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I wish to begin with some very general introductory remarks. My main question is, "Do phenomena exist that, by their very nature, are resistant to scientific study?" A "Yes" answer would suggest that probably we should revise our scientific method to attempt embracing these phenomena. This, of course, would mean a crisis, but possibly a most productive and important crisis. Having this in mind, I would like to suggest that our current discussion in "pseudosciences' (parapsychology/psychical research, UFOlogy etc.) lacks a most important dimension. Indeed, what could be a priori wrong with the idea of a scientific study of claims of possessing some "hidden powers of mind"? As it is, we face a situation that a century old study by some remarkable scientists has shown and that it that by strict scientific criteria the very reality of "parapsychological" phenomena is still an open question (Ramakrishna Rao and Palmer, 1987; Palmer and Ramakrishna Rao, 1987; Alcock, 1987; Alcock, 1987). A traditional explanation is that the very phenomena to be studied are created by sleight-of-hand, credulity, imagination and concidences. While this explanation has by no means been falsified so far, a most intriguing alternative possibility is that the above mentioned phenomena just cannot be handled within the contemporary scientific method framework. Can we suppose that this quite "romantic" hypothesis has some chance? My personal answer is a hesitant "Yes....possibly yes". (I have to note that the very possibility of the existence of some phenomena able to resist our contemporary scientific approach seems to be a major challenge worthy of further consideration).

What is it that parapsychology/psychical research attempts to tell us? Obviously, that there exists a connection between distant events that is not accounted for by our current body of knowledge in physics. Everything we hope to have learned about this hypothetical interconnection seems to tell us that this link transcends any spatial, and maybe even temporal, limits. Indeed, the effects seem not to obey any clear-cut dependence on physical distance. This seems to be one of the best founded results of the years of modern parapsychological experimentation (Palmer and Ramakrishna Rao, 1987). Some evidence has been collected even in favour of retrocausation (backward causation) that seems to be quite strong by psychical research standards (Schmidt, 1987).

Now, let's turn to the very beginning of our discussion and ask a question: how is one supposed to perform an isolated, repeatable experiment with these supraspatial and supratemporal interactions? Obviously a lot of spatially and temporally distant (nonlocal) unaccounted factors can enter the picture. Do they? Another and best

documented (but quite differently interpreted) result is a so called *experimenter's effect*: influence of the experimenter him/herself (but also of any related personalities) on the outcome of a parapsychological experiment (Ramakrishna Rao and Palmer, 1987; Palmer and Ramakrishna Rao, 1987; Alcock, 1987; Alcock, 1987). This interpenetration of the experiment and the personalities involved seems to be mirrored by a well-known fear of exhibiting paranormal abilities (Tart, 1986). Biographies of both star performers and successful psychical researchers seem not to contradict the fear of some dangerous interdependence of psychical performance and personal life history. Maybe we should also mention a feeling of "gambling one's soul" - that, of course, remains wholly in the realm of one's metaphysical beliefs. As a result, one can even have a strange feeling that paranormal phenomena are possibly a by-product of forces shaping one's personal history. (Am I to call this idea an hypothesis of "nuovo cemento", a kind of "superholistic life force"?) Any speculations along these lines would of course be quite premature. Anyway, a feeling of the universal interconnectedness has been a ground for proposing some independent formulations of an enigmatic elusive holistic principle connecting distant events. I can only make a short mention here of Jung's remarkable concept of synchronicity (Beloff, 1990).

I will now consider in more detail the brilliant and controversial hypothesis of morphic resonance by Sheldrake that has attracted considerable attention from both the general public and also some parts of the scientific community during the last few years (Sheldrake, 1987; Sheldrake, 1988). (Some people would suggest that this is an elaborated hoax instead). Sheldrake's main idea is that Nature has not only laws, but also habits. Similarity breeds more similarity. We can start with a random choice between several roughly equiprobable alternatives. Repeated deliberate (or even random) choice of one variant makes this particular alternative more and more probable. The interaction of this kind is named "morphic resonance" and is supposed to be mediated by a "morphic field". It is supposed that there is no energy transfer during this very specific resonance and also no weakening of the interaction with distance. So in a spirit of mock Zen one can conclude: "no resonance, no field". Or one can make use of the expression coined for synchronicity: "an a-causal connective principle". Proving the real existence of anything like morphic resonance is to mean among many other things the elimination of any trivial interactions leading to the same end. Also, only similar forms (or possibly also similar constellations of events) are supposed to interact this way. But we have no exact guidelines for defining similarity from the "point of view" of morphic resonance. Keeping in mind also that any predictions of the hypothesis are qualitative rather than quantitative, one has an uncomfortable feeling that the morphic resonance is possibly a concept as difficult to prove as anything in the controversial realm of parapsychology. Perhaps, however, the metaphysical perspectives opened by Sheldrake's ideas are more important than the question of falsifiability. Good metaphysics can feed one's thinking in science below the level of explicit formulations and theories.

Having the above mentioned in view, I would like to suggest here a minor change to Sheldrake's original idea that can possibly lead to some not so trivial and maybe even quite far-reaching consequences.

I suppose that any interactions of living organisms via the morphic resonance (or any other "a-causal connecting principle") channel are mediated by the structure of their macromolecules.

To be a bit more specific, let's consider some very simple, very basic ideas. the

biochemical individuality of every organism depends mostly on its nucleic acid sequence. So why not suppose that morphic resonance is also canalized according to DNA and (or) RNA nucleotide sequences. Indeed, morphic resonance must be species specific. No one needs duck habits (or morphogenetic peculiarities) to influence hen behaviour (or morphogenesis). Sheldrake himself likes a TV metaphor. As a TV set creates an interplay of most intricate forms guided by information from invisible electromagnetic fields, so is a living organism supposed to do with the help of morphogenetic fields. Here we are possibly to remember that there are many different TV channels and a tuning mechanism to make a choice. In the case of a living organism there is not too much freedom of tuning and I'll use the term "antenna" to denote a biological carrier of both the antenna (sensu stricto) and tuning mechanism properties. My proposal is that nucleic acid molecules as the agents of our biological identity serve also as molecular antennae for interactions via morphic resonance channels and so it is the nucleic acids structure that determines our morphic resonance directory (all the individuals, who are inter-connected by the morphic resonance channels). Most likely different macromolecules are to link us to different possibly overlapping directories.

It is easy to name DNA and RNA antennae molecules. What is important is that some not too trivial things follow from the simple hypothesis proposed. Let's take a mammalian genome, sized circa a billion nucleotides long, DNA molecule. Obviously we can have 4 in a billionth power of different DNA molecules of the same length. Am I to add that even a number of elementary particles in the visible part of the Universe are practically infinitely smaller than this estimate. What follows is that DNA of a given species is most likely to be unique in our Universe. Morphic resonance makes this uniqueness a natural science kind factor. Some peculiarities of the evolutionary game with morphic resonance include stochastic mutations (neutral evolution) pushing individuals to a species border. Some degeneracy of nucleotide sequences of a given species is certainly to be allowed but this does not influence the conclusions here. The border is armored by species specific morphogenetic processes and behavior patterns supported by morphic resonance. some pressure for generating genocopies for the morphic resonance backed interactions provides the cases of pre-adaptation necessary to cross the species barrier. (One can even imagine - or is it really a remembrance of? - an Adamic ecstasy of a new species just generated, a mixture of feelings of freedom, responsibility and hazard).

What is still lacking in this picture is any movement towards some greater unity (or even Great Unity), of some Omega point, something one would suppose to be inherent to a hypothesis like this. So perhaps one should attempt to include memory in the model of the new brave morphic resonance world!? In my native Estonia it is often told that one who does not remember has no future.... As I have already noted in a different place (Soidla, 1992; Soidla, in preparation), two main properties of Memory one needs to explain are (1) its linearity and (2) its associative character. A simple recording of firing/rest patterns of individual neurons can provide an attractive model of linear memory coding. Taking the normal rate of RNA synthesis (not more than 50 nucleotides/second for a RNA-polymerase molecule) we can build a Lilium/amphibian genome size memory molecule for a human life span. Summary stable RNA content in a typical eukaryotic cell is of the same size range. See Watson, Hopkins, Roberts, Steitz, Weiner, 1987. But, of course, one is to remember that the very idea of molecular coding of memory is still quite controversial. To create a model of associative memory coding one can try a seemingly very mechanistic solution and postulate that together with a master memory string a set of partially overlapping associative

memory engrams are also growing. What seems to be very important is that there exists a ready made solution for interaction of these two types of hypothetical RNA molecules. This is a process of RNA editing, that in the case of Trypanosomal and fungal mitochondria results in addition and deletion of oligoU and oligoC blocks and is directed at least in some cases by a set of guide RNAs (Simpson and Shaw, 1989; Weiner and Maizels, 1990; Benne, 1990). the homo-oligomers involved are an important thing to tie together some very different concepts. To build interacting similar antennae in the basis of real macromolecules one needs to get homopolymers. At the same time various mystical traditions speak of repeating acts of difficult unselfish choice, of unconditional love. This is a process some mystics even call "soul-building". The merging molecular model to be discussed in more details elsewhere (Soidla, in preparation) includes almost pure homopolymer guide RNAs as a basis of mystical experience, a hierarchy of more and more complex RNAs (some of them are guides of guides etc.) and the final master memory engram. I would like to note here an interesting possibility that hallucinogens can induce synthesis of unstable near-homopolymer RNA molecules. At the same time this model of memory is rather conservative. According to Sheldrake, memory provides something like a direct access to past events, an idea that was proposed also by some other thinkers of both past and present (Beloff, Emmet, Morgan, Sheldrake, Thompson, 1981; Marshall, 1960). According to our model, mind is in love with brain and body, and everyday memory is if not 100 then 99% explained by molecular coding only. It is with ultimate existential questions (and maybe with the illuminating cases of "paranormal memory" not to be discussed here) that the molecular antennae concept is to enter the scene with an exact science like precision, based on some very simple, basic and unequivocal chemistry.

Maybe all the above said is a metaphor, maybe - just a dream...No coding, no RNA...No brain...Never mind.

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