

Remote mental interactions and molecular recognition mechanism as different aspects of a same phenomenon?

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Abstract

TGD inspired theory of consciousness together with the notion of many-sheeted spacetime leads to a theory of biosystems as macroscopic quantum systems. Quantum control is based on many-sheeted ionic flow equilibrium: the densities of the superconducting ions control the densities of the ions at atomic spacetime sheets, and are in turn controlled by 'massless extremals' (MEs) distinguishing TGD sharply from Maxwell's electrodynamics. 'MEs' are topological field quanta of the classical radiation fields and ideal for both classical and quantum communications. The hypothesis of topological self-referentiality stating that the topological field quanta of classical fields form a symbolic representation for the system's properties (system contains in its own structure a theory about system) provides a strong interpretative tool. For instance, bound state entanglement is represented by negative energy MEs and the generation of macroscopic bound states essential for the binding of the mental images is accompanied by the liberation of the binding energy as a usable energy. Hence the ability of the system to behave as a single coherent whole and nonlocal quantum metabolism are different sides of the same coin.

MEs and magnetic flux tube structures seem to provide a royal road to the understanding of living systems as macroscopic quantum systems. The pairs formed by MEs and magnetic flux tubes define 'magnetic mirrors' serving as electromagnetic bridges between systems (not only living ones). By fractality, magnetic mirrors provide a common mechanism allowing to understand seemingly totally unrelated phenomena occurring at widely differing length scales. At molecular length scales miracle like molecular recognition mechanisms could be based on MEs serving as electromagnetic bridges between the molecules: the molecules recognizing each other would 'sing in tune' electromagnetically. In TGD framework sensory representations are realized outside brain in terms of magnetic mirrors and 'EEG MEs' are very closely related to this realization. The model of long term memories relies on magnetic mirrors: to remember what happened for a year ago is to look at a magnetic mirror at the distance of half light year. This mechanism gives rise to memories in entire hierarchy of time scales, even water memory could be conscious and realized in this manner. The transformation of p-adic ME to a real one in quantum jump provides a candidate for the transformation of intention to action and is a crucial element of remote mental interactions.

Magnetic mirrors can also serve as bridges between different brains, organisms, and also between living and nonliving systems. This provides a general mechanism for remote mental interactions like hypnosis, telepathy, remote healing, remote vision, identification phenomena, and psychokinesis. Magnetic mirrors make possible feedback so that the active participant (say the healer or the sender of a telepathic message) can gradually learn how to generate the desired effect. The role of the medium is to act as a relay station to which the audience and the sender of the message are connected by magnetic mirrors. The role of medium can be also taken by

'adjunct', an object owned by a healer or healee. In case of E(lectronic) V(oice) P(henomena) the experimenter would act as a medium and the role of the audience would be formally taken by the magnetic tape. The sender of EVP message receives feedback during the receipt of the message and also when the experimenter listens the tape. The message could be modified by the sender also during the listening stage by 'history editing' (geometric past changes in each quantum jump).

KEYWORDS: quantum jump, entanglement, p-adic numbers, many-sheeted spacetime, superconductivity, massless extremal, magnetic mirror.

1 Introduction

During years I have developed several ideas about paranormal phenomena and, believing that there must be very few general principles behind these phenomena, I try to combine these ideas into a single coherent conceptual framework in this article. For the convenience of the reader it is good to summarize the evolution of the basic concepts briefly.

a) On the experimental side the most important boosts came from the lecture of Cyril Smith about homeopathy in CASYS'2001 conference [30] and from the contact with Lian Sidoroff and from reading her articles related to remote vision and healing [31]. Also the work of Gariaev's group on wave aspects of DNA [16] was important for the concretization of the ideas. Of course, without the already existing view about living matter as symbiosis of MEs, superconducting magnetic flux tubes and ordinary biomatter at atomic spacetime sheets, which was inspired the information about effects of ELF em fields on brain [12] and by the strange findings challenging the notions of ionic pumps and channels [25] these developments would not have been possible.

b) The latest steps of progress was the understanding of energy metabolism: living matter literally eats hydrogen ions. The dropping of protons from atomic spacetime sheet to magnetic flux tubes and kicking them back by using metabolic energy is how biosystems circulate energy. The notion of many-sheeted spacetime resolves the paradoxical findings related to ATP molecules, ionic pumps and ionic channels. A model for molecular machines as machines whose moving parts move at the cold spacetime sheets where dissipative effects are absent, emerges. The theory is surprisingly successful quantitatively: the liberated metabolic energy when single ATP molecule is used is predicted correctly; the value of the threshold value of the membrane resting potential can be understood: the ratio of co-existing high and low imprinting frequencies is predicted correctly; etc...

c) On the purely conceptual side the realization that p-adic physics provides the physics of cognition and intention was a decisive breakthrough. The lectures of Peter Marcer about quantum holographic brain provided an important stimulus leading to the realization that MEs (massless extremals) serve among other things also as quantum holograms. The ideas about magnetic mirrors (ME-parallel magnetic flux tube pairs) acting as electromagnetic bridges between living subsystems and about liquid crystal blobs representing and amplifying the rotational, vibrational, etc. spectra of molecules, are the most recent newcomers in the zoo of ideas.

d) The resulting concrete view is that living organisms at all levels of the hierarchy are connected by the magnetic mirrors serving as electromagnetic bridges between them and making possible high precision directed communication, remote sensing, sensory representations using magnetic sensory canvas, memory as communication between the geometric past and geometric now, and remote control. Even the claimed communications with deceased can be seen as being based on the same mechanism as long term memory. Besides classical signalling with light velocity quantum entanglement (also timelike) mediated by MEs is key element of model and makes possible sharing of experiences. By fractality the same basic mechanisms are at work in all length scales: water memory and our long term memory are the same phenomenon but in different length scales.

Similarly, the miraculous molecular recognition mechanisms and remote healing and vision are also phenomena based on the same basic mechanisms.

e) A further strong support for the idea that biosphere is a fractal organic whole came from the realization that the notion of psychological time leads to paradoxes unless one assumes that psychological time corresponds to the space-time region at which macroscopic volition is concentrated: this front of volition proceeding in the direction of future is where the p-adic-to-real phase transition changing intention to macroscopic action dominantly occurs. Psychological time must be also common to me and my fellow human beings, probably for entire biosphere: otherwise strange paradoxes result.

f) Topological self reference means that topological field quanta, in particular MEs, provide a representation for the properties of the material system (system contains in its structure representation of system itself). One implication is that the formation of bound states involves generation of negative energy MEs and that formation of bound states giving rise to coherent wholes is accompanied by a liberation of usable energy: this means effective over unity energy production and there is even evidence that buy no-pay later mechanism is at work at the brain level. The quantum entanglement made possible by ME can be also regarded as a quantum counterpart of a link in web: the first guess is that the transmission of nerve pulse to a postsynaptic cell is like transmission of email message containing links to other parts of brain so that web would actually mimic what happens in brain.

In the following possible implications for the understanding of the paranormal phenomena will be discussed.

a) I propose a general vision about the mechanisms behind the paranormal phenomena based on the ideas briefly summarized. This involves the new, more precise view about psychological time, p-adic physics as the physics of cognition and intention, the notion of magnetic mirrors, LC crystal water blobs as mimicking electromagnetically molecules and amplifying signals em signals, field representation of the genetic information based on magnetic mirrors, and a general model for remote mental interactions

b) Parapsychological phenomena like extrasensory perception, precognition, psychokinesis, near-death experiences, and communications between living and dead are discussed: remote healing and vision are discussed also in the chapter "Homeopathy in Manysheeted Spacetime" of [24].

c) A TGD based model for the instrumental transcommunication (ITC), in particular electronic voice phenomena (EVP), is developed in more detail (I am grateful for Adrian Klein for informing me about these phenomena).

2 General view about paranormal phenomena

In the following I summarize basic aspects of TGD inspired theory of consciousness relevant to the paranormal phenomena. The basic philosophy behind TGD inspired theory of consciousness is crucial for the model but I do not have opportunity to discuss it here. Material about the underlying philosophy (neither monistic nor dualistic but 'tripartistic') can be found in the chapter "TGD inspired theory of consciousness" of [23].

2.1 Quantum jump between histories and self as a subsystem able to remain unentangled

The basic notions of TGD inspired theory of consciousness are quantum jump between quantum histories (rather than time=constant snapshots of single quantum history) as moment of consciousness, and the notion of self as subsystem able to remain unentangled in subsequent quantum jumps (see for instance the chapters "TGD inspired theory of consciousness" and "Self and Binding" of [23]).

Each quantum jump replaces the solution of field equations (universe) with a new one. Quantum jump involves three steps: the unitary time development U giving rise to the S-matrix summarizing quantum physics as it is understood by particle physicist, the counterpart of state function reduction, and state preparation. Both state function reduction and preparation cease to be phenomenological concepts in TGD framework. The sequence of quantum jumps defines subjective time whereas geometric (or physicist's) time corresponds to the fourth spatial coordinate. The distinction between these times allows to resolve the basic paradoxes of modern physics and philosophy of mind.

Self is by definition a subsystem able to remain unentangled in subsequent quantum jumps. Only bound state entanglement is stable in quantum jump and selves correspond to regions of the spacetime surface having local topology in a given number field (real or p-adic numbers). p-Adic regions are interpreted as physical (nonconscious) correlates for cognition whereas real regions correspond to matter. p-Adic and real selves cannot entangle. The unitary operator U can generate entanglement between p-adic and real regions which is destroyed in state function reduction step. This is crucial for the generation of cognitive maps assigning to the states of matter (say reading of physical measurement apparatus) cognitive states (say mental image about the reading).

The contents of consciousness of self are determined as the average over the quantum jumps occurred after it was created (the real or p-adic spacetime region corresponding to self appeared in quantum jump). Selves can have sub-selves and self experiences them as mental images. Self can represent a mental image of a higher level self. Self experiences only the average of its sub-selves. Thus statistical averaging is involved in both subjectotemporal sense and spatially and is of central importance in the theory of qualia. This suggests that the foundations of, not only quantum measurement theory, but also statistical physics, reduce to the theory of consciousness. Quantum entanglement between selves means fusion of mental images. The simplest assumption is that entangling self loses its consciousness.

p-Adic numbers are of central importance for the theory. They are crucial for the notion of self, p-adic physics provides the physics of cognition, and p-adic self hierarchy defines cognitive hierarchy. Locally evolution corresponds to a gradual increase of the finite prime characterizing a given spacetime region, and at the level of the entire universe to the increase of the infinite prime characterizing the universe (the theory of infinite primes is more or less isomorphic to called arithmetical quantum field theory for which second quantization is performed again and again). Also ethics can be reduced to p-adic mathematics: a deed (quantum jump) is good if it promotes evolution: in other words, it induces the increase of the infinite p-adic prime characterizing the universe.

2.2 What is the most general structure of the self hierarchy?

Selves form a hierarchy. This hierarchy need not be a simple nested hierarchy represented by a tree or a union of disjoint trees. On the other hand, arbitrary connections between the levels of the hierarchy imply paradoxical situations. Simple questions help to get a grasp on the problem. What happens if the branches of a given tree or separate trees are connected? What kind of connections are allowed without ending up with a paradoxical situation in which one cannot tell which one of the two selves is the subself of another self. The appearance of loops in the self hierarchy certainly leads to this kind of paradoxical situations since self can become its own subself.

This kind of paradoxical situations are avoided if only those selves which belong to the same level of the self hierarchy can fuse so that one has a collection of trees which can have horizontal connections (both intra- and inter-tree) between the nodes belonging to the same hierarchy level. The presence of a horizontal connection means that two separate selves share the mental image resulting in

the fusion. Of course, the same mental images could be shared by an arbitrary number of selves, and this could be one of the mechanisms making possible both social behaviour and the propagation of memes. Also a genuine communication might necessitate sharing of the mental images rather than being only active sending and passive receipt. Sharing of mental images might occur also in hypnosis and various remote mental interactions and identification phenomena ('experiencing the sorrow of all mothers lost their son in war'). Long term memory could also involve the sharing of the same mental image by the selves of the geometric past and geometric now.

The paradox-free situation is achieved if the selves are arranged according to the local spacetime topology so that all p-adic selves with given prime are at the same level in the hierarchy and real selves ($p = \infty$ formally) are at the top of the hierarchy. Subselves must always have smaller p than self and real selves are at the top. Quantum entanglement allows only fusion of selves at the same level of the hierarchy and thus having the same local topology labelled by the p-adic prime p . Algebraic extensions of p-adic numbers presumably bring in more refined sub-hierarchies for a given value of p and they could correspond to various levels of mathematical cognition. This hierarchy is represented by a collection of trees which can have horizontal connections joining nodes at the same level. The sharing of mental images by the fusion of subselves is thus possible. The level of the self in the hierarchy can change and is induced by a quantum jump in which the local number field (p-adic or real) associated with the spacetime sheet representing self changes from R_{p_1} to R_{p_2} .

Anyone can do a simple but thought provoking experiment suggesting the presence of the macroscopic quantum entanglement at the level of brain and a change of the level of subself in the self hierarchy. Look at a mirror, direct your attention at your left eye, and redirect the gaze to the right eye. What you find that it is impossible to perceive the change in the direction of the eye gaze.

This might have a trivial explanation: the change in the direction of the gaze could be too small to be perceived. But also quantum entanglement might be involved. What must be crucial is that the change of the orientation of the eyeball is caused by brain itself rather than some external agent as in the case of a moving object belonging to the external world. The changing orientation of an external object of the perceptive field is consciously perceived by comparing it with the orientations of other objects of the perceptive field. That is, self compares its subselves (mental images) with each other. When the direction of the gaze is changed, quantum entanglement between self and the visual-cognitive mental image representing eyes is generated to achieve the needed motor response. The visual-cognitive subself representing eyes is temporarily lifted to a higher level in the self hierarchy and becomes part of higher level self (the change of the local number field is involved). The other subselves at the same p-adic level cannot anymore serve as a reference against which the changing orientation would be perceived. Since self cannot compare itself with itself, it cannot perceive visually the changing direction of the gaze.

2.3 General view about psychological time

A natural resolution of the problems related to the preferred role of single moment of time for conscious experience is based on the idea that biological growth and self-organization is a 4-dimensional phase transition proceeding in the direction of the geometric future quantum jump by quantum jump. And, in particular, that the dominating contribution to the conscious experience comes from the front of the phase transition where the volition is. More concretely:

a) There is electromagnetic body (or more generally, field body) serving as a template around which ordinary matter self-organizes by phase transition and at the same time modifies this template. The field body could be also regarded as a kind of manual of the system. The phase transition front proceeds from the moment of birth to the geometric future in a manner analogous to the polymer-

ization process or to the gradual build-up of a protein in mRNA-protein translation process. Electromagnetic body could correspond to the electromagnetic part of the genetic information hypothesized to be coded by transversal magnetic mirror structures (massless extremals parallel to magnetic flux tubes): see the chapter "Homeopathy in many-sheeted spacetime" of [24]. The motivation for this hypothesis comes from the TGD based quantum models for biocontrol and sensory representations, from the data about homeopathy and puzzles related to genome, from the mysteries of the biochemical self-organization, and from the experimental work related to phenomena like remote vision and healing. Among other things this model explains processes like molecular recognition which remain mysterious in the framework of standard biochemistry.

b) Each choice made during life cycle is analogous to an addition of a new protein in mRNA-protein translation process. There is a lot of freedom of choice associated with the addition of the new building blocks to a growing protein. The freedom to modify the already existing structure is however relatively restricted. The already existing part of protein can adopt a highly restricted repertoire of conformations but the ordering of the component aminoacids remains essentially fixed as also the chemical structure of the individual aminoacids. Translating this to the level of evolution of individual: presumably only the non-determinism associated with various sensory and cognitive representations is present whereas the non-determinism associated with say macroscopic motor actions and decisions affecting dramatically future is absent in our geometric past. Thus the classical (and also quantum) non-determinism is concentrated at the phase transition front propagating towards the geometric future quantum jump by quantum jump. As a consequence, also the contents of conscious experience are strongly concentrated around the value of the geometric time characterizing the location of this front.

c) Quantum criticality of TGD universe suggests that also the reverse phase transitions can occur and could proceed most naturally towards geometric past like the depolymerization of a protein. The fractality of the TGD universe in turn suggests that these phase transitions and their reversals occur in all length and time scales.

d) The idea that 4-D body is kind of a 4-D sculpture constructed gradually by trial and error process suggests that the 4-D growth process proceeds by trial and error and when dead end appears the reverse of the phase transition (counterpart of depolymerization) occurs (or can occur) and proceeds backwards in the geometric time to the moment when the wrong choice was made. Thus our life would not end at the physical death but would be an iterative process starting again and again from the moment when things went wrong.

e) Physical death means that the 4-D body becomes mature and could survive at least for some time in a state in which conscious experience does not contain the dominating input from the phase transition zone. Some kind of a meditative, timeless form of consciousness should be in question. This vision conforms with the idea that physical life is only one stage in much longer lasting process of conscious evolution. These 4-D bodies can in principle communicate with the living ones and long term memories about the deceased might represent one form of this communication. The communications would be based on the same mechanism as long term memories in general: by looking at magnetic mirror with length of order lightlife or more I can see, not only me of the past, but also my fellow (not only) human beings. At quantum level this means timelike quantum entanglement making possible to share experiences.

f) What is this fundamental phase transition giving rise to what we call life? We know that the front of phase transition corresponds to volitional consciousness. We also know that volition as a transformation of intention to action in TGD universe corresponds to the p-adic-to-real phase transitions of spacetime spacetime sheets taking place in quantum jumps. Thus the natural conclusion is that p-adic-to-real phase transition is the fundamental phase transition inducing the biological self-organization. This phase transition could occur for massless

extremals (MEs) and perhaps also for the flux tubes of wormhole magnetic fields (and thus for magnetic mirrors) representing the plan for the evolution of the biological system and induce biological self-organization of matter around the resulting electromagnetic hologram like templates.

g) At least the selves at the same level of self hierarchy possess same value of psychological time. It might even be that the entire living biosphere could be seen as a phase transition front proceeding to the direction of the geometric future. This conclusion is of utmost importance since it leaves no other possibility that to accept that even biosphere defines conscious self and we correspond to only single level in the self hierarchy. In particular, the notion of collective consciousness is more or less 'a must' in this framework.

The fractality of TGD Universe suggests that there are phase transition fronts inside phase transition fronts each with their characteristic span with respect to the geometric time and age with respect to subjective time suffering the 4-dimensional analogs of cell decay and regeneration. One can imagine a fractal hierarchy of phase transition fronts in which subselves experience a common psychological time and experience the systems, whose psychological time is in the geometric future, more or less as dead because the degree of non-determinism in the geometric past of the four-dimensional body is low. Perhaps what we call non-living matter corresponds to life for which self-organization front is in the distant geometric future. Also the idea about gradual build-up of four-dimensional sculptures by 4-D phase transitions and their reversals at all levels of the self hierarchy looks attractive.

2.4 Paraphysics and p-adic-to-real phase transitions

p-Adics-real phase transitions and p-adic teleportation (discussed in the chapter "p-Adic Physics as Physics of Cognition and Intention" of [23]) could provide a general explanation for a large class of paranormal phenomena. The very fact that experimenters usually do their best to eliminate subjective elements from the experimental arrangements might explain why paranormal phenomena are so poorly reproducible. It is also quite possible that in the statistical averaging these phenomena indeed disappear and it might be more reasonable to concentrate on the character of the fluctuations around the average. An interesting analogy is the research of Shnoll related to the fluctuations of radioactive and chemical rates which demonstrated clear periodicities in fluctuations correlating with astrophysical periods [28]. Perhaps this approach might be applied also to the claimed paranormal phenomena.

p-Adic spacetime sheets bring in mind the notion of ectoplasm often used in spiritistic circles. One could of course ask whether the claimed materializations of persons and material objects by mediums are real in *some* sense, and could be regarded as p-adic-to-real phase transitions. For instance, the communications between deceased and alive could be based on the transformation of memes to real sensory spacetime sheets making possible collective sensory hallucinations (of course, hallucination is a somewhat misleading notion in this context). Similar anecdotal stories abound also around yogies and everyone knows the stories about ghosts.

2.5 Magnetic mirrors

Magnetic flux tubes and MEs are basic structures in TGD based model of biosystems based on the symbiosis of MEs, magnetic flux tubes and ordinary biomatter at atomic spacetime sheets. Magnetic flux tubes are topological field quanta of magnetic field whereas MEs ('massless extremals') are topological field quanta of radiation field, 'light rays'.

To avoid misunderstandings, it is important to emphasize that MEs are not possible in Maxwell's theory and the classical fields associated with MEs differ in many crucial aspects from those possible in Maxwell's theory. Most importantly, MEs are ideal for classical communications. The signal is effectively

one-dimensional wave packet with fixed local polarization, it propagates with a light velocity without change in shape, and is channelled and thus does not weaken with distance. There is no dissipation involved: in TGD framework dissipation can be seen only a phenomenological trick to model the dynamics of quantum jumps between nondissipative quantum histories using single dissipative quantum history.

Magnetic mirrors formed by the magnetic flux tube-ME pairs occur in many different contexts in TGD inspired theory of consciousness. For example, magnetic mirrors of length of order lightlife appear in the model of long term memory. Classically: when I look at sufficiently distant mirror I see the me of the geometric past. Quantum mechanically: timelike quantum entanglement made possible by the magnetic mirror makes it possible for the self of the geometric now to share the experience of the subself of the geometric past. Magnetic mirrors are crucial for the model of the sensory canvas and there seems to be no sharp difference between different types of memory which suggests that there is an entire hierarchy of memories in various p-adic time scales. Magnetic mirrors play a key role in the model of frequency imprinting and provide a general molecular recognition mechanism. Magnetic mirrors allow also a generalization of manysheeted DNA so that magnetic mirrors represent genetic information in electromagnetic form (see the chapter "Homeopathy in Manysheeted Space-time" of [24]).

In accordance with the fractality of consciousness, the wide applicability of the magnetic mirror notion suggests that various functions associated with the magnetic mirrors are different aspects of the same basic phenomenon. Magnetic mirrors would thus provide sensory canvases, long term memory mirrors and recognition mechanism at all length scales. Even manysheeted DNA would possess sensory canvas and long term memories, perhaps an entire hierarchy of them. Taking the ideas of fractality and quantum hologram to extreme, one can even consider the possibility that our long term memories are average of those associated with genes associated with various neurons!

Nothing precludes the possibility that magnetic mirrors can also serve as electromagnetic bridges between different organisms (even the notion of organism must be generalized if the idea of multibrained magnetic selves is taken seriously). For instance, communications with the deceased might be basically like looking in magnetic mirror and seeing the image of the deceased. This could make possible effects similar to observed at DNA level (such as self assembly and translation of RNA to proteins made possible by electromagnetic recognition mechanism based on em bridges).

2.6 How water represents and amplifies?

What the role of the atomic spacetime sheets in the representations of frequencies provided by MEs and magnetic flux tubes might be, is suggested by the fact that the matter at the atomic spacetime sheets should have the role of an amplifier of em fields associated with MEs.

a) The generation of spacetime sheets containing water in liquid crystal form with a rotational frequency spectrum mimicking that of the homeopathic potency is a further aspect of this mimicry and could amplify the otherwise weak signal molecular by amplifying the em fields associated with MEs serving as topological correlates for photons emitted in the transitions of the molecule. The water domain could be also seen as a mental image (subself) about the chemical at atomic spacetime sheet. In principle all the rigid body aspects of the molecule can be mimicked in this manner. Mimicking water domains can also control the transitions of the biomolecules or vice versa.

b) Not only rotational spectrum but also vibrational spectrum (such as conformational vibrations of molecules) can be mimicked since any system near equilibrium reduces to a collection of harmonic oscillators: the sound waves propagating in LC water blobs would provide the representation. It is known that

the water in cell interior and near to the cell membrane transforms routinely between sol and gel (LC) states in response to various stimuli: this transformation would have an interpretation as a formation of a conscious representation for something, perhaps some event or object outside the cell.

c) Note that by the scaling law $f_h/f_{ELF} = 2 \times 10^{11}$ proposed by Cyril Smith in [30], the characteristic neuronal frequency $f_{ELF} = 1$ kHz corresponds to $f_h = 10^5$ GHz and to a ME with a length of 3 micrometers, which corresponds to the thickness of the magnetic flux tube. Thus kHz frequency is maximal if ME is required to extend outside the magnetic flux tube. Perhaps this ME could be involved with a sensory representations at the cell level. For human vision the wavelengths of photons are in the range of $10^{-6} - 10^{-7}$ meters and corresponding ELF length scale is $10^4 - 10^5$ meters if scaling law is assumed.

d) The requirement that LC water blob has size not larger than about one micron implies that that the lowest ELF frequency corresponds to a time period of about $T = 1000$ years so that all time scales relevant for human consciousness are covered and MEs with frequencies relevant to human long term memories can be amplified by intracellular LC water spacetime sheets. If the scaling law $f_h/f_{EEG} = 2 \times 10^{11}$ is taken literally, one obtains $f_h = 20$ Hz at the upper bound: this corresponds to the lowest audible frequency which suggests that also sound waves serve representative purposes.

e) Fractality suggests that LC water spacetime sheets in turn form liquid crystals in longer length scale giving rise to secondary representations and that there exists entire hierarchy of these representations.

2.7 Field representation of the genetic information

TGD leads to the notion of mansheeted DNA in which DNA is accompanied by transversal magnetic mirror pairs which, besides coding 4 different DNA nucleotides to pairs of polarizations, also give rise to field representation of the genetic information by classical em and Z^0 fields associated with MEs as well as by the holograms generated by the electromagnetic MEs in active state. What is remarkable that the sizes of these MEs are can quite well be of same order as body size. In fact, the known facts from homeopathy suggest that ELF frequencies f_{ELF} and high frequencies f_h with ratio $f_h/f_{ELF} \simeq 2 \times 10^{11}$ appear as pairs such that f_h imprinting implies f_{ELF} imprinting and vice versa [30]. f_h can vary up to body size whereas f_{ELF} corresponds to length scales with typical unit given by Earth size. The interpretation would be that MEs represent 'spirit' and 'flesh', that is code for magnetic sensory canvas or magnetic body and for physical body. Electromagnetic representation of genetic information solves the mystery of introns (the portion of chemically silent DNA is the higher the higher the organism is in the evolutionary hierarchy and is roughly 95-98 per cent for human genome): introns would not be electromagnetically silent.

The most naive guess is that the field representation is simply a 4-dimensional photograph about body part, that is dynamical hologram, and that the DNA in the cells which express the formation of a given body part contain this kind of representation. The cells in which the genes are expressed could contain this kind of representation serving as a template and biological control command. Thus body part would contain its own image in each of its cells. The time reversal (phase conjugate) of the 4-D hologram would in turn naturally act as a time reversal of the control command and provide a universal mechanism making possible healing and self repair.

Entire hierarchy of representations in various length scales might be involved providing dynamical photographs about the planned evolution or various biomolecules, subcellular structures, cells, etc... This sounds utterly simplistic but one can ask what else? The representation for the development of the body structures must be based on very simple and concrete code since the cells building it during morphogenesis are very simple creatures and see only the light telling where to go!

2.8 General model for remote mental interactions

The properties of the magnetic mirrors suggest also a general model for the remote mental interactions (including phenomena like remote viewing and healing, telepathy and psychokinesis) defying standard science explanations. The article of Lian Sidorov [31] and its references give a thorough view about remote healing and viewing. One particular healing method goes under name Qigong (see the article [10]). Qigong is a general term for a large variety of traditional Chinese energy exercises and therapies. Qigong is generally considered as a self-training method or process through Qi (vital energy) and Yi (consciousness or intention) cultivation to achieve the optimal state of both body and mind. The traditional Chinese medicine postulates the existence of Qi, which could be regarded as a kind of subtle energy circulating around the physical body.

In TGD framework the energy associated with MEs and supracurrents flowing along magnetic circuitry would be a natural counterpart of Qi. Yi would in turn would translate to p-adic cognitive representations representing also intentions, perhaps p-adic variants of MEs or even magnetic mirrors. Internal Qigong refers to self healing whereas external Qigong means directing Qi energy or intention to help others by opening Qi blockages or inducing the sick Qi to get out of body, or helping to achieve Qi balance. The physiological, chemical and electromagnetic effects of both internal and external Qigong have been studied ([31] contains large number of related references). Also the effects of Qigong healing on cancer has been studied [10].

In TGD framework remote mental interactions can be understood using a model generalizing the vision about endogenous biocontrol so that the sender and receiver of the control signal can be different organisms. Thus independently whether the claimed effects are replicable not, this kind of effects are more or less predicted by TGD framework.

The general model for remote mental interactions is following.

a) Magnetic mirrors connecting the sender and receiver make possible a universal mechanism for the transfer of intent (Yi) and action (Qi). p-Adic MEs represent the transfer of a mere intent and real MEs represent a transfer of action. p-Adic ME can be transformed to real ME either by receiver or some higher level magnetic self.

b) The transfer of intent gives rise to mechanism of remote interaction which can act both endo- and exogenously. Magnetic mirrors characterized by their fundamental frequencies make possible bridges between sender and receiver (say healer and healee) and allow a resonant interaction in which healer can initiate various control commands acting as 4-dimensional templates represented as holograms. Also smaller MEs can be send along the MEs serving as bridges (this is like throwing balls with light velocity!).

c) The ME-magnetic flux tube pair connecting sender and receiver acts as a reference wave which can initiate an arbitrarily complex hologram representing biological program. Sender has the ability to generate and amplify the frequencies which induce holograms representing the control commands. In particular, sender can initiate complex biological programs without knowing anything about their functioning.

d) Magnetic mirrors make possible also feedback and this feedback could make possible learning. For instance, in psychokinesis (especially so in micro PK), this learning would be crucial and analogous to that what occurs when we learn to drive a car. In healing this kind of feedback might help to find the healing frequency by trial and error.

e) It is quite possible that also multibrained and -bodied higher level magnetic selves actively participate in the process. This makes possible coherent amplification effects (TEM, prayer groups) and also makes available information resources of all brains involved with the group. This could for instance explain the ability of a remote viewer to see an object on basis of data which need not have any meaning for her. Fast amplitude modulation of alpha waves introducing higher harmonics to the carrier wave is a good candidate for mediating

communication between brains and higher level multibrained selves. Mesoscopic 'features' in brain involve precisely this kind of amplitude modulation [11] and might represent just this kind of messages (see the chapter "Spectroscopy of Consciousness" of [24]). Interestingly, also speech is produced by fast amplitude modulation of 10 Hz basic vibration frequency of speech organs.

This model explains a wide variety of observations related to remote healing and vision [31]: these observations are discussed in the chapter "Homeopathy in Manysheeted Spacetime" of [24]. Since magnetic mirrors can connect also living organisms and 'dead' mater, say electronic instruments, the model can be applied to explain also phenomena like micropsychokinesis, causal anomalies related to machine-animal interaction, and so called instrumental transcommunications.

3 Parapsychological phenomena

In this section various parapsychological phenomena are discussed in the general framework introduced in the previous section.

3.1 Extrasensory perception, precognition, and other parapsychic effects

p-Adic teleportation (discussed in the chapter "p-Adic Physics as Physics of Cognition and Intention" of [23]) makes possible very general mechanisms of extra sensory perception and precognition and analogous phenomena involving mind-mind interactions and interactions between mind and matter external to the organism. It is assumed that the sensory input usually generates the sensory representations based on real mindlike spacetime sheets transformed to p-adic cognitive spacetime sheets. Cognitive spacetime sheets could be also p-adically teleported between different brains and possibly transformed back to real spacetime sheets. This could make possible tele-variants of cognition, sensory perception, emotions and motor activities. If p-adic cognitive spacetime sheets are floating around everywhere, one could understand the mysterious emergence of a completely new idea as an absorption of a p-adic meme by brain. Of course, p-adic non-determinism makes it possible to modify existing memes volitionally and thus evolution of ideas.

p-Adic spacetime sheets could be also seen as intentions which can be teleported and transformed then to real actions by p-adic-to-real phase transition. This kind of mechanism might be involved with extrasensory perception and remote healing. MEs acting as bridges between different organisms would mediate em oscillations and allow a directed transmission of smaller MEs behaving effectively as particles moving with light velocity. These MEs could be both real and p-adic and using the terminology of Qigong practice, would represent qi (action) and yi (intention) respectively. An essential element would be resonance: sender and receiver in should be accompanied by MEs characterized by the same fundamental frequency: only these MEs could resonantly connect healer and healee. Healer must have ability to continuously vary the healing frequency.

Extrasensory perception could also result from the direct electromagnetic perturbation of the sensory magnetic canvas outside the body and the sounds generated by auroras and meteors might be genuine extrasensory perceptions of this kind (see the chapter "Spectroscopy of Consciousness" of [24]). The frequency spectrum for the sounds produced by meteors and detected both sensorily and electronically in in the range 37 – 44 Hz [34], which is the range of thalamocortical resonance frequencies associated with sensory representations in magnetic sensory canvas model. The sounds are several orders of magnitude more intense than they should be unless em perturbations propagate to Earth in a channelled manner. Only few meteors generate these sounds. These observations suggest that a resonant amplification of the em perturbations by magnetic

mirrors of the sensory canvas channelling the em field to the surface of Earth are in question.

p-Adic teleportation makes also possible the transmission of memes to the direction of the geometric future and even past. This means a mechanism of precognition and it is quite possible that the memes which have established themselves and replicate, can infect also the geometric past by the p-adic teleportation mechanism. An interesting question is whether memes are really species-specific. The ability of shamans to transform at the level of conscious experience to animals suggests that this restriction could be overcome. There is also a famous real life story about a student who spend several days in the experiential world of dog.

Various identification phenomena would very probably involve also magnetic mirrors acting as bridges between say shaman and animal (or possibly multibody collective self defining 'species self') and making possible to share the experience of animal. Same mechanism as in the case of long term memories would be in question but with personal memories being replaced with the experiences of another species.

3.2 Robots, chickens, rabbits and men

The interaction between random number generators and humans or animals is one form of psychokinesis. For a few years ago the issue 62 of "Network", the journal of the Scientific Medical Network [19] contained a report about the experiments carried out by Dr. Rene Peoch, working at Fondation ODIER at Nantes. In these experiments chickens and rabbits apparently influenced signals composed by a random-number generator for a robot close to them, and human subjects apparently influenced the movements of the robot even though its signals had been generated by a random-number computer program six months earlier.

Chickens stayed close to the robot "imprinted" on it as their mother and followed it about. The robot had a random-number generator inside it controlling its movements, which checks showed to be truly random. The chickens were then removed and one placed so it could see the robot but could not follow it. Under these circumstances the robot spent measurably more time close to the chicken than away from it. The effect was that the chick was influencing the robot's generator. The generator was then removed to a computer away from the experimental area. The same effect occurred. "Non-imprinted" chickens however had no apparent effect on the robot.

In the rabbit experiment, baby rabbits were frightened by the robot and kept away from it. When the rabbits' movement was inhibited, the robot's movements became non-random and it kept away from them. However, when one rabbit was starved and food was placed on the robot, this behaviour was reversed and the robot brought the food to the rabbit. It was found that humans likewise could influence the robot.

Also humans were invited to influence the robot as before, but in fact it was being driven by a code generated six months earlier and recorded on a CD, now being played back. The robot was influenced as in the contemporary study. The CD was then examined and it was found that the first half of its code was indeed non-random, but the unused code was truly random. This gave the effect that the computer somehow "knew" six months earlier not only that half the code would be used for such an experiment, but also the general direction of the movements that would be required.

The interpretation of the reported results in terms of psychokinesis and human-animal-machine symbiosis suggests itself. The experiment with humans can also be interpreted as a dramatic verification for the prediction that in quantum jumps between quantum histories also the geometric past changes: the recent experiment suggests that the change occurred in a time scale of six months. If the crucial assumption about the randomness of the random number

generator is correct, the effect is also very strong. This could mean that we are changing our geometric past all the subjective time in macrotemporal time scales, as indeed suggested by the paradigm of four-dimensional brain. A further suggestion is that this hypothesis can be indeed tested empirically by developing further these experimental arrangements.

To better comprehend what might be involved, recall that in TGD subjective time and geometric time are not one and the same thing. Accordingly, subjective memories are memories about conscious experiences and geometric memories are memories with respect to the geometric time for which time is in a precisely same position as space: geometric memories give prediction of the future and past changing quantum jump by quantum jump like weather broadcasts (except that one usually is not interested in the predictions of what weather will subjectively be in geometrically last summer). The crucial point is that the contents of say computer files representing purely geometric memories (such as number sequences) can change in the quantum jumps whereas the possible subjective memories about their contents can remain unchanged. This peculiar contradiction between subjective and geometric memories, which I have christened as 'tribar effect', serves as a possible experimental test for the reality of notions of the subjective and geometric time. These experiments are bound to involve human memory as a subjective element: nothing however prevents several human subjects store to their memory the original memory to guarantee objectivity in a statistical sense.

If the randomness of the original random number series produced six months before the experiment involving human-robot interaction has not been checked, it can be argued that random number generators (if genuine) accidentally produced a number series which was not random in the time scale involved. This problem could be circumvented by modifying the experiment by checking already six months earlier whether the number series is really random or not. Humans can indeed remember whether the series is genuinely random or not although they are not able to remember long number series. On the other hand, if the non-randomization effect appears only under special conditions (effect is present for the imprinted chickens only), one has even without the check good reasons to believe that machine-mind interaction has occurred.

An important question of principle is whether the random number generators are genuine or whether the numbers are generated by some algorithm yielding only pseudo random numbers. If genuine randomness is due to quantum phenomena at atomic or molecular level, then the p-adic teleportation would affect basic atomic or molecular physics. If some algorithm produced them and there is no noise affecting the outcome, the only changes which can occur is the modification of the algorithm or of the initial conditions for the algorithm. In the latter case the production of the desired behaviour might however be impossible since the algorithm need not even allow the needed regular behaviour of the random number sequence. This of course could be checked.

If the p-adic teleportation is a general mechanism of the psychokinesis, then the conclusion would be that p-adically represented intentions/memes are able to interact with random number generators. If the p-adic memes are actually chicken's intentions mediated by magnetic mirrors and transformed to real ones when intention is realized, the interaction mechanism is basically ordinary electromagnetic interaction with the machine. The question about the detailed mechanism allowing chicken's volition to affect the geometric past of the robot allows endless variety of answers. One possibility suggested by the more precise views about psychological time is that the robot has primitive consciousness and that the p-adic-to-real phase transition of robot proceeding to the direction of geometric future is undone by the reverse real-to-padic phase transition down to the moment when the random numbers were generated and regeneration of them occurs and gives rise to a new chicken friendly behaviour. Again trial and error might be involved.

The results of experiments, if replicable, suggest that animal-machine anom-

alous interactions might be much stronger than human-machine interactions, perhaps because animal is totally confident that the desired interaction happens (Blessed are the meek since they will inherit the kingdom of Heaven!). One could imagine experimental arrangements analogous to the chicken-robot experiments in which the chicken is replaced by a human who genuinely believes that the robot can do what (s)he wishes: this could be achieved by telling the subject person that machine is programmed to deduce her/his wishes, from say EEG. Various modifications of the imprinting mechanism could be applied in more complicated situation. The results might be also used as guidelines in the attempts to generate artificial life. The systematic use of genuine random number generators as control tools of robotic motion suggests itself as a basic principle to guide the attempts to build artificial life. This would optimize the flexibility of the robot behaviour so that it could be affected by the p-adic intentions.

3.3 Near death experiences

Near death experiences are rather commonly experienced, say by the victims of various accidents. These experiences are known for centuries but it was the best-selling book "Life after Life" of Raymond Moody which brought these experiences known to the general public [18].

1. *What NDEs are?*

NDEs seem to possess invariantly the same characteristic features. There are feelings of peace and joy, time speeded up, heightened sense, lost awareness of body, seeing bright light, entering another world, encountering a mystical being or deceased relatives and coming to a point of no return. The experiences seem to proceed in quite universal manner. First comes a loud buzzing or ringing noise and a long dark tunnel. Patient sees his own body from outside and does not feel any pain or agony anymore. Patient meets others and a being of light who shows his life in its entirety as a kind of playback to evaluate. Then comes the point of no return, and although patient feels peace, joy, and love, the patient has to return to continue his life. Often these experiences induce very profound changes in the subsequent life of the patient. The claims of Moody have been supported by subsequent research and hardly anyone, even the most foolhardy skeptic, denies the reality of these experiences.

The latest twist in the development emerged when University of Southampton research team announced the result of a one-year study of NDEs of victims of a heart attack supporting the view that consciousness and mind exist after the brain has ceased to function and the body is clinically dead. The resuscitated patients were various times clinically dead, with no pulse, no respiration and fixed dilated pupils. Independent EEG studies have confirmed that brain's electric activity, and hence brain function (according to standard dogmas of neuroscience) ceases in this kind of situation. 11 per cent of patients who survived the heart arrest however recalled emotions and visions during this state. This announcement has created considerable excitement in various consciousness related discussion groups and the question whether some of the basic dogmas of neuroscience are badly wrong has been raised by the neuroscientists themselves.

2. *TGD based view about life after death very concisely*

It is good to summarize the latest TGD based view about consciousness after physical death before comparison with other theories and detailed analysis of NDEs. The view, which is certainly not the only possible one can imagine, is supported by the improved view about psychological time.

The basic notion is that of 4-D body involving both the physical body and the magnetic mirror structures associated with it. 4-D body is gradually carved like an artwork via p-adic-to-real phase transitions representing the progress of front of volition to the geometric future and by the reverse phase transitions deconstructing the 4-D body or its parts. This fractal trial-and-error construction

of the 4-D body occurs in various time and length scales. Gradually increasingly stable 4-D body results. The volition is concentrated to the front of the p-adic-to-real phase transition so that the experience of 4-D body for which deconstruction processes occurs only in the time scales short compared to the duration of lifecycle, would be about entire lifecycle and in this sense 'timeless'.

The simplest view assumes that the front of volition does not propagate after the physical death. One could however consider the possibility that the front of volition continues to propagate by transforming p-adic magnetic mirror structures to real ones: volitional life would continue in electromagnetic form. This would make possible the communications of the deceased with living since the resulting real magnetic mirrors could connect the deceased with the living. On the other hand, the repertoire of possible p-adic magnetic mirror structures would be very wide because of the p-adic non-determinism. Since magnetic mirror structures are fundamental for the field realization of the genetic code, one can quite well consider the possibility that this process induces also the self-organization of the ordinary living matter around the magnetic mirror structures. This would have interpretation as a reincarnation. Buddhas able to resist the temptation to reincarnate would continue their life at the field level. Interestingly, the development of physics from Newtonian physics of the material bodies to Maxwellian physics of fields would mirror the evolution of consciousness from concrete biological life to life at the field level.

3. Astral plane theories for NDEs

There are several theories of NDEs. A theory enjoying popularity in New Age circles is based on the notions of the astral projection and next world stating that we have another body that is vehicle of our consciousness which leaves the body at the moment of death. Although completely respectable as such, this kind of theory is not based on existing or even postulated physics, and is therefore hard to test. The notions of 'higher vibrational level' and 'astral plane' are simply devoid of a physical meaning.

In TGD framework the idea about 'vibrational levels' generalizes in an astonishing concreteness to an entire hierarchy of electromagnetic life forms and electromagnetic bodies whose sizes vary to astronomical length scales (see the chapters "Quantum Model of Qualia" and "Spectroscopy of Consciousness" of [24]). In this framework the idea about brain as a seat of consciousness is an illusion resulting from the fact that sensory data is mostly about the immediate region around body. Of course, even the idea that consciousness (as opposed to its information contents) can be localized to some part of spacetime, is basically wrong in TGD approach.

A possible test for the astral projection theories is a weighing of the body after death to deduce the weight of the astral body (assuming of course that astral planes obey ordinary physics!). If 'astral planes' correspond to the p-adic spacetime sheets, this test of course does not make sense. Magnetic mirror structures are obvious candidates for astral body and are real but their separation from body is impossible so that this kind of measurements do not make sense. The notion of 4-D body also suggests that the physical body remain in the geometric past in the physical death wherefrom it can communicate with the living ones via the magnetic mirrors of magnetic body which continues to be generated by p-adic-to-real phase transition.

Extrasensory perception via astral bodies is a second possible test. This test might make sense if extrasensory perception can be generated by patterns of ELF em fields as supposed in the TGD inspired model of qualia. Magnetic mirrors connecting organisms to each other and also to 'nonliving' matter make possible ESPs. Also direct electromagnetic perturbations of the magnetic sensory canvas can give rise to ESPs: in the chapter "Spectroscopy of Consciousness" of [24] the possibility that the strange sounds produced by meteors [34] could correspond to ESPs is discussed. The p-adic teleportation followed by p-adic-to-real transition makes also possible extrasensory perception and could

be one of the basic mechanisms in the remote transfer of intent.

4. Tunnel experience

The theory of Grof and Halifax [14] is based on the observation that NDE involves elements which might be assigned to the moment of birth. Perhaps NDE is reliving the moment of birth. The counter argument is that the newly born baby does not see anything unless she is able to perceive extrasensorily. 'Nothing but hallucinations' theories are of course no explanations at all and belong to the same category as 'consciousness as mere illusion' theories. In neuroscience framework also the wake-up reality is seen basically as a hallucination produced by brain and coupled with sensory input to guarantee correspondence with what is out there.

The tunnel is experienced also during epilepsy and migraine, during meditation and relaxed state of mind, and with certain drugs like LSD, phencyclidine and mescaline. I have also personal 'tunnel experiences' every-daily: when I close my eyes in a half-meditative state achieved by writing at computer terminal, I can see a dim flow consisting of points. Typically this flow enters to or emerges from a tunnel. It can be rotating spiral like flow or simple sink or source. Source or sink can be also linear structure. Earlier this experience was not stable and tends to fade away all the time, and after few minutes I was not anymore able to achieve it. Situation has changed quite recently: I can have the experience almost anytime in peaceful state of mind. During my great experiences this flow was much more complicated and completely visible and formed a stable background of the ordinary visual experience and of hallucinatory visual images. There is however no experience of entering into the tunnel in this case so that the tunnel need not be the same as encountered in NDEs.

It has been suggested that the physiology of brain could explain the properties of near death experiences [13]. The theory of Cowan [13] states that the tunnel results from a failure of the inhibition leading to brain induced activity yielding visual experiences. What is however questionable is why person would feel falling into the tunnel, to say nothing about meeting deceased relatives. Blackmore and Troschienko have proposed a theory in which also the motion along tunnel could be understood as a visual illusion [8].

TGD based explanation for tunnel experience might be simply as a direct visual experience about magnetic flux tube structures resulting from the perturbation of the magnetic sensory canvas outside body. Thus a genuine ESP would be in question. Magnetic field obeys indeed same basic equation as incompressible liquid flow. Both retinas and pineal gland ('third eye' literally since it contains retinal pigments and serves as a genuine third eye in some species, see chapter "General Theory of Qualia" of [24]) are magnetic structures. The practically always present vortex in center ('third eye' in my private terminology) could correspond to the magnetic flux tube structure emanating from the pineal gland whereas the very dynamical flow could correspond to the contribution of retinas. If the magnetic mirrors are universal electromagnetic bridges connecting us to other living beings, in particular to our friends and relatives, the meeting of the 4-D bodies of the deceased relatives would happen at the level of fields.

The movement along the tunnel could correspond to the propagation of p-adic-to-real phase transition along this kind of magnetic mirror structure transforming it from p-adic to real: thus the tunnel would be created after the physical death. During lifetime these em bridges would be p-adic and physical death be followed via the transformation of these bridges to real ones.

5. OBE aspect

Blackmore explains OBEs [7] as resulting from the replacement of ordinary self-center experience of world with bird's eye of view model where brain sees own body from above. Bird's eye of view is only a memory model so that extrasensory perceptions are predicted to be impossible during OBEs. There is

however some evidence that patients can report very precise visual perceptions during OBE. It has been indeed argued, that some other senses than vision, namely hearing [7], could create indirectly these perceptions. It is however difficult for even the most hardborn materialist to understand how a clinically dead person could be able to effectively see by hearing, since this feat is impossible for even completely healthy person.

The idea of Blackmore about bird's eye of view is very attractive as such and can be interpreted in TGD framework in quite different manner. Cognitive maps based on the canonical identification map (see the chapter "p-Adic TGD: Mathematical Building Blocks" or [23]) typically exterior to inside and vice versa. Thus both a p-adic map of the external world realized inside brain and a p-adic map of body and its surrounding realized outside the body are possible and would give models of the external world and self. The inside-to-exterior map could provide a bird's eye of view about body and its immediate surroundings.

Both exterior→interior and interior→exterior maps could contribute to the conscious experience even under the normal wake-up consciousness and the exterior contribution would thus represent genuinely extrasensory contribution to the conscious experience. When the ordinary sensory input and volitional activity ceases as during NDE, the contribution of the model of external world to the conscious experience becomes negligible. The ability to experience tunnel unstably during relaxed wake-up consciousness with eyes closed is consistent with the interpretation that these two components are competing. It is quite possible that during sleep the bird's eye of view component also dominates but that no memories about this period are generated for the simple reason that the brain functions necessary for the generation of the memories are not active. My own remembrances about the long depressive period after the great experience caused by the extreme dullness of the normal wake-up consciousness suggest at least to me that these kind of memories might make it too painful to continue the daily life.

Sensory canvas hypothesis provides a more concrete view about the situation. p-Adic-to-real phase transition of a p-adic magnetic sensory canvas to real one could also be part of the fundamental volitional process. The magnetic mirrors connecting brain to sensory canvas should be there also in the absence of sensory input. Could it be that the out of body view is always involved but masked by the from the body view and after the physical death only out of body view remains?

The competition between bird's eye of view and sensory view has also EEG correlate. Delta waves in the EEG spectrum are natural EEG correlates for the external part of cognition. The reason is that this part of EEG frequency spectrum has a shape and intensity very similar to that for the so called sferics [29], which correspond to meteorological electromagnetic perturbations typically associated with thunder storms. Could sferics be the electromagnetic correlates of discarnates?! The degree of the sensory alertness correlates directly with the ratio of the EEG net intensities in the delta band and in higher EEG bands [29]. This is consistent with the competition predicted by NMP. Certainly in the NDE experiences studied by the Southampton team only delta band is present in EEG. Note that delta waves dominate also during deep sleep.

Also alpha band is a good candidate for communicating sensory information to higher level selves having magnetic sensory canvas receiving sensory input from several brains simultaneously. It is indeed alpha band in which detectable changes occur in remote vision and remote healing [31]. Could it be that higher than alpha consciousness somehow transforms to alpha consciousness in physical death and could it be that alpha consciousness relates with the fact the lowest Schumann frequency associated with the perturbations of Earth's magnetic field is in the alpha band? It might be that magnetic transition frequencies are involved with the 'vertical' communications from brain to the sensory canvas whereas Schumann resonances would be involved with the lateral communications between different sensory canvases. The fact that hypnagogic experiences

involving also identification with other persons (personal experience) appear in the borderline between wake and sleep when dominating EEG frequencies are around 7.8 Hz supports this view.

6. *Life review*

Blackmore explains the life review as an effect analogous to the lively episodal memories generated by stimulating temporal lobes. This explanation leaves open what exactly happens in the stimulation of the temporal lobes and what episodal memories are. To say nothing about the systematic review and evaluation.

In TGD framework brain and perceptive field are four-dimensional and it is quite possible that episodal memories are multitime experiences involving input which comes from the moment of the geometric time when the recalled experience happened and happens again at the level of sensory representation but not as real life event since this would involve macroscopic volition and induce miracle life events in the geometric future. The notion of 4-D body makes this idea concrete. In the physical death 4-D body becomes in some sense mature (about possible deconstruction processes in shorter time scales). The volitional contribution essential for the illusion that world is 3-dimensional is not anymore present and entire 4-D body is experienced as a whole. Perhaps this is just what life review is.

Since geometric memories are in question, the review is only a narrative since our geometric past changes all the subjective time and the review is about geometric past subjectively now. Life review would be a temporal counterpart of the OBE experience in the sense that one sees one's geometric life history from outside in a 4-dimensional sense. This is possible since p-adic cognitive representations are four-dimensional and four-dimensional bird's eye of view could begin to dominate at the moment of death.

Also genuine subjective memories about time interval equal to the wake-up period of self and of order lifetime could be in question. This requires the occurrence of what might be called a p-adic phase transition to higher level self with much longer subjective memory: this view is in accordance with the vision about the physical death as a birth to a life in 'other world'. p-Adic phase transition could mean that the p-adic magnetic mirrors after the geometric time after physical death correspond to higher value of p and quite concretely, have lengths which are longer than during the physical life. This makes possible both geometric and subjective memories in much longer time scale.

7. *Positive emotions*

With the motivation coming from the OBEs associated with the temporal-lobe epilepsy, it has been suggested that brain-stress near NDE episode leads to the release of neuropeptides and neurotransmitters (in particular endogenous endorphins) which are responsible for positive emotional states like joy, peace, and love. Again the question concerns about the deeper mechanism. Presumably these neurochemicals are only correlates for the experiences in which extra-sensory component of the experience begins to dominate. It has been also suggested that the lack of oxygen is what gives rise to the NDE experiences [7].

The observations of the Southampton team seem to exclude these explanations. Of course, one could claim that some core parts of brain are working even when the patient is clinically dead (no respiration, no heart beat, dilated pupils) and that these functioning parts of brain are able to generate NDE. If so, spiritual experiences would represent the lowest possible levels of consciousness, and even reptiles would have them: perhaps a vulgar skeptic could applaude here but I do not find this idea very convincing.

In TGD framework clinical death naturally implies that extrasensory component of the conscious experience begins to dominate. This picture is consistent with the view about brain as p-adic-real transformer rather than the seat of the entire conscious experience. The dominance of the positive emotions would

simply mean that the negative emotions coming from sensory input would be absent.

8. *Other worlds*

The experiencing of 'other worlds' requires a considerable amount of hand weaving in the standard neuroscience framework. Blackmore claims that imagined worlds are experienced as real because these experiences are the most stable. I believe that Blackmore is right in the sense that mental images (sub-selves) correspond to self-organization patterns which are stable asymptotic states of self-organization. I do not however believe that this is an essential point, and certainly Blackmore's explanation fails if the interpretation of the Southampton team about NDEs is correct.

In TGD framework the other worlds might correspond to the emergence of magnetic mirror structures which correspond to higher value of p-adic prime than during the physical life. They would have much longer lengths and give rise to much longer subjective and geometric memories. Note that the MEs associated with magnetic mirrors are classical representation for light (which brings in mind Tibetan book of death!) so that one could say that the deceased becomes a light being in a well-defined sense. The meeting of the light being might mean an ability to communicate with and sensorily experience the presence of other light beings, natural if the deceased herself has transformed to a light being (but having still 4-D body in the geometric past, this is perhaps why angels have human body!).

Note also that the absence of sensory and corresponding cognitive mental images during NDE is analogous to the emptied mind free of mental images which is the goal of the meditation practices. Perhaps soul could be identified as a self having no subselves, 'irreducible self' as suggested in the chapter "Self and Binding" of [23].

9. *After effects*

The after effects induced by the spatio-temporally extended consciousness in which one sees one's own life from outside are often dramatic. It is difficult to reduce these after effects to brain pharmacology. My own great experience had many aspects common to NDEs and induced profound (not at all pleasant!) changes in my own life. In my case the direct experience of the higher levels of reality made possible the realization how magnificent the almost-boring everyday reality really is when seen through sharpened senses, how pathetically narrow the zone of wake-up consciousness is, and how ridiculously little the celebrated big science tells about reality. This realization resulted in a strong conviction that I am on a right track, and has given the courage to work these fifteen years as a ridiculized scientific dissident in a country in which vulgar skepticism is in the role of a scientific state religion and vulgar skeptics have taken the role of the mind police of science.

3.4 **Are communications between living and deceased possible?**

The vision about psychological time suggests that the life after the physical death could be purely electromagnetic so that the memes and memplexes represented by p-adic cognitive spacetime sheets (magnetic mirrors say) associated with the organism continue to transform to their real counterparts after the physical death. Since these magnetic mirrors can connect the 4-D body of the deceased to living physical bodies, communications between deceased and living become possible and the mechanism of communications is same as the mechanism of long term memories. It is also possible that the transformation of the magnetic mirror structures to real form induce generation of biological organisms around them and this would give rise to re-incarnation.

In the language used in the spiritistic circles, 4-D bodies of the deceased

together with the magnetic mirror structure associated with them also after the physical death would correspond to 'discarnate' or 'ethereal' entities belonging to the 'etheric level'. Perhaps the proper interpretation for p-adic spacetime sheets representing thoughts and intentions is as not-yet-born entities.

Since the p-adic copies of all real physical systems are possible, even the most far-fetched claims of psychics about materialization and communication phenomena could in principle make sense. It however seems that what is materialized by p-adic-to-real transition is the plan for organism represented by magnetic flux tube structures.

3.4.1 Mediums and materializations

In spiritualistic circles mediums have been traditionally seen to mediate communications between deceased and alive. This includes also claimed materializations of physical objects besides the bodies of the deceased. Often direct voices emerging from empty space are claimed to be heard during the sittings: trumpets and accordions flow in the air and produce music. Analogous direct voice phenomena are associated with the claimed poltergeist phenomena. The explanation goes that medium is able to somehow to draw 'ectoplasm' from her (quite often her) own body and from the bodies of the participants which then materialises as the bodies of deceased and as material objects. For a physicist this explanation is empty as long as a physical and mathematical definition of the ectoplasm is lacking.

In TGD frame work mediums could be seen as persons able to act as relay stations communicating with both deceased and with the participants of the sitting via magnetic mirror bridges. Perhaps these bridge already exist or in p-adic form or are generated during sitting (recall the inherent non-determinism of p-adic physics) and medium helps to transform them to real form so that communications along these bridges become possible.

The transformation of the p-adic spacetime sheets to real ones is of course the natural candidate for the materialization process. Accordingly, ectoplasm could be identified as p-adic spacetime sheets or their materializations. My own great experience, which involved several parapsychological elements, was a parade of deep ideas, and one of them was the notion 'flogiston' as something new for the existing physics and absolutely essential for the living matter. According to the vision, living organisms were fighting and killing to get 'flogiston', and the greatest minds had been able to get it (even steal!) more than the lesser souls. I have considered several identification of this mysterious 'flogiston' and p-adic spacetime sheets are certainly the most elegant identification I have ended up hitherto.

One cannot exclude the possibility that the transformation of the p-adic plan for a material body represented by magnetic mirror structures could induce a self-organization of the ordinary matter around this template to form material objects or at least mimics of them. This is essentially what biological growth is assumed to be. I however find it difficult to take seriously materialization of entire physical objects by p-adic-to-real transitions (the phenomenon would have enormous technological impact!). It would seem more probable to me that memes transform directly to real spacetime sheets causing what are usually regarded as hallucinatory experiences, which is now however completely real communication. If this can happen, it could happen also collectively so that all participants have the same paranormal experience. This does not look strange if one accepts the possibility of magnetic sensory canvases receiving sensory input from several brains and also inducing hallucinatory perceptions.

Usually the spiritistics sittings have been held in the darkness and this allows excellent opportunities for a fraud. On the other hand, alpha band in EEG begins to dominate in darkness and might make possible the communications. There are several reasons to think that it is fast amplitude modulation of alpha frequencies producing harmonic multiples of the alpha frequency, which could be the communication mechanism between our level and higher levels of self

hierarchy. The so called mesoscopic features appearing in EEG correlates and corresponding to 1-2 cm areas of cortex [11] could be direct physical correlates for these communications (see the chapter "Spectroscopy of Consciousness" of [24]). The model of bicameral mind based on the notion of semitrance relies on the same idea (see the chapter "Semitrance, Language, and Development of Civilization" of [24]). Note that the minimization of the sensory input (sittings are arranged in dark room) might be just what is needed for the extrasensory input to dominate.

3.4.2 EMDR method as a mechanism to communicate with deceased

Near-death experiences are not the only manner to get convinced about life after death. So called eye-movement desensitization and reprocessing (EMDR) discovered by Francine Shapiro [27, 9] induces what could be interpreted as after-death communications. The experiences of subject persons can be induced by this therapy in highly reliable manner: according to [9] 98 per cent of patients willing to participate the therapy had after death communication experience. It does not matter what the religious convictions of the subject person are and the experiences are actually rather easy to induce. It does not matter if the loss is traumatic or not or whether it is recent or occurred for decades in past.

The experiences resemble near death experiences (light tunnels, beautiful landscapes) and involve spiritual contact with the deceased. The EMDR technique involves getting the patient to move his or her eyes in a particular rhythmic fashion while at the same time attending to a particular aspect of the traumatic memory. How EMRD works is poorly understood as yet: possibly the fact that the shifting of eyes leads to increased brain processing is of importance. Notice that rapid eye movements REM are also involved with dreams. A possible explanation is that EMDR experiences could involve communication with the 4-D bodies of the deceased ones located possibly in the geometric recent or past via the magnetic mirrors associated with them.

One might think that rapid rhythmic eye movements induce fast modulations of some alpha frequency and generate the above mentioned features which somehow help to get a contact with deceased, perhaps rhythmic eye movements somehow induce the p-adic-to-real transition of the p-adic magnetic mirror bridges. Essentially the same mechanism as involved with long term episodal memories would be in question: the only difference would be that the magnetic mirrors now mediate information not from own 4-D body from the 4-D body of the deceased.

3.5 Magnetic mirrors, remote viewing and remote healing

Magnetic mirrors formed by the magnetic flux tube-ME pairs occur in many different contexts in TGD inspired theory of consciousness. Magnetic mirrors of length of order lightlife appear in the model of long term memory (when I look at sufficiently distant mirror I see the me of the geometric past). Magnetic mirrors are crucial for the model of the sensory canvas and there seems to be no sharp difference between different types of memory which suggests that there is an entire hierarchy of memories in various p-adic time scales. Magnetic mirrors play a key role in the model of frequency imprinting and provide a general molecular recognition mechanism. Magnetic mirrors allow also a generalization of manysheeted DNA so that magnetic mirrors represent genetic information in electromagnetic form.

The wide applicability of the magnetic mirror notion suggests in accordance with the fractality of consciousness that various functions associated with the magnetic mirrors are aspects of the same basic phenomenon. Magnetic mirrors would thus provide sensory canvases, long term memory mirrors and recognition mechanism at all length scales. Even manysheeted DNA would possess sensory canvas and long term memories, perhaps an entire hierarchy of them. One can even consider the possibility that our long term memories are average

of those associated with genes associated with various neurons! Nothing precludes the possibility that magnetic mirrors can also serve as bridges between different organisms (even the notion of organism must be generalized if the idea of multibrained magnetic selves is taken seriously). This could make possible effects similar to observed at DNA level (such as self assembly and translation of RNA to proteins).

3.5.1 A general model for remote viewing and healing

The last observation suggests also a general model for the phenomena like remote viewing and healing defying standard science explanations (see the article of Lian Sidorov [31]). One healing method goes under the name Qigong (see the article [10]). Qigong is a general term for a large variety of traditional Chinese energy exercises and therapies. Qigong is generally considered as a self-training method or process through Qi (vital energy) and Yi (consciousness or intention) cultivation to achieve the optimal state of both body and mind. The traditional Chinese medicine postulates the existence of Qi, which could be regarded as a kind of subtle energy circulating around the physical body.

In the TGD framework the energy associated with MEs and supracurrents flowing along magnetic circuitry would be a natural counterpart of Qi. Yi would in turn translate to p-adic cognitive representations representing also intentions, perhaps p-adic variants of MEs. Internal Qigong refers to self-healing whereas external Qigong means directing Qi energy or intention to help others by opening Qi blockages or inducing the sick Qi to get out of the body, or helping to achieve Qi balance. The physiological, chemical and electromagnetic effects of both internal and external Qigong have been studied ([31] contains a large number of related references). Also the effects of Qigong healing on cancer have been studied [10].

Skeptics tend to eliminate these effects from their consciousness simply by denying their reality or claiming that only placebo effects are in question. The deep irony is that placebo effect represents a basic example of this kind of effect. The basic psychological reason for this reactive attitude is very simple: only the understood phenomenon is an existing phenomenon. In the TGD framework these phenomena can be indeed understood using a model generalizing the vision about endogenous biocontrol so that the sender and receiver of the control signal can be different organisms. Thus independently whether the claimed effects are replicable or not, this kind of effects are more or less predicted by the TGD framework.

The general model for remote viewing and healing is roughly following.

a) Magnetic mirrors connecting the sender and receiver make possible a universal mechanism for the transfer of intent (Yi) and action (Qi). p-Adic MEs represent the transfer of a mere intent and real MEs represent a transfer of action. p-Adic ME can be transformed to real ME either by the receiver or some higher level magnetic self.

b) The transfer of intent gives rise to a healing mechanism which can act both endo- and exogenously. ME-magnetic flux tube pairs characterized by their fundamental frequencies make possible bridges between healer and healee and allow a resonant interaction in which the healer can initiate various control commands or 4-dimensional templates represented as holograms. Also smaller MEs can be sent along these MEs serving as bridges (this is like throwing balls with light velocity!).

c) The ME-magnetic flux tube pair connecting healer and healee acts as a reference wave which can initiate an arbitrarily complex hologram representing a biological program. The healer has the ability to generate and amplify the frequencies which induce holograms representing the control commands. In particular, the healer can initiate complex biological programs without knowing anything about their functioning.

d) It is quite possible that also multibrained and -bodied higher level magnetic selves actively participate in the process.

3.5.2 Comparison with data

The model of remote healing and vision proposed above seems to conform with the findings described in [31] (the URL references of this article provide a comprehensive source of background data).

1. *Coordinate healing and healing using adjunct*

The basic observation [31, 3] is that there are two classes of transfer of intent (including remote healing and vision as special cases).

a) The target is found by the remote healer or viewer being given a name, location, birthdate, etc. What is strange is that this information need not have any conscious meaning for healer. This can be understood if multibrained magnetic selves are involved with the process so that it is enough that the information has meaning for some brain involved. The well-documented effects of prayer groups (see [3] which gives various aspects of spiritual healing) could be understood if the higher level selves receiving information from all prayers are actively engaged in the process. Also a coherent amplification of the effect (the so called Maharishi effect in transcendental meditation proportional to the square of the number of participants) would be involved.

b) An adjunct (an object previously treated by the healer, such as water, cloth, a crystal, etc) is used by the healee with or without the healers's knowledge. Adjunct could act as a relay station being connected to the healer and healee by MEs containing same frequencies. Besides serving as relay station, the adjunct can also act as an antenna amplifying the healing frequencies. This would explain why water (LC water blobs), linear structures like lock of hair of healee containing DNA, and crystals are effective adjuncts. This also explains why remote viewer can have vision about the viewed by touching some object belonging to the viewed.

2. *The role of imagery*

The role of imagery is known to be important. The abilities of the sender to transmit the intent seem to be better the more vivid is his/her ability to imagine the intent. This conforms with the hypothesis that the transfer of intent involves at basic level the generation of a p-adic spacetime sheet transformed to real form at some stage and that the transformation to a real action occurs in the easiest manner if the p-adic pseudo constants involved are genuine constants as for real solutions of the field equations.

2. *Two kinds of healing mechanisms seem to be involved*

TGD view conforms with the fact that two kinds of healing mechanisms seem to be involved. Healer either uses his own energy to influence the healee or uses 'universal energy'. In the first case healer herself would transform the p-adic intent into a real action. In the second case this transformation is carried out by the healee or some third agent, possibly higher level self.

3. *Distance does not seem to matter*

The model explains also how healing effects can be achieved over distances of thousands of miles. The basic characteristic of MEs is that they allow a directed propagation of classical energy without attenuation (Maxwell's equations do not allow this kind of solutions). Thus, if magnetic mirrors serve as bridges between the sender and receiver of intent, the high precision communication of intent does not look mysterious.

Lian Sidoroff [31] mentions the experiment performed by M. Sue Benford et al. (unpublished), where exposing half of a hair sample to an ionizing radiation produced radiographic film exposure underneath the other half of the sample, located many miles away. A possible explanation is that part of the ionized atoms reside at the magnetic flux tubes connecting the two halves of the hair sample and are transferred from sample to another one via the mediary of supra currents. This experiment encourages to consider the possibility that

supra currents can flow between healee and healed and that the supracurrent circuitry (magnetic circulation) is not restricted inside single organism but can connect different organisms to each other. Also adjuncts could become part of these circuits.

This kind of experiments could serve as ingenious tests for the hypothesis of superconductivity in macroscopic length scales. For instance, a variant of this test is based in the addition isotopes of selected ions to other half of the sample and finding whether the fraction of ion isotopes increases in the second half of the sample located, say, at the second side of the globe.

That supercurrents could flow in these length scales is in consistency with the magnetic sensory canvas model. Even more, the model for auroras as an astrophysical quantum phenomenon discussed in the chapter "Biosystems as superconductors" of [23] relies on the assumption that the magnetic flux tubes of both earth's and solar magnetic fields are superconductors (solar wind would thus flow as supra currents). A topological model for the crucial reconnection phenomenon of the magnetic field lines of earth's and solar magnetic fields results. Recombination is accompanied by the leakage of the supra currents to nonconducting spacetime sheets through join along boundaries bonds: this mechanism is a good candidate for a universal mechanism leading to breakdown of superconductivity and is presumably involved with a wide class of atmospheric phenomena like lightnings, ball lightnings, tornadoes, etc.. The model allows to identify the mechanism generating the electric fields responsible for the acceleration of ions eventually giving rise to auroras via collisions with the ions of the ionosphere.

What is fascinating that the sounds claimed to be heard during auroras but not measured by microphones might represent genuine extrasensory percepts resulting from the perturbations of the magnetic auditory canvas caused by the auroras. The breakdown of the super conductivity might even correlate with the loss of consciousness reported to sometimes occur during perceiving auroras. This picture encourages to think that weather phenomena, in particular thunder storms, relate to our consciousness also in extrasensory manner.

4. *The effects of healers to the em frequency spectrum of water*

There is evidence that healers can affect the em frequency spectrum of water. In [31] examples of these effects are listed: the Raman spectra of water can be influenced from a distance up to 1900 km; the polarization angle of He-Ne laser can be affected by so called waiqi method; the IR spectrum (hydrogen bonds) of sterile water changes in the proximity of therapeutic touch practitioners. Experiments do not support the hypothesis that the time of exposure correlates with the intensity of the effect. On the other hand, the treatment time of adjuncts is known to be an important factor in the distant healing. Also the UV spectrum of the water treated by healers differs from that for control samples.

It is not difficult to understand these effects in terms of magnetic mirrors. The effects at UV frequencies can be understood if MEs with lengths shorter than 10^{-7} meters are involved. Microtubules in UV length scale range are natural candidates for being accompanied by UV MEs (for instance, the receptors in retina contain microtubules in UV wavelength range). The cell membrane could contain an array of MEs of length $L(151) = 10$ nm parallel to lipids whereas genes should involve also MEs with lengths corresponding to the wavelengths of visible light [16].

Especially interesting wavelengths for biophotons in IR-UV range are the p-adic length scales $L(151) = 10$ nm, $L(157) = 80$ nm, $L(163) = 640$ nm, and $L(167) = 2.52 \mu\text{m}$ which all correspond to Gaussian Mersenne primes (Mersenne primes are in a preferred role in elementary particle physics: all charged leptons, nuclei, hadrons and intermediate gauge bosons correspond to ordinary or Gaussian Mersennes). That these primes span all p-adic length scales between cell membrane thickness and cell length scale could be the number theoretic correlate for the miracle of life. Needless to emphasize, the finding that these

frequencies are biologically special frequencies would give an enormous boost for TGD approach. The transfer of intent could involve sending of MEs with short lengths, say in UV or IR range: this would be like throwing a ball. These MEs would move inside larger MEs forming the bridge between sender and receiver.

$L(163) = .640 \mu\text{m}$, which is in the lower end of the visible portion of photon spectrum (.4 – .7 μm) and thus corresponds to red light, equals with .6 per cent precision with the wavelength $\lambda = 644 \mu\text{m}$ associated with photosynthesis by chlorophyll b) and with 6 per cent precision to the wavelength $\lambda = 680 \mu\text{m}$ associated with the photosynthesis by chlorophyll a). Could it be that magnetic mirrors with these wavelengths amplify photosynthesis by first amplifying the incoming visible light in a resonant manner?

5. Z^0 force and biology

The classical Z^0 force is strongest in the cell length scale. According to [35], even radioactive decay rate of Am241 has been influenced by intent. The life-long work of Russian scientist Shnoll demonstrates the fluctuations for the rates of various chemical and radioactive processes vary with periods related to astrophysical phenomena (see [28] and TGD based model in the chapter "Anomalies explainable by the many-sheeted spacetime concept" of [22]). Classical Z^0 force would also explain also the mysterious chiral selection occurring in living matter. These observations together with other applications of Z^0 force encourage to think that Z^0 MEs could have an important biological role.

Although neutrinos seem to correspond to $k = 13^2 = 169$ spacetime sheet, the quantum model of hearing (see the chapter "Quantum model for hearing") forces to assume that neutrinos can temporally reside at $k = 151$ spacetime sheet (cell membrane length scale) and have appropriately scaled-up mass (scaling factor is 512 just like between ordinary hadron physics associated with M_{107} and its scaled-up version associated with M_{89}). This encourages a generalization: perhaps neutrinos can reside in all spacetime sheets $k = 151, 157, 163, 167$ corresponding to the biological Gaussian Mersennes.

6. The role of the magnetic fields

The treatment of water by magnetic fields is known to stimulate plant growth and to affect IR absorption spectra, surface tension and crystallization patterns. The effects resemble those achieved by the treatment of healer. The emission of biophotons in IR and UV range have been frequently measured in the proximity of healers. This is easy to understand if MEs and magnetic fields form magnetic mirrors so that presence of either makes the presence of another probable.

7. The transfer of intent has EEG correlates.

In one class of experiments described in [31] the sender and receiver are located separately in sensorily-shielded rooms and extrasensory transfer of information is attempted while both sender and receiver are connected to electroencephalographs. The sender transmits his intent during randomly selected intervals and receiver attempts to guess the moments of transmission. Experiments demonstrate no conscious ability to guess the moment of transmission. However, a statistically significant correlation between the actual sending time and the alpha wave amplitude was found in the receiver.

Alpha wave synchronization was detected between pairs of qigong masters and their receivers even when they were separated by a distance of 4 km. A possible interpretation is that the low frequency part of EEG, in particular alpha band (perhaps Schumann frequency) are used by the higher level multibrained magnetic selves which act as relay stations receiving the intent of the sender and communicating it to the receiver. This hypothesis is natural since Schumann frequencies are associated with the oscillations of the magnetic flux tubes also representing sensory canvases and magnetic components of our selves. Note however that for the complex structures formed by the magnetic flux tubes of Earth's magnetic field also other resonance frequencies than Schumann fre-

quencies are expected. The time lapse between the sending and onset of the unconscious physiological response in the receiver was found in these experiments to vary in the range 10-17 seconds. This corresponds to p-adic length scale of order 3 – 5 Gmeters. Perhaps magnetic mirrors with length in the time interval of 5-8.5 light seconds are involved.

4 TGD based model for instrumental transcommunications

The so called instrumental transcommunications (ITC) and electronic voice phenomena (EVP) belong to the borderline of even parascience and it is rather difficult to take seriously.

The first problem concerns about the existence of discarnates. TGD approach predicts that our electromagnetic bodies will survive so that the conscious experience of a discarnate gets a contribution from the 4-dimensional body of the deceased (life review reported in near death experiences) plus a contribution from electromagnetic body still existing. Thus communicators are really there.

The second question relates to the communication mechanism. If magnetic mirrors act as bridges between deceased and experimenter and experimenter and electronic instrument with experimenter taking the role of a relay station (or medium), the phenomenon ceases to look totally implausible. Long term memory, telepathy, remote healing,..., and communications with deceased become special cases of the same general phenomenon.

The third question relates to how the discarnate can handle modern electronics to generate the desired messages. Feedback from the electronic instrument and thus trial-and-error learning of how to send desired messages becomes possible and might allow even this kind of communications.

A further problem is that it is very hard to imagine how these phenomena could be tested experimentally: in phenomena like remote healing are different since it is possible to study the physiological and electromagnetic correlates of the action of the healer. What increases the implausibility further is that mental machine-human interaction is involved: deceased seem to be able to use electronic instruments for the communication purposes.

4.1 Magnetic mirror as electromagnetic bridge

There are several mysteries which make it difficult to take seriously ITC phenomena. On the other hand, the experimenter in ITC seems to play a role similar to that of the medium in spiritistic sittings. The idea about experiment as a relay station between electronic instrument making possible both the sending of classical message to the instrument and receiving the conscious response of the receiver during the reading/listening session might indeed allow to understand ITC at general level.

a) The first question is whether deceased or discarnates are indeed there. The conservation of magnetic flux suggests that the magnetic flux tubes associated with the electromagnetic body remain after the physical death so that both the 4-dimensional physical body of the deceased in the geometric past and also electromagnetic body in geometric present would exist. If the p-adic MES associated with the electromagnetic body continue to transform from p-adic to real form, electromagnetic bridges between the 4-D body of the deceased and physically living creatures or electronic instruments result and this is just what ITC is special case of this.

b) The existence of magnetic mirror bridges between experimenter and electronic instrument would not be surprising. MEs and magnetic flux tubes represent topological field quanta of electromagnetic field and it would be more surprising if they would not interact with electronic instruments since these

instruments interact already in Maxwell theory with external electromagnetic fields. What is new is that MEs make possible channelled transfer of energy and information: in Maxwell's theory signals would be transmitted to all directions as 'mass communications' and distance would be the limiting factor unlike in case of MEs. The presence of kind of interaction would suggest that humans and electronic instruments are already now in intense interaction and that the electronic revolution is more like a symbiotic process in which both machines and men are active participants. In case of EVP the em bridge between the instrument and experimenter need not be involved always: in the experiments of Alec MacRae the primary signal is acoustic rather than electric [26].

c) Also signals from the geometric past are possible as some ITC data suggest (the communications by Kostantin Raudive). TGD based model of long term memories (all memories, even water memory) is based on the mirror idea: when I remember I look me at a magnetic mirror located at a huge distance of light years. Therefore I see the me of the geometric past in the mirror. Magnetic mirrors can however connect me to some other person and this means communications with the person having 4-D body in the geometric past, receiving their memories. This communication is more probable between persons have had (and still have) a close relationship generating the required magnetic mirror bonds.

d) The generation of electronic (and also acoustic) signal requires energy. Magnetic mirror quantum entangles the discarnate, experimenter, and the electronic instrument. Only bound state entanglement is preserved in quantum jump and thus binding energy is liberated when bound state entanglement is generated. This energy is usable energy and could provide the energy needed to generate the signal. If stochastic resonance is involved, the noise acts as an amplifier of the signal. In case of acoustic signal the body of the experimenter could generate the sound and energy could come from metabolism.

4.2 Feedback is necessary

How it is possible to code the information sent by the discarnate entity to say computer picture. It is difficult to imagine that the sender would be able to same as a group of IT specialists and computer engineers (unless the sender is multibrained magnetic self!). The sender could however apply the same method as human brain: by receiving feedback via the brain of the experimenter when experimenter perceives the message (say listens to the magnetic tape).

The proposed model is consistent with the fact that EVP and ITC skills develop only gradually and require patience and that some persons are more gifted than others. The generation of the magnetic mirror bridges between senders and experimenter and experimenter and electronic instrument require time. Also the sender must learn by feedback how to code desired messages to the electronic instrument. At least in principle, the proposed model could even explain claims about phone calls from deceased and even the claimed receipt of faxes from dead. This would however require mastery from the side of the discarnate in manipulating electronic systems like computer memories by using experimenter as a relay station.

4.3 Is history editing involved?

Each quantum history changes the geometric past so that history editing becomes possible in principle. There is an experiment in which a chicken confined to move in small area became imprinted to a robot [19]. The motion of the robot was coded to a random number sequence half year before. After the imprinting the motion the robot tended to stay near the chicken which suggests that the bleak chicken was able to alter the random number sequence and thus edit history in a time scale of half year.

During the listening period the sender of the message could use the information about the conscious experience of the experimenter would be mediated to

the sender from the brain of the receiver. The sender would make a quantum jump to a new history which would imply a modification the message to the electronic instrument located in the geometric past (the geometric past changes in each quantum jump in TGD framework), the experimenter would perceive the improved message, and so on. This iterative loop would lead finally to a message which generates the experience of recognition of message in the receiver. During repeated sessions sender would learn the code and would be able to send messages more easily.

4.4 How the information is coded?

The general communication mechanism between the sender and experimenter could be based on fast amplitude modulation of alpha waves involving higher harmonics of 10 Hz wave (this is like adding small ripples in long wavelength water wave). Our speech uses the same mechanism (10 Hz frequency is the basic vibration frequency of speech organs) and so called features identified recently in EEG patterns can be also regarded as fast amplitude modulation of alpha wave. These features could communicate information to higher level multibrained selves. It has been found, that healer's alpha wave activity intensifies during healing process and magnetic emissions in ELF range have been observed. Also correlations and synchronization between alpha wave activities of Qigong masters and healees has been reported [31].

If the brain of the experimenter is used as relay station, the deceased (identifiable as the electromagnetic body remaining after the physical death) could use the same code as it has used while controlling its own material body from magnetic sensory canvas during life time. If magnetic sensory canvas is able to produce visual hallucinations and dreams it might be also able to produce visual images by sending similar commands to the brain of the experimenter serving as a relay station.

The TGD based model of motor control from sensory canvas outside body (and having size at least of order Earth size) suggests that the transformation to sound waves could occur in the brain or body of the receiver. In the generalized motor control signals must be very high level signals leaving a lot of room for brain to take care of details. In the simplest model the signals are represented by Z^0 MEs carrying classical Z^0 fields not possible in standard model universe (Z^0 is the neutral intermediate gauge boson mediating neutral current weak interactions). Classical Z^0 field forces atomic nuclei, which are completely ionized Z^0 ions, to oscillate and is transformed to endogenous sound waves. Collagen structures acting as Z^0 -piezoelectric crystals could be involved.

The endogenous sound wave could correspond to what we call internal speech and be internal speech because it is not projected back to the sensory canvas. Internal speech could also correspond to p-adic variant of ordinary speech, intention to say something. If the experimenter can directly hear the voice of the discarnate directly: it should be due to a re-representation of the internal speech at the sensory canvas. Z^0 field of ME is transversal to its direction of propagation and this forces to ask whether the sound waves in body could have polarization orthogonal to the direction of propagation unlike ordinary sound waves in gas. If so, they cannot propagate in the air. One must however take this argument extremely cautiously: electromagnetic waves are transformed into ordinary sounds by piezo-electricity so that one expects that the same can occur for Z^0 waves.

This relates in a interesting manner to taos hum [32], which involves hearing a sound correlating with the acoustic environment but which cannot be detected by electronic instruments. Could it be that transversal polarization guarantees that internal speech does not generate sounds propagating in the air and thus remains private? Z^0 MEs emanating from the brain of the experimenter could however interact with microphone and generate 'endogenous' sound waves by the same mechanism as in case of brain and body.

4.5 The role of stochastic resonance in ITC

An important question is how the message is amplified and filtered from the background noise. A possible answer to this question is stochastic resonance but the most natural place for it seems to be the brain of the receiver. This would suggest that the message comes through the brain of receiver, is amplified by stochastic resonance, and sent to the electric instrument in question.

The receiver would thus take the role of the relay station (or adjunct) being connected to the sender of the message and electronic instrument by magnetic mirrors along which electronic signal is transferred. In the case of the magnetic tape this kind of signal transmission might be possible and require that ME transfers the same electronic signal as induced by ordinary sounds. Since amplitude modulation is the coding mechanism for sounds, the realization of this mechanism looks rather straightforward. ITC, in particular EVP research support the view that certain background noise is necessary for receiving messages. On basis of this observation it has been proposed that stochastic resonance (the article [15] is an excellent review about the principles and applications of the stochastic resonance) is the mechanism of EVP. Stochastic resonance requires a bistable system (for instance, double potential well) or an excitable system having metastable states. An essentially nonlinear phenomenon is in question.

Let us now analyze the viability of the stochastic resonance as being involved with ITC. For definiteness, one can concentrate to the case of a magnetic tape as a receiving instrument although the discussion is actually quite general. What happens in this case is that the signal is first transformed to an electric current, which subsequently induces a shortlasting magnetization of a soft electromagnet which in turn induces a permanent local magnetization of hard ferromagnet (magnetic tape). The strength and sign of the local magnetization depends on the strength of the current which in turn codes the strength of the sound signal. A similar transformation to an electric current occurs also for the signal in case of visual ITC.

Stochastic resonance requires the presence of a bistable system to which the signal is fed. Signal is in a role of the harmonic external force: the output of the bistable system is interpreted as a transformed signal. If one takes seriously the claim about the positive effects of the white noise, bistable system must reside either in the electronic system transforming sound signal to an electric signal or in the brain of the experimenter serving as a relay station between the sender and electronic instrument in the proposed model.

4.5.1 Does the brain of the receiver contain the bistable system?

Skeptic would argue that the noise used to promote the receipt of the messages is what cheats the brain of the poor pseudoscientist to recognize a feature which is not actually present in the incoming signal. The skeptic might be quite right although after listening the some of recordings I have a tendency to believe that there are actual messages there. One could however turn around the argument of skeptic. Perhaps it is indeed the brain of the experimenter where the bistable system resides and amplifies the very weak signal from the sender and sends it to the electronic instrument. Stochastic resonance in experimenter's brain would be involved also with the receipt of the feedback signals from the instrument by the sender of the message.

This model has several satisfactory features.

- i) The model is consistent with the latest facts about brain science [15, 33]. The model is also universal in the sense that it does not require discarnate entities to be ingenious electric engineers: they can learn by trial and error how to generate desired messages by affecting the electronic instrument.
- ii) The model would explain why some experimenters are much better in receiving messages. They are like crickets able to distinguish very weak input from the high noise. If feedback from experimenter's brain to the sender is involved this in turn helps the sender to learn to generate desired messages. The model is

also consistent with the fact that the highly tuned system which works perfectly for a particular experimenter, does not work for the other experimenters. Note that the magnetic mirror bridges between experimenter and electronic instrument are essential part of the system.

iii) Brain is indeed optimal for detecting the sound signals coded by amplitude modulation because in the case of hearing brain decomposes the signal to separate frequencies.

The hypothesis could be tested by purposefully building EVP and ITC instruments for which the background noise can be varied.

4.5.2 Does electronic system contain the bistable system?

The hypothesis that the electronic system contains the bistable system is subject to so strong additional constraints that it does not look too plausible. The very fact that the electronic information transfer systems should not induce large distortions of the signal, requires that the system is effectively linear. Bistable systems are highly nonlinear systems unless the signal fed into the system represents sufficiently strong external force in which case system is analogous to a one-dimensional particle in an external harmonic force: archetypal model is the potential well $V(x) = -x^2 + x^4$. In case of magnetic tape the direction of magnetization would naturally represent the two potential wells and hopping of the particle between wells would correspond to the changing direction of magnetization.

Thus, if bistable systems are involved, ordinary signals must represent strong external forces for which the system is effectively linear and nonlinearity can be important only for very weak signals. In case of EVP this requires that possible messages should be contained by the portions of the magnetic tape where ordinary signal is reduced to mere noise and the noise is sufficiently weak. Already this requirement might kill the hypothesis. To test this option, one should find whether the electronic system transforming the sound to electric current contains portions modellable as bistable systems fed by an external signal for sufficiently weak input signals. If this is the case, then model could be tested by varying the intensity of the external noise to see whether this has any effect on the probability of receiving the messages.

4.6 EVP as an example

Whatever the origin of the p-adic MEs is, they must first be transformed to real MEs which in turn interact with the receiving instrument. A detailed model of the communication mechanism requires models for the transformation of the p-adic ME to a basic signal (represented by light or sound) or directly to an electric signal (say in magnetic tape recorder). The mere occurrence of this transformation involves an active volition, and here the role of the experimenter who believes and wants that the transformation occurs, might be decisive. If this is the case, the phenomenon might be also regarded as a particular form of psychokinesis and disappear if the experimenter has a skeptic attitude. Also feedback via the brain of the experimenter to the sender is required and is strongest when the experimenter listens or sees whether the message is there and possibly recognizes it.

One basic question is whether the signal enters to the magnetic tape as electromagnetic or Z^0 field from brain or whether it is transformed to ordinary sound before this.

1. Does the signal enter in tape as em or Z^0 oscillation

The first possibility is that primary messages appear as a p-adic em or Z^0 wave having the Fourier decomposition resembling sufficiently that of the sound wave, and giving rise to the required vibrations of atoms. MEs are the basic candidates for the carriers of these waves and the Fourier spectrum of the voice with respect to frequency could be coded into the Fourier spectrum of em and Z^0

fields associated with ME. Hence ELF frequency range would be in question. Phase information is crucial: anyone can easily verify that a reversed speech usually consists of a gibberish despite the fact that the Fourier spectra are same for speech and reverse speech. This suggests an amplitude modulation of the carrier wave or fast amplitude modulation producing ripples to the carrier wave as a candidate for the representation of the information contained by ME.

The sound frequency range involved with the sounds heard by humans is in the interval 20 – 20.000 Hz meaning ME length scales would vary between Earth radius and 10 kilometers so that p-adic memes, which also can be thought of as forming parts of the bodies of discarnate entities, would have sizes much larger than single human brain. This spectrum is also claimed to be important for water memory and the mechanism of homeopathy [4].

2. Does the signal enter to the microphone as a real sound signal?

Classical EVP suggests that the basic signal enters to the magnetic tape as an electric signal. On the other hand, the experiments of Alec MacRae [26] are consistent with the assumption that real sounds generate the signal and that electromagnetic signal does not generate signal in microphone. The latter conclusion comes from the observation that Faraday cage around microphone does not affect the communication. In TGD framework this conclusion cannot be made since Faraday cage is not expected to affect MEs. The acoustic insulation of another microphone however weakens the voice so that it seems that a genuine acoustic signalling is in question. This does not of course imply that generation of real sounds is the only mechanism: in the presence of feedback the best communication mode available could be used.

TGD based model for the real sounds generated by meteors heard both directly and recorded by microphones is based on electromagnetic signals coming along magnetic mirrors associated with the sensory magnetic canvas and acting as wave guides and transformed to ordinary sounds via the coupling with objects at the surface of Earth. The same mechanism could be involved also now: the electromagnetic signal could come either from the magnetic sensory canvas of the experimenter or the sender. Higher harmonics of the frequencies 37-43 Hz appearing in case of meteors would be however required to generate the voices or shorter magnetic mirrors should be involved.

The fact that frequency range continues much above EEG range favours however a different option. Human body could act also as a Z^0 -piezo-electric transforming the Z^0 signal to an ordinary sound. The so called oto-acoustic sounds (audible sounds emanating from ears) could result in the same manner. Also material objects of the acoustic environment could serve the same purpose. The role of Z^0 MEs in the TGD based model of hearing makes this option more plausible in TGD context since the entire audible range would be naturally involved and the same communication mechanism would be utilized in motor control.

3. Basic parameters of the model

The basic parameters of the model are fundamental frequencies associated with magnetic mirrors involved.

a) The first basic parameter of the model is the carrier frequency used by the discarnate entity and the noise level (besides the parameters characterizing the brain of the experimenter!). Alpha wave frequency is here a good first guess. Amplitude modulation if however fast now since multiples of alpha frequency appear besides alpha frequency itself: the structure of mesoscopic features suggests strongly that the harmonics up to the 8:th harmonic of alpha wave are present. This amplitude could modulate a carrier wave which should have frequency above 80 Hz: the presence of the carrier wave is however not absolutely necessary. Interestingly enough, the frequency interval for so called taos hum is in the interval 40-80 Hz (see the chapter "Spectroscopy of Consciousness" of [24]).

b) If a direct em or Z^0 signal to the instrument causes the effect, second parameter is the carrier frequency associated with the magnetic mirror connecting experimenter and electronic instrument. The sounds detected from meteors are in the thalamocortical 37-44 Hz frequency band (see chapter "Spectroscopy of Consciousness" of [24]) suggesting that magnetic sensory canvas mediates ELF perturbations to both brains and to electronic instruments. Thus 40 Hz is the first guess for this fundamental frequency.

c) If em or Z^0 ME represents signal amplified by the body of the experimenter or some objects in the acoustic environment one cannot point out any special frequency.

4.7 Tests for the model of ITC

One can imagine several kinds of tests for ITC.

a) One can test the motion of electromagnetic bridges.

i) Since the development of the magnetic mirror bridges between experimenter and electronic instrument takes time, the replacement of the magnetic tape in EVP with identical one, might make the performance poorer.

ii) One could test the importance of the magnetic flux tubes by varying the strength of the local magnetic field (note that magnetic tape has a natural coupling to the magnetic flux tube structures of Earth's magnetic field) to see whether Earth's magnetic field plays a role in the effect.

iii) Maxwell's electrodynamics, which is not equivalent with TGD, would suggest that MEs cannot penetrate Faraday's cage so that ITC would not be possible inside Faraday cage. In many-sheeted spacetime this argument is lost because MEs by definition are em bridges outside the atomic spacetime sheets where the Faraday cage acts. If MEs cannot penetrate Faraday cage, the TGD based model for sensory representations would fall down since it would predict that person in ideal Faraday cage could not have sensory experiences! Be as it may, one can test this aspect by putting the experimenter and/or the instrument in Faraday cage.

b) One could test the ideas about the communication method.

i) In remote healing the changes of alpha waves in EEG are reported to correlate with the intentions communicated by the healer. Alpha waves dominate when sensory input is absent, in particular the closing of eyes stimulates alpha waves. This is consistent with the fact that EVP requires silent and dark room. A possible test would be to record the EEG of the experimenter and look whether there is a clear change in the activity in alpha band both when the tape is on and when the tape is listened to and find whether there are recognizable changes of alpha activity. In particular, one could see whether alpha activity changes at the time when the message appears to the magnetic tape.

ii) One could also test whether the sounds in EVP are received electronically or acoustically. Both mechanisms might be of course involved. Alec MacRae has demonstrated and in his experiments signal is received as sound. One could also test whether the pitch of the sound correlates with the acoustic environment (big room–small room).

c) History editing is not necessary for understanding of ITC but one could test whether it is involved. Let an outsider, presumably not able to act as a relay station, listen the magnetic tape first and document whether he/she received any message. Suppose that he/she detects no recognizable message. Next let the experimenter listen the same tape, and report what he/she found: during this session the feedback mechanism could transform the message to a recognizable form by affecting geometric past at the moment the magnetic tape was on. Suppose that the experimenter indeed recognizes a message. Let an outsider listen the tape again to see whether there is any recognizable message now. If the proposed mechanism is correct, the outsider who did not hear any message in the first trial, should hear now a clear message. Note that one cannot replace external person with a computer since the computer records

change in quantum jumps too! Note also that even the geometric memories of the external person might change if they are comparable to mechanical records: genuine subjective memories are required. Also the repeated listening of the tape by the experimenter could improve the quality of the message and the above experimental arrangement could be iterated.

5 Paranormal phenomena in biological systems

5.1 Magnetic mirrors provide a universal recognition mechanism

Quite generally, if two molecules possess a common subset of characteristic frequencies, they share also a subset of MEs with same fundamental frequencies so that they can physically share these MEs or more concretely, be connected by magnetic mirrors containin the ME in question. Being connected by magnetic mirror means a strong resonant interaction between them induced by LC water blobs associated with molecules. Quite literally the molecules could find each other by walking along the magnetic flux tube or more poetically, following the light.

a) This mechanism would allow to understand the mysterious looking features of DNA replication, the formation of DNA double strand and the translation of RNA to proteins. DNA nucleotide and conjugate could have common subset of characteristic frequencies and become connected by magnetic mirrors or mere MEs. The same applies to RNA triplet and the corresponding aminoacid and could explain the miraculous accuracy of the translation process. The same mechanism could explain also the self assembly of say mosaic virus from its molecular components.

This hypothesis is testable: one should check whether some portion of the frequency spectrum is same for DNA nucleotide and its conjugate *resp.* RNA triplet and the corresponding aminoacid. In the first case nucleotide is the basic unit whereas in the latter case it is triplet: scaling by a factor of three should relate the frequencies if liquid crystal blocks are linear structures surrounding DNA/protein and consist of elementary blocks.

b) The magnetic mirrors are expected accompany, not only DNA, but also proteins and other biomolecules. Common MEs associated with various molecules would generate resonant interaction between them. In DNA length scale the sizes of the liquid crystals might be bounded by the size of the cell nucleus or perhaps some shorter length scale. It is possible that liquid crystals along DNA and proteins are dynamical and decomposing all the time into their subunits and fusing again (this brings in mind the fusion of mental images by entanglement). For instance, electromagnetically active genes could correspond to liquid crystals having length of an entire gene.

c) This picture provides also a vision about how immune system might function. The invader protein is like a singer out of tune in a choir. It cannot interact resonantly as a whole with the other molecules of the host organism and thus cannot become an organic part of the host organism. The organism could recognize the invader on basis of the out of tune property and this would initiate the proces leading to the elimination of the invader, say the decomposition of the invader protein into parts accepted by the host organism.

5.2 Memory of water

The prediction that cognition is present in all length scales means quite a dramatic deviation from the standard prejucides of the standard skeptic. One of the basic implications suggesting itself is a new view about evolution. The chemical evolution might quite well have preceeded by a cognitive evolution of water culminating in the discovery leading to the use of biomolecules as tools to generate p-adic-real transformations making possible to use them as both

sensory and motor organs. In this view the visions about life emerging from sea and from the self-organization of clay induced by a water flow acting as an external energy feed, could be seen as special cases of the same phenomenon. The cognitive evolution of water leads to the point where tools, proteins or some of their predecessors, are discovered. As in human cognitive development, and in accordance with the fractal view about cognition, the next discovery would have been the discovery of symbols and would have led to the emergence of the genetic code.

Memory is perhaps one of the simplest mental functions. Homeopathy, which could be understood as evidence for water memory, has for a long time been one of the evergreens in the skeptic's list of pseudosciences. An interesting twist in the story came when Benveniste reported about evidence for water memory in Nature [4]: no errors were found in the experimental setup of Benveniste but the attempts to replicate the experiment failed. Benveniste lost his laboratory, his funding and his reputation. Then came Prof. Madeleine Ennis and the independent experiments performed in four laboratories gave completely unexpected support for the observations of Benveniste. The reactions of the skeptics in my own country have been highly emotionally charged, to put it mildly. One of the arguments, represented quite seriously, has been that these experiments do not even deserve a serious inspection because skeptics have honoured Benveniste twice with a special Nobel of pseudoscience!

5.2.1 The experiments of Benveniste and Ennis

Citing freely the article of Guardian [17], the story goes as follows.

In 1985, Benveniste began experimentation with basophils, which are human white blood cells involved in allergic reactions. Basophils possess tiny granules containing substances such as histamine, partly responsible for the allergic response. The granules can be stained with a special dye, but they can be decolourised (degranulated) by a substance called anti-immunoglobulin E or aIgE. The sensational claim of Benveniste was that he continued to observe basophil degranulation even when the aIgE had been diluted out below a detectable concentration, but only as long as each dilution step, as with the preparation of homeopathic remedies, was accompanied by a strong agitation.

In 1988 Benveniste managed to publish his work Nature, speculating that the water used in the experiments must have retained a "memory" of the original dissolved aIgE. Water memory could provide the long waited hard evidence for homeopathy. Celebration was short-lived. Spearheaded by a Nature team that famously included a magician (who could find no fault with Benveniste's methods - only his results), Benveniste was pilloried by the scientific establishment. A British attempt (by scientists at London's University College, published in Nature in 1993) to reproduce Benveniste's findings failed. Benveniste has been striving ever since to get other independent laboratories to repeat his work, claiming that negative findings like those of the British team were the result of misunderstandings of his experimental protocols.

Then Prof. Madeleine Ennis and the pan-European research effort entered the stage. A consortium of four independent research laboratories in France, Italy, Belgium, and Holland, led by Professor M. Roberfroid at Belgium's Catholic University of Louvain in Brussels, used a refinement of Benveniste's original experiment that examined another aspect of basophil activation. The team knew that the activation of basophil degranulation by aIgE leads to powerful mediators being released, including large amounts of histamine, which sets up a negative feedback cycle that curbs its own release. So the experiment planned by the pan-European team involved comparing inhibition of basophil aIgE-induced degranulation with "ghost" dilutions of histamine against control solutions of pure water.

In order to guarantee that no bias was introduced into the experiment by the scientists from the four laboratories involved, they were all "blinded" to the contents of their test solutions. In other words, they did not know whether

the solutions they were adding to the basophil-aIgE reaction contained ghost amounts of histamine or just pure water. The ghost histamine solutions and the controls were prepared in three different laboratories that had nothing further to do with the trial. The whole experiment was coordinated by an independent researcher who coded all the solutions and collated the data, but was not involved in any of the testing or analysis of the data from the experiment. Hence there was not much room for fraud or wishful thinking.

The results were a complete surprise. Three of the four labs involved in the trial reported a statistically significant inhibition of the basophil degranulation reaction by the ghost histamine solutions compared with the controls. The fourth lab gave a result that was almost significant, so the total result over all four labs was positive for the ghost histamine solutions.

There was still one possible loophole for a human factor to enter the game. The basophils were stained with a dye and then hand-counted those left coloured after the histamine- inhibition reaction. Perhaps the human error might enter at this stage. So a previously developed counting protocol that could be entirely automated was applied. The activated basophils were tagged with a monoclonal antibody that could be observed via fluorescence and measured by machine. The result, to be shortly published in *Inflammation Research*, remained the same: histamine solutions, both at pharmacological concentrations and diluted below detectable concentrations, lead to a statistically significant inhibition of the basophile activation by aIgE, confirming the previous work in this area.

5.2.2 Is water constructing cognitive representations about the molecules it contains?

There is no need to emphasize that the results of the experiments of Benveniste and Ennis could force a thorough re-evaluation of the basic assumptions of biochemistry and pharmacology. The results are not so difficult to understand if one takes seriously the possibility that biomolecules are accompanied by their own cognitive representations. One can also assume that these representations are formed when biomolecules are dissolved in water. I have already earlier (see the chapter "Wormhole Magnetic Fields" of [23]) proposed this kind of model but without any special reference to the connection between p-adic physics and cognition. The treatment of the water during the dilution (involving strong shaking at each step) could imply that the cognitive spacetime sheets representing the dissolved molecules remain in the diluted water and provide a representation of the properties of the molecule relevant for the effect caused by the molecule. The most plausible candidates are frequencies and more generally, electromagnetic field patterns associated with MEs. The p-adic-to-real transformations of these MEs could in turn lead to the homeopathic effect.

Benveniste and his group report [5] that it is possible to code the electromagnetic signals characterizing the information about the effects of the biologically active molecule in a digital form and transmit the information via, say, internet to another side of the globe, and that the effect of the reconstructed electric signals is the same as of the biomolecule itself. This is of course by no means mysterious even in the standard physics framework: charged particles experience the effects of the biomolecules via the electromagnetic fields generated by them, and it is quite possible that the molecule can be fooled to believe that other molecule is present by using only that part of em field to which it responds strongly. This said without any intention to irritate skeptics, I find it rather strange that skeptics are fighting even against Maxwell who has been dead and buried for more than a century.

Benveniste and collaborators report that the presence of the water is essential for the formation of the electromagnetic representation of biomolecule in terms of frequencies, and my belief is that here the new physics emerges and relies on MEs. Probably also amplification phenomenon by quantum phase transitions are involved. Rather remarkably, the important frequencies are reported to be in the range 20-20.000 Hz which is the range of audible frequencies and

also the most relevant frequency range in the TGD inspired model of qualia relying strongly on the observations about the effects of ELF em fields on living matter by Blackman and others [12] (see the chapter "General Theory of Qualia" and "Spectroscopy of Consciousness" of [24]). Thus the later experiments of Benveniste and his group provide direct support also for the basic ideas of TGD based theory of qualia. I have proposed an analogous mechanism as an explanation of the so called phantom DNA effect in the chapter "Wormhole Magnetic Fields" of [23]. In the chapter "Biosystems as Superconductors" of [23] a mechanism of homeopathy and water memory based on the model of biocontrol in terms of many-sheeted ionic flow equilibrium is briefly discussed.

The analysis of the data provided by Cyril Smith in his lecture in CASYS'2001 conference in Liege [30] led to a detailed model for the frequency imprinting and entrainment and to the idea that spacetime sheets associated with liquid crystal water blobs provide real world representations for the rotational, vibrational, etc. spectra of molecules (see the chapter "Homeopathy in Many-sheeted Spacetime" of [24]). This is however only one kind of representations and should be regarded more like symbolic, externalized representations analogous to written language rather than cognitive or sensory representations. Of course, DNA would involve also this kind of externalized representations. MEs and perhaps also magnetic flux tubes could be also in p-adic state and provide thus cognitive representations for external world.

The $f_h/f_l = 2 \times 10^{11}$ scaling law [30] states that the imprinted frequencies appear in pairs having a constant ratio such that the presence of the high frequency f_h implies the presence of the low frequency f_l and vice versa. TGD explains the ratio of the frequencies as the ratio $\Delta E/E_c$, where $\Delta E = \pi^2/2mL^2$ (137) is the reduction of the zero point kinetic energy for a singly ionized ion dropping from $k = 137$ atomic spacetime sheet to a magnetic flux tube of Earth having much larger size, and $E_c = eB/m$ is the cyclotron energy of the ion. There exists a simple mechanism explaining why f_h implicates f_l . A photon with frequency f_h kicks an ion from the magnetic flux tube to the atomic spacetime sheet wherefrom it drops back to a high n cyclotron state at the magnetic flux tube. This state in turn decays by the emission of photons with energies coming as multiples of E_c . The mechanism transforming f_l to f_h requires more assumptions and it seems that several frequencies f_l can be mapped to f_h .

There is also a deep connection with the TGD based model of metabolism in which the liberation of the metabolic energy takes place via the dropping of proton to the magnetic flux tube of Earth's magnetic field (.49 eV of zero point kinetic energy is liberated as a usable energy per single proton). The dropping is followed by the 'kicking' of the proton back to the atomic spacetime sheet by using the metabolic energy (this involves simultaneous generation of ATP molecule which is essential for the process but does not really act as universal energy currency as usually believed).

5.3 Healing by time reversal

Temporal reflection of the p-adic MEs is allowed by p-adic conservation laws and generates a time reversed ME, which in turn can be transformed to real ME by the p-adic-real phase transition. The creation of the time reversed MEs is possible at least in the case that MEs appear in pairs of opposite time orientation having vanishing net energy. In quantum optics time reversal is known as a phase conjugation [20] and is one of the basic notions of holography. MEs act as both quantum holograms and receiving and sending quantum antennae (see the chapter "Quantum antenna hypothesis" of [23]). MEs can generate reference waves of coherent photons interacting with other MEs and activating dynamical holograms of coherent light. If the reference wave is phase conjugated, the resulting hologram is time reversed.

What makes this so interesting is that MEs are at the highest level of quantum control in the TGD based view about biosystem as a symbiosis in which

MEs control superconducting magnetic flux tubes controlling ordinary matter at atomic spacetime sheets via the many-sheeted ionic flow equilibrium. The coherent light pattern emitted by ME resulting from the interaction of ME with the reference wave (its phase conjugate) could act as a control command (time reversed control command) inducing process (time reversed process). Conjugate reference waves would thus provide an incredibly simple and general mechanism of healing by time reversal allowing the living matter to fight against second law. This would be like a general initiating a war by just nodding or shaking his head.

Of course, one can ask what one precisely means when one says that biological program runs backwards.

a) Does the program run in standard direction of the geometric time but the commands are realized in the reverse order?

b) Or is also the direction of time's arrow changed?

Both options are possible. The latter option is suggested by the idea about 4-D body being constructed iteratively by constructive phases during which p-adic-to-real phase transition proceeds towards the geometric future and by deconstructive phases during which real-to-p-adic phase transition proceeds towards the geometric past and what followed from wrong decision is undone. Miraculous healings in which healing occurs instantaneously could be understood if this interpretation is correct.

There is also some empirical support for the idea about healing by time reversal coming already from the period when only Soviet scientists knew about phase conjugation. In 1960's and 1970's French Antoine Priore built and tested electromagnetic healing machines of startling effectiveness [1]. Tom Bearden has in this website document "The Priore Machine and Phase Conjugation" which I recommend for an interested reader for a more detailed exposition [2] besides the material that can be found from the homepage of Tom Bearden.

In hundreds of rigorous tests with laboratory animals, Priore's machine cured a wide variety of the most difficult kinds of terminal, fatal diseases known today. Many of the experiments and tests were done by prestigious members of the French Academy of Sciences. The operation of the Priore machine was incomprehensible for both the inventor and orthodox French scientists. Into a tube containing a plasma of mercury and neon gas, a pulsed 9.4 GHz wave modulated by a frequency of 17 MHz was introduced. The waves were produced by radio emitters and magnetrons in the presence of a 1200 Gauss magnetic field. Experimental animals were exposed to this magnetic field during irradiation, and the mixture of waves (about 17 or so) coming from the plasma tube and modulating and riding the magnetic field passed through the animals' bodies.

Interestingly, the magnetic field used corresponds to magnetic length of order 10^{-7} meters. It is equally interesting that a combination of magnetic fields and radiation was involved: this conforms nicely with the vision about biosystems as many-sheeted ionic flow equilibrium controlled by MEs. It is known that phase conjugated waves can be produced in plasmas. The so called four-wave interaction of waves of equal frequency is the simplest manner to amplify weak wave in the effective dynamical diffraction grating defined by the interference of two waves propagating in opposite directions. If a phase conjugate wave with a correct frequency results in this kind of situation, it could act as a reference wave acting with ME and initiate a complex time reversed biological programs at subcellular level. In particular, it could induce the time reversal of the 'development-cancer' program controlling the development of the cancer cell population and lead to healing.

By its extreme generality this mechanism could apply to almost any disease which is a disease of the highest level quantum biocontrol. This mechanism could be also used to induce de-differentiation of cells. The de-differentiation of cells to stem cells could be controlled by a similar mechanism. One can also wonder whether this kind of mechanism could make possible eternal youth (or rather eternal life) at cell level. An interesting question is whether the phase conjugates of EEG waves or time reversals of nerve pulse patterns could induce

time reversals of brain functions.

5.4 DelaWarr camera and field representation of genetic information

In CASYS'2001 symposium Peter Marcer [6] told about the British engineer George DelaWarr who built a remote imaging camera in the 1950s (radionics is the term used). Using only a test object provided from the subject such as a small blood, sputum, or hair sample, this device is reported to photographically image the subjects internal conditions at a distance, with a high degree of accuracy. A unique feature of the DelaWarr system is claimed to be that it is able to detect diseases in the pre-clinical stages prior to detection by conventional techniques such as physical examination, X-ray, CT scan, or Magnetic Resonance Imaging. The photographs taken by DelaWarr camera at fifties were treated by Susan Benford by modern image processing techniques and she claims that these photographs contain the information needed to reconstruct three-dimensional holograms [6]. The proposed explanation was that the test object (adjunct) contains a hologrammic representation about the patient.

The functioning DelaWarr camera looks highly mysterious even when one takes seriously the idea that DNA generates holograms of the body parts it codes for. Therefore it is better to introduce the ingredients of the model as questions rather than hypothesis.

a) Was the intent of the photographer all that was needed and did other levels levels of the self hierarchy take care of the rest as they do when I make the decision to raise my hand? Could the intent of the photographer have generated a reference wave at some very special frequency acting on the adjunct and activating a hologram giving rise to a photograph about the desired body part or inducing a sequence of events leading eventually to the generation of the photograph?

b) Was the visible light giving rise to the photograph generated in the adjunct? Does the DNA of each cell of body and thus also of the adjunct contain electromagnetic representations for the body parts and are these representations more or less equivalent with holograms? Certainly direct hologrammic images about body parts would provide the simplest manner to realize the field part of the genetic code as proposed.

c) Did the adjunct serve as a relay station (somewhat like thalamus in brain) mediating the information from the patient via magnetic flux tube-ME pairs to the camera projecting it to the camera as a coherent light generating an ordinary photograph? Was the image realized as a coherent light propagating along the MEs connecting adjunct and patient serving as bridges?

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