws that are clearly audible to my husband at the other end," she says. "If someone else telephones, Whiskins takes no notice." The cat responds even when he telephones home from field trips in Africa or South America.

This led me to reflect that I myself had had this kind of experience, in that I had thought of people for no apparent reason who shortly there afterward called. I asked my family and friends if they had ever had this experience, and I soon found the majority were very familiar with it. Some said they knew when their mother or boyfriend or other significant person was calling because the phone sounded different!

Through extensive surveys, my colleagues and I have found that the most people have had seemingly telepathic experiences with telephone calls. Indeed this is the commonest kind of apparent telepathy in the modern world.

Is this all a matter of coincidence, and selective memory, whereby people only remember when someone they were thinking about rang, and forget all the times they were wrong? Most sceptics assume that this is the case, but until recently there had never been any scientific research on the subject at all.

I have developed a simple experiment to test for telephone telepathy. Participants receive a call from one of four different callers at a prearranged time, and they themselves choose the callers, usually close friends or family members. For each test, the caller is picked at random by the experimenter by thowing a die. The participant has to say who the caller is before the caller says anything. If people were just guessing, they would be right about one time in four, or 25% of the time.

We have so far conducted more than 800 such trials, and the average success rate is 42%, very significantly above the chance level of 25%, with astronomical odds against chance (10^{26} to 1) (Sheldrake and Smart, 2003a, 2003b).

We have also carried out a series of trials in which two of the four callers were familiar, although the other two were strangers, whose names the participants knew, but whom they had not met. With familiar callers, the success rate was 56%, highly significant statistically. With strangers it was at the chance level, in agreement with the observation that telepathy typically takes place between people who share emotional or social bonds.

In addition, we have found that these effects do not fall off with distance. Some of our participants were from Australia or New Zealand, and they could identify who was calling just as well as with people down under as with people only a few miles away. This research is summarized in my book *The Sense of Being Stared At* (Sheldrake, 2003).

PERCEPTUAL FIELDS

Where are our minds located? We have been brought up to believe that they are inside our heads, that mental activity is nothing but brain activity. Instead, I suggest that our minds extend far beyond our brains; they stretch out through perceptual fields that link us to our environment and to each other.

Perceptual fields are rooted in brains, just as magnetic fields around magnets are rooted in the magnets themselves, and just as the fields around mobile phones are rooted in the phones and their internal electrical activities. As magnetic fields extend around magnets, and electromagnetic fields around mobile phones, so perceptual fields extend around brains.

According to the conventional theory of vision, there is a one-way process: light moves in to the eyes, and causes changes in the retina, optic nerves, and brain, but nothing is projected out.

For all its physiological sophistication, the standard theory has no explanation for our most immediate and direct experience. All your experience is supposed to be inside your brain, a kind of virtual reality show inside your head. That means your skull must lie beyond everything you are seeing: if you look at the sky, your skull must be beyond the sky! This seems an absurd idea, but it seems to be a necessary implication of the mind-in-brain theory.

The idea I am proposing is so simple that it is hard to grasp. Your image of this page is just where it seems to be, in front of your eyes, not behind your eyes. It is not inside your brain, but outside your brain.

Thus vision involves both an inward movement of light, and an outward projection of images. Through perceptual fields our minds reach out to touch what we are looking at. If we look at a mountain ten miles away, our minds stretch out ten miles. If we gaze at distant stars our minds reach out into the heavens, over literally astronomical distances. According to the hypothesis of formative causation, perceptual fields are particular kinds of morphic fields. They extend beyond the brain into the environment, and because they link us to the objects of our perception, we are capable of affecting what we look at through our intention and attention (Sheldrake, 1981). For example, we may be able to affect someone by looking at her from behind, when she has no other way of knowing that we are staring at her.

The sense of being stared from behind is in fact a common experience. Surveys show that more than 90% of people have had experiences such as these. The sense of being stared at should not occur if attention is all inside the head. But if it stretches out and links us to what we are looking at, then our looking could affect what we look at. Is just an illusion, or does the sense of being stared at really exist?

This question can be explored through simple, inexpensive experiments. People work in pairs. One person, the subject, sits with his or her back to the other, wearing a blindfold. The other person, the looker, sits behind the subject, and in a random series of trials either looks at the subject's neck, or looks away and thinks of something else. The beginning of each trial is signaled by a mechanical clicker or bleeper. Each trial lasts about ten seconds and the subject guesses out loud "looking" or "not looking." Detailed instructions are given on my website, www.sheldrake.org.

More than 100,000 trials have now been carried out, and the results are overwhelmingly positive and hugely significant statistically, with odds against chance of quadrillions to one. The sense of being stared at even works when people are looked at through closed-circuit TV (Sheldrake, 2003, 2005).

This sense is not confined to the human realm. A sensitivity to looks seems widespread in the animal kingdom and may well have evolved in the context of predator–prey relationships: an animal that sensed when an unseen predator was staring would stand a better chance of surviving than an animal without this sense.

EXTENDED MINDS

Telepathy and the sense of being stared at only seem "paranormal" if we define as "normal" the theory that the mind is confined to the brain. But if our minds reach out beyond our brains, just as they seem to, and connect with other minds, just as they seem to, then phenomena like telepathy and the sense of being stared at seem normal. They are certainly normal in the sense that they are common. They are not spooky and weird, on the margins of abnormal human psychology, but are part of our biological nature.

Of course, I am not saying that the brain is irrelevant to our understanding of the mind. It is very relevant, and recent advances in brain research have much to tell us. Our minds are centred in our bodies, and in our brains in particular. However, that they are not *confined* to our brains, but extend beyond them. This extension occurs through the fields of the mind that exist both within and beyond our brains.

The idea of the extended mind makes better sense of our experience than the mind-in-brain theory. Above all, it liberates us. We are no longer imprisoned within the narrow compass of our skulls, our minds separated and isolated from each other. We are no longer alienated from our bodies, from our environment and from other people. We are interconnected.

IMPLICATIONS

The hypothesis of formative causation has far-reaching implications in all branches of science. For example, morphic fields could revolutionize our understanding of cultural inheritance, and the influence of the ancestors. Richard Dawkins (1976) has given the name "meme" to "units of cultural transmission," and such memes can be interpreted as morphic fields. Morphic resonance also sheds new light on many religious practices, including rituals (Sheldrake and Fox, 1996). Even scientific paradigms can be seen as morphic fields, stabilized by morphic resonance, with a tendency to become increasingly habitual and unconscious the more often they are repeated (Sheldrake, 1988a).

But however wide its implications, this hypothesis has a major inherent limitation. It helps explain how patterns of organization are repeated; but it does not explain how they come into being in the first place. It leaves open the question of evolutionary creativity. Formative causation is compatible with several different theories, ranging from the idea that all novelty is ultimately a matter of chance, to explanations in terms of divine creativity (Sheldrake, 1981, 1988a, 1990).

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