

Semi-trance, Mental Illness, and Altered States of Consciousness

M. Pitkänen¹, February 1, 2006

¹ Department of Physical Sciences, High Energy Physics Division,
PL 64, FIN-00014, University of Helsinki, Finland.
matpitka@rock.helsinki.fi, <http://www.physics.helsinki.fi/~matpitka/>.
Recent address: Puutarhurinkatu 10,10960, Hanko, Finland.

Contents

1	Introduction	3
2	Semitrance	6
2.1	How societies of idiots can behave intelligently?	6
2.2	Semitrance as basic mechanism of communication between collective consciousness and individual	6
2.2.1	Semitrance	6
2.2.2	Semitrance and personal narrative	8
2.2.3	Thoughts, emotions, motivations and semitrance	8
2.2.4	Stress and semitrance	9
2.2.5	Semitrance and EEG	10
2.2.6	Both hemispheres entangle with higher level selves	11
2.3	Various aspects of semitrance state	12
2.3.1	Social interactions and semitrance	12
2.3.2	Semitrance and childhood	12
2.3.3	Semitrance and exceptional mental abilities	13
2.3.4	Music and semitrance	13
2.3.5	Poetry and semitrance	14
2.3.6	Semitrance and the development of human civilization	15
3	Semitrance and mental disorders	15
3.1	Schizophrenia and semitrance	16
3.1.1	General wisdom about schizophrenia	16
3.1.2	More about symptoms of schizophrenia	17
3.1.3	About neurophysiological signatures of schizophrenia	18
3.1.4	What good in schizophrenia?	19
3.1.5	Nature or nurture?, possible cures?	20
3.1.6	Tourette's syndrome	20
3.2	Disorders of mood	21
3.3	Mental disease as communication disorder?	22

4 Semitrance, trance and altered states of consciousness	23
4.1 Sleep, trance and dreams	23
4.2 Altered states of consciousness	24
4.2.1 Religious and similar experiences	24
4.2.2 Telepathy, clairvoyance and identification experiences	25
4.3 Stephan's case	25
4.3.1 What happened?	26
4.3.2 The general hypothesis explaining medical miracles	28
4.3.3 Medical miracles	29
4.3.4 Other strange occurrences	31
4.4 Personal experiences about semitrance like states	34
4.4.1 Years before great experience	34
4.4.2 Great experiences	35
4.4.3 Analysis of the great experiences	36
4.4.4 Smaller experiences	37
4.4.5 Self-diagnosis	38

Abstract

The book "The origin of consciousness in the breakdown of the bicameral mind" of Julian Jaynes provides, not only a fascinating scenario about the evolution of modern consciousness from the consciousness of bicameral stone age man, but also a holistic view about schizophrenic consciousness. In fact, Jaynes regards schizophrenic as a bicameral man receiving commands of 'God' as auditory and visual hallucinations.

Jaynes sees 'Gods' as the right brain of the bicameral man. In TGD framework 'Gods' represent higher levels of the self-hierarchy. To put it in nutshell, TGD view about the relationship of human consciousness to higher levels of self-hierarchy relies on the notion of semi-trance. During semi-trance parts of brain entangle with some higher level, say the self associated with the social group, and are in trance and therefore unconscious. The remaining parts of brain are however conscious and receive communications from the collective consciousness via the entangled region of brain as sensory hallucinations, emotions and thoughts. Semi-trance is absolutely essential for the self-narrative: without it our consciousness would consist of memory fragments lasting only few seconds: higher level selves tell us where we come from and where we are going. Bicameral man received the commands and advices of the collective consciousness as auditory and visual hallucinations via regions of the right brain hemisphere wherefrom they were communicated to the left hemisphere whereas modern man receives these communications as thoughts ('internal speech') in left brain semi-trance and emotions in right brain semi-trance.

According to this view, schizophrenic spends in the bicameral state larger fraction of time than normal person and receives communications of the higher levels selves more often as sensory hallucinations than as thoughts and emotions. Thus schizophrenia can be seen as cognitive and emotional abnormality and becomes illness in modern society relying crucially on cognitive and emotional self-narrative which is much more refined than the self-narrative based on sensory hallucinations. In normal consciousness left brain hemisphere inhibits the messages from right hemisphere, left and right hemispheres are totally entangled a considerable fraction of time and the entanglement with higher level selves can also involve the entanglement of entire brain leading to short periods of total trance. In this view negative periods of schizophrenia correspond to the phases when right brain hemisphere is not entangled with higher level selves and positive, psychotic periods to the phase when this entanglement occurs often. This vision generalizes also to manic-depressive and anxiety disorders and one can see mental illness as disorder of communication between human brain and higher levels of self hierarchy.

Semi-trance mechanism provides also more detailed understanding about various altered states of consciousness and extrasensory perception (hypnotic state, telepathy, clairvoyance, some meditative states, identification experiences). Semi-trance mechanism provides considerable insights to 'Stephan's case', which originally stimulated serious attempts to understand the communications between various levels of the self hierarchy. I also apply semi-trance mechanism to model my personal altered states of consciousness.

1 Introduction

The stimulus leading to the birth of this chapter was rather personal question made with some tongue in cheek: Am I a schizophrenic? The basic motivation for this question was my life situation: I have found completely impossible to find any support for my work and despite my high level of education live practically without human rights. There must be some reason to this and it might not be only related to my heretic views about physics and consciousness and to the present neobarbaric market economy stage of Finland and of western societies in general. Perhaps I differ from ordinary scientist in some manner which, not only explains why I am a builder of theory of everything, but also induces aggression, repression and perhaps also fear in my analytically thinking colleagues. 'What might this 'something different' be' was my question, which I finally decided to resolve during the period of exhaustion following long-lasting writing project.

The first thing to realize was that I know very little about schizophrenia. So I went to the library and also read my Bible about neuroscience [27] to find what schizophrenia is. Thanks are also for Gene Johnson about material. First, I realized that paranoid schizophrenia combined with manic-depressive characteristics and occasional anxiety disorders is probably a more scientific looking conceptualization for the label 'crackpot'. Examples of symptoms: 'peculiar philosophizing' is one of the characteristics of paranoid schizophrenia (TGD as a whole!); withdrawal from social interaction (I see this as supplanting); paranoia (my belief that I am supplanted!); megalomania (look only the inspired blurbs about new developments at my homepage); seeing me as a 'secretary of God' communicating TGD through me (schizophrenics obeying voices, perhaps I mediate the message of 'Gods' by writing!). All this fits nicely with the diagnosis. There are however big flaws. I express myself fluently by speaking (if allowed to do so, certainly not in academic circles!) and writing (if allowed to do so, certainly not in 'big science' circles). I do not experience horrendous loss of my self, disappearance of my self boundaries nor total emptiness. What was also peculiar that I seemed to have all the basic disorders of mind when suitable symptoms were picked up! As if even the nastiest claims of my colleagues were true: I seemed to be a real poly-maniac! More seriously, what the results of this self-diagnosis demonstrated is the dis-ability of the modern neuroscience based psychiatry characterizing illness as a collection of separate symptoms to differentiate between altered states of consciousness, religious experience, meditative states and schizophrenia. What is really tragic and horrifying that many materialistic neuroscientists indeed identify all these states of consciousness as mental illness.

It seems that the reductionistic approach of neuroscience does not provide much insight to the basic subjective characteristics of mental illness. It seems that a more holistic approach (or 'romantic approach', as it was called by Luria) based on 'stories' is needed. The book "The origin of consciousness in the breakdown of the bicameral mind" [26] provides, not only a fascinating scenario about the evolution of modern consciousness from the consciousness of bicameral stone age man, but also a holistic view about schizophrenic consciousness. In fact, schizophrenics are regarded as bicameral men in his approach. When I received this book as gift from my friend Ben Price, I was stuck with the definition of consciousness which looked very bizarre to me: Jaynes stated that stone-age man was unconscious but despite this hallucinating God's voice giving commands! Definition does not look so bizarre when one realizes that Jaynes differentiates between experience and consciousness whereas in quantum approach this kind of distinction is not useful. Time was not yet ripe for me to realize the deepness of Jaynes's ideas. Couple of years later, armed with the notion of self hierarchy; with concrete ideas about interaction between different levels of self hierarchy; the realization that we are much more than our neurons as conscious selves and with detailed models for basic aspects of brain consciousness, I was mature to realize that I can modify the story of Jaynes and that the impressive material gathered by Jaynes supports also the TGD based quantum version of the story.

To put it in nutshell, TGD version about the relationship of human consciousness to higher levels of self-hierarchy relies on the notion of semi-trance. During semitrance parts of brain entangle with some higher level, say the self associated with the social group, and are in trance and therefore unconscious. The remaining parts of brain are however conscious and receive communications from the collective consciousness via the entangled region of brain as sensory hallucinations, emotions and thoughts. Semitrance is absolutely essential for the self-narrative: without it our consciousness would consist of memory fragments lasting only few seconds: higher level selves tell us where we come from and where we are going. Bicameral man received the commands and advices of the collective consciousness as auditory and visual hallucinations via regions of the right brain hemisphere wherefrom they were communicated to the left hemisphere whereas modern man receives these communications as thoughts ('internal speech') in left brain semitrance and emotions in right brain semitrance.

The evolution of modern consciousness meant a gradual development of the simplest God+ few

men two-leveled hierarchy to a refined many-leveled hierarchy of selves having social hierarchy as its social image and various higher level selves talking with the voices of the persons in the hierarchy. At the same time subjective consciousness evolved: left and right brain became more and more entangled and semitrance periods became briefer, left brain began to inhibit the communication of sensory hallucinations from right to left brain, and sensory hallucinations transformed to thoughts and emotions. Thus the loss of 'God's voice' did not mean the loss of semitrance communications and they are absolutely essential for the survival of the social structures and for modern self-consciousness. It is however quite possible that modern man spends much shorter fraction of time in semitrance than his bicameral cousin.

Since our genome does not differ much from that of stone age man, this process is much more a self-organization process than evolution of genome. By 'ontogeny recapitulates phylogeny' principle this development is expected to repeat itself during the development of individual during the first years of childhood about which we not remember anything. This explains the Father-God and Mother-Goddess associations and the strongly reactive attitudes to religion resembling often strongly rebel against father. The average effective cognitive and emotional ages of the individuals of a civilization characterize the developmental level of the civilization.

According to this view, schizophrenic spends in the bicameral state larger fraction of time than normal person and receives communications of the higher levels selves more often as sensory hallucinations than as thoughts and emotions. Thus schizophrenia can be seen as cognitive and emotional abnormality and becomes illness in modern society relying crucially on cognitive and emotional self-narrative which is much more refined than the self-narrative based on sensory hallucinations. In normal consciousness left brain hemisphere inhibits the messages from right hemisphere, left and right hemispheres are totally entangled a considerable fraction of time and the entanglement with higher level selves can also involve the entanglement of entire brain leading to short periods of total trance. In this view negative periods of schizophrenia correspond to the phases when right brain hemisphere is not entangled with higher level selves and positive, psychotic periods to the phase when this entanglement occurs often. This vision generalizes also to manic-depressive and anxiety disorders and one can see mental illness as disorder of communication between human brain and higher levels of self hierarchy.

Semitrance mechanism provides also more detailed understanding about various altered states of consciousness and extrasensory perception (hypnotic state, telepathy, clairvoyance, meditative states, identification experiences). It has been said that schizophrenia is drowning into the sea of consciousness whereas deep meditation is swimming in this sea. I believe that this statement is to the point. My fascination to the problem of consciousness was initiated by a deep and long-lasting altered state of consciousness which began with a period, which might be characterized as conversation with God, Great Mind, as I called it: sounds very schizophrenic if one sees only collection of symptoms! It seems that circle is closed now: I believe that I finally understand what was behind this experience and 'what is wrong with me'. Like other modern men, I am receiving emotional and cognitive messages from higher level selves. What distinguishes me from the average person is the abnormally long fraction of time spent in semitrance state. I do not get drowned to the sea of consciousness and I am able to write these lines as a 'secretary of God'. I even dare to believe (put it on account of megalomania) that the age of modern man having no Gods is coming to its end with the recent neobarbarism of the market economy. Our species can survive only if it keeps in contact with higher level selves and allows room for modern bicameral men and women sitting at computer terminals in semitrance and feverishly typing the messages of, not Village Gods, but much mightier Web Gods to the computer screen.

2 Semitrance

The original path to the model for the interaction of collective consciousness with individual was via the book Jaynes [26]. It is however more appropriate to represent the problem and its solution without any reference to Jaynes's idea to demonstrate that the scenario of Jaynes with only slight modifications follows from very general assumptions.

2.1 How societies of idiots can behave intelligently?

Animal kingdom is full of species forming societies: ant nests, beehives, flocks of birds, packs of wolfs, groups of apes, human communities. Also organisms can be regarded as cell communities. The ability of these societies to behave as single coherent whole although individuals behave in a random looking manner, is a mystery. Especially mysterious this ability looks in case of termites: the architectural feats of the termites are not consistent with the fact that the brain of termite consists of few neurons. Mechanisms explaining this as unconscious self-organization based on chemical communication or communication by direct contact have been proposed. I find it however difficult to understand how even stone-age men wandering around randomly and communicating intensively could have managed to build Gothic cathedral. This kind of achievement requires the presence of a conscious collective intelligence able to plan and control individuals of the community telepathically. There is indeed evidence for telepathy in ant community described in the article [20].

This raises several questions. How collective consciousness is possible at all? How collective consciousness could be realized without total loss of individuality? How the rather limited intelligences of individuals can sum up to a high collective intelligence? What mechanisms collective self uses to control and coordinate the behavior of the individuals?

2.2 Semitrance as basic mechanism of communication between collective consciousness and individual

Self hierarchy is the basic prediction of TGD inspired theory of consciousness and self hierarchy makes possible collective consciousness. The experience of self is abstracted 'sum' over the experiences of its subelves so that subself is experienced as a mental image. In the abstraction process the experience of subself is replaced with an 'average' over the mental images of subself. The intelligence of the antnest results from summation of the mental images abstracting the contents of consciousness of the individual ants. This explains why ant group containing overcritical number of ants can act as an architect. The concrete realization of the self hierarchy in biomatter has been discussed in [13]. The most important conclusion is that we are much more than our brains: our mental images correspond to 'ELF selves' associated with various EEG frequencies. These 'ELF selves' have as geometrical correlates topological field quanta representing ELF em fields. Topological field quanta can have size of order Earth's circumference. The interaction of these topological field quanta (say fusion to form larger structures) provides a mechanism giving rise to larger selves and makes possible telepathy and various other EPR phenomena as also experiences involving communications with deceased persons [22].

2.2.1 Semitrance

How collective self can control and coordinate the behavior of individuals? Some kind of communication mechanism making possible collective consciousness to give commands to the individuals is clearly needed. The entanglement of individual with collective self leads to a total loss of consciousness of the individual and can be regarded as sleep or trance state, possession. For instance,

during mating rites of birds, male and female seem to behave like single conscious unit formed by male and female.

Social animals are however not mere organs of a higher level organism, they are also individuals. To explain this one can consider a mechanism which might be called 'semi-trance'. If individual consists at least part of time of two separate subelves, second subself can entangle with collective self and in this trance state can communicate with the second self and communicate commands or advices to the subself which is awake. Communication is here quite generally understood as a generation of mental images: this corresponds to waking-up of subelves. The wake-up process initiates self-organization leading to a final state pattern representing the message. Final state pattern depends only weakly on the stimulus serving as message: this is as it should be.

Brain hemispheres or parts of them are the most obvious candidates for these two subelves. The entanglement of the right or left brain hemisphere (or some part of it, perhaps the linguistic regions with respect to which human brain has highest asymmetry) with a collective self could be the basic mechanism making it possible to communicate the commands of the collective self to left and/or right hemisphere as 'hallucinations'.

Jaynes's vision about the evolution of civilization is based on the notion of bicamerality [26] provides strong keys to the nature of semitrance state and how it has changed during cultural evolution.

1. Jaynes assumes that right brain activities were unconscious to bicameral man and that the left hemisphere received the volition of right brain hemisphere as commands and advices as hallucinatory voices and visions. This would suggest that in the case of ancient bicameral man it is right hemisphere or parts of its that fall in trance and that left brain hemisphere receives the commands from right hemisphere as sensory 'hallucinations'.
2. In case of modern man situation is presumably different. The average time spent in semitrance is probably shorter; the probability to fall in semitrance state is lower; the profile of semitrance is different and the communications between right and left brain hemispheres are probably different. Inhibition of the sensory communications developed so that the sensory messages from the right brain hemisphere to left hemisphere became inhibited: visions and God's voice disappeared. The profile of the communications of the collective self to human brain changed also. Modern man receives the messages of the collective self both via left and right hemisphere semitrance. Spontaneous thoughts and ideas are received via left brain semitrance. Emotions and moods are received via right brain semitrance and guide the behavior of individual much more implicitly than direct commands. Thus sensory 'hallucinations' have transformed to imaginative thoughts and emotions which we do not regard as hallucinations at all: the ancient world of elves, gods and demons has transformed to emotions and to the Platonic realm of ideas.
3. In this framework the development of civilization from primitive agricultural communities of 8000 B.C. to a modern society can be seen as the gradual establishment of 'memetic code' [L1] implying the parallel development of language and society: 'In the beginning there was the Word'.

The characteristic feature of semitrance is the passivity of the experiencer: collective self communicates experiencer something or gives possibly commands. They are not hallucinations in which the experiencer would hallucinate volitional acts. Only activity in the sense that experiencer has conversation with the higher level self seem to be possible. Of course, this conversation could induce changes in the behavior of the collective self: consider only the claimed effects of prayer.

Semitrance mechanism is extremely general and could be at work in brains of all social animals, especially those which as groups exhibit an intelligence much higher than the intelligence of the members of the group. Similar mechanism could work also at cellular and biomolecular length

scales. DNA double strand and cell membrane consisting of two lipid layers are indeed binary structures and the components of the structure could serve in the role of right brain lobe. This mechanism would explain why cell society can behave like an organism with self identity. The observed possibility of humans with high EEG coherence to intentionally affect the degree of winding of DNA strand [21] supports the notion of semitrance at DNA level.

2.2.2 Semitrance and personal narrative

If the contents of consciousness of self involve temporal average over moments of consciousness occurred after last 'wake-up', the duration of our self cannot be much longer than .14 seconds since this would mean that we could not discriminate between events with time separation not longer than about .14 seconds. This problem can be partially circumvented if our experience is multi-time experience containing several selves of this duration. The duration of the short term memory is few seconds and this might represent the duration of our self. This raises the problem how we can have long term memories and self-narrative.

Geometric memories containing contributions from entire life span provide a candidate for the self narrative as a model for has happened and what will happen assuming that no quantum jumps have occurred before and will occur after this quantum jump. This need not however be enough since it seems that geometric memories must correspond to episodal memories only rather than the declarative long term memories often expressed as internal speech. Geometric memories are also expectations rather than genuine memories about conscious experiences and one can argue that we have genuine subjective memories about what really happened. Furthermore, 'Ontogeny recapitulates phylogeny' principle suggests that the time interval spanned by our geometric memories is same as that spanned by subjective memories and thus few seconds. This leaves only one possibility: higher level selves must communicate to us information about their subjective memories whose time span is much longer than the time span of our personal subjective memories.

Semitrance mechanism seems to provide the most plausible manner to have self-narrative telling where we have come from and where we are going to. Thoughts and emotions, cognition and motivation, are the manner how higher level selves express this self-narrative to a modern man. Indeed, the time scales of emotions and moods are slow. The time scales for the action of second messengers and hormones are slow and involve changes of the synaptic strengths and modifications of the gene expression so that they could be perhaps identified as tools used by higher level selves to control the behavior of the organism. Perhaps also our cells have their own self-narratives provided by us and making possible such miraculous feats like DNA transcription: genetic determination could indeed be a long term goal of cell!

2.2.3 Thoughts, emotions, motivations and semitrance

One can imagine two strategies for how higher level self could communicate to us our self-narrative as thoughts and emotions.

1. Higher level self could communicate both geometric and subjective memories and allow us to perform the comparison generating emotions.
2. Higher level self could compare geometric and subjective memories and communicate the result of comparison to us as emotions. In this picture emotions are essentially generalized sensory experiences. The fact that the borderline between emotions and sensory experiences (pain is good example) is very difficult to draw, favors this option. This option, when combined with the identification of the quantum correlates of the sensory qualia, implies that the spectroscopy of consciousness provided by the magnetic transition frequencies applies also to emotions [K3].

Support for this identification comes from several sources. Thoughts are not direct reactions to sensory experience. Ideas pop out of nowhere. The explosive development of science and technology is perhaps the best example of the non-predictability of thoughts. The changes of emotions can be unpredictable and not direct reactions to sensory input but resulting from the comparison of what was expected or desired with what really happened and thus involving self-narrative in an essential manner. Expectations correspond to geometric memories and self-narrative tells what really happened: the comparison yields emotion serving as a control tool. Since self-narrative is told to us the one who makes ultimate comparison must be higher level self. The fact that music couples strongly to the 'hallucinatory' regions of right brain hemisphere and affects strongly our emotions, suggests that music is language of emotions.

Spectroscopy of consciousness provides additional insight to emotions consistent with the considerations above. Magnetic and Z^0 magnetic transition frequencies could parameterize the spectrum of both sensory qualia and emotions. The smaller the frequency, the more emotional the experience since the corresponding time scale is longer and deviation between the expected and real can be larger. Hence emotions could have as their correlates the cyclotron frequencies defined by the magnetic field assignable to the personal magnetic body carrying a magnetic field $B_{end} = 2B_E/5 = .2$ Gauss (B_E denotes the nominal value of Earth's magnetic field) explaining the findings of Blackman and others [M3]. These frequencies are below 8 Hz. Since cyclotron frequency is inversely proportional to the mass of the charged particle, this implies that emotions must be associated with biomolecules (second messengers, hormones, etc...).

Synesthetes are able to experience very lively episodal memories. It might be that it is possible to have multitime conscious experience with a time scale of order life span or even longer as the possibility of transpersonal states of consciousness suggests. A phase transition increasing the value of the p-adic prime associated with brain temporarily could make possible to have extended state of consciousness with subjective and geometric memories with the time scale of life span.

2.2.4 Stress and semitrance

Stress is known to induce hallucinations in schizophrenics. This suggests that stress is a general mechanism inducing entanglement with higher level selves. The basic mechanism could be very simple. In case that brain decomposes unentangled parts representing separate selves, say part of right brain hemisphere and rest of brain, this part of right brain hemisphere can get tired and 'fall asleep' which means nothing but semitrance. This makes possible the communications of higher level self to that part of brain which is awake.

Semitrance provides an alarm clock mechanism. The natural function of the holistic language regions of right brain is to remember what task primitive man was performing (say carving some tool). If the bicameral state for, say linguistic regions, dominated, semitrance began when right brain got tired and fall asleep. But just this semitrance induced 'God's voice' telling for left brain hemisphere what task bicameral man was performing! Also in the situations in which bicameral man did not know what to do, stress caused semitrance and immediate advice from the collective self. It is quite possible that the voice of conscience does it best to perform the same function in modern man! What has happened is that commands have transformed from sensory hallucinations to thoughts.

Heavy stress could also induce the splitting of entangled brain to two unentangled subselves so that collective consciousness takes the lead when right brain hemisphere or parts of it fall asleep. For instance, the exceptionally stressing situations encountered in war presumaly lead to situation in which collective consciousness takes control and soldiers behave like single organism. Too much alcohol, which probably has same effect as stress, leads to the splitting of the visual field to right and left fields: this might be interpreted as de-entanglement of right and left visual fields. This state does not yet represent the state in which right brain or part of it has fallen asleep. Further

stress leads to semitrance causing delirium. Note that also reduction of left-right inhibition must be involved with the stress.

The short period between wake-up and sleep state involves often visual and auditory hallucinations. This to be expected if falling asleep involves the decomposition of the brain to separate unentangled regions which fall asleep at different times. The lack of sleep leads also to a hallucinatory state. These phenomena support the view that stress can split self to two separate selves followed by the trance state of the right or left hemisphere or parts of it. The fact that sensory hallucinations are involved would suggest that sensory regions of the right hemisphere fall asleep first and communicate 'God's messages' to the left hemisphere.

Spinning causes dizziness and is therefore a good candidate for a stimulus causing semitrance. This could explain the social role of dance. Dance is very important also in many religions, spinning dervishes are good example of this. Children love to spin around: the reason is perhaps that spinning around induces the semitrance state of the early childhood. The dizziness caused by ill functioning of the sense of balance involves spinning like feeling in either direction. This suggests that hemispheres tend to stimulate experience of spinning in opposite directions but that normal situation they manage to inhibit each other.

One can wonder how stress leads to de-entanglement. Entanglement corresponds geometrically to the presence of join along boundaries bonds along which Josephson currents flow. This would suggest that de-entanglement involves the splitting of the join along boundaries bonds. This is possible if Josephson current vanishes: this happens if the density of the superconducting charge carriers becomes sufficiently low. Thus it seems that the disappearance of superconductivity is the required condition. Perhaps dissipative effects might cause this: the increase of temperature over critical temperature at relevant space-time sheets could cause this. This would suggest that brain is near criticality for the phase transition leading to the disappearance of super conductivity. This is in accordance with quantum criticality of TGD Universe.

2.2.5 Semitrance and EEG

TGD predicts two kinds of EEG waves [M4, M5]. Propagating waves are typically associated with linear structures such as nerve circuits and left brain hemisphere is excellent candidate for corresponding selves. Large number of subselves representing mental images are predicted and the analyticity, reductionism and temporal linearity of left brain processing can be understood if left brain waves are dominantly propagating ones. Non-propagating waves can be associated with any structure of arbitrarily large size. The corresponding mental images can therefore be holistic and correspond to large region of brain.

The regions of right brain hemisphere are excellent candidate for a seat of nonpropagating EEG waves. Quantum entanglement of subselves gives rise to the formation of parts from wholes and it seems that brain halves provide reductionistic and holistic representations of sensory percepts. As far as sensory experience and emotion is considered, it is right brain which indeed seems to be holistic.

Standard wisdom is that right viz. left brain hemisphere are responsible for holistic viz. reductionistic aspects of consciousness respectively. There is however also conflicting evidence[23] and it might be that there is some kind of division of labour [H3] such that right brain concentrates on sensory holism and left brain concentrates on cognitive holism. The experiments indeed suggest that it is left brain which recognizes holistic aspects of figures representing symbols and consisting of smaller figures representing also symbols. This would suggest symmetric scenario in which regions of both right and left hemispheres can entangle with collective selves and give rise to cognitive and emotional communication from higher level selves in modern man. This supports the view that also left brain hemisphere regions can support nonpropagating EEG waves. Gap junction connected neuron groups provide candidates for regions allowing nonpropagating EEG waves.

The entanglement with collective self corresponds to the formation of join along boundaries bonds between corresponding mindlike space-time sheet and the space-time sheet associated with some part of brain. This is expected to occur naturally if brain space-time sheet is in state corresponding to nonpropagating EEG wave.

It would be interesting to check whether there are some anatomical and neurophysiological differences between the brain hemispheres of social animals. Of course, mere reductionism-holism difference, which is not obvious anatomically, is enough. The differences of right and left brain EEG:s could be also informative. One could also study whether different brain lobes react differently to stress.

2.2.6 Both hemispheres entangle with higher level selves

The functional anatomy of brain is asymmetric: it is left brain hemisphere which is responsible for the production of speech whereas both hemispheres understand speech. Wernicke area on the left lobe and its mirror images are responsible for the understanding speech. Wernicke's area and its mirror counterpart are connected by anterior commissure. Broca area and supplementary motor cortex on left side are responsible for the production of speech. The removal of the supplementary motor cortex or Broca area yields loss of speech which is however not permanent in case of supplementary motor area. This specialization is dynamical and results from self-organization. Very ambidextrous people can have speech on both hemispheres and injury to Wernicke areas in early youth can lead to a generation of the speech areas in right hemisphere. Right brain contains counterparts of the speech production areas of the left hemisphere with no obvious function. What is surprising that large amounts of right brain tissue can be removed with surprisingly little deficits on mental function. The idea that these areas are completely useless is not attractive idea knowing that evolution has been extremely economical. So, what has been and what is the function of these areas?

The TGD inspired hypothesis modifying Jaynes's original proposal is that both Wernicke area and its mirror image of modern man entangle with higher level selves and mediate their messages as thoughts in left hemisphere semitrance and emotions in right hemisphere semitrance. Imaginative thoughts and emotions are indeed more than just mechanical reactions to sensory input. In the brain of a healthy person brain hemispheres inhibit each other during normal consciousness but when the inhibition of right brain does not occur for some reason, 'God's communications' to the right hemisphere are mediated to the left hemisphere via anterior commissure as sensory hallucinations. This inhibition is also needed to avoid splitting of perceptive fields to two parts. This kind of splitting implied by de-entanglement together with inhibition might be especially useful in cognitive regions since it would make possible internal debate between holistic and reductionistic subselves.

Rather interestingly, in case of dogs and rats anterior commissures connect olfactory areas of brain. In this case odors might be in same role as voices in case of human brain. The idea about Dog-God expressing its will and advices using odor hallucinations does not sound so weird when one realizes that even human perceives huge number of different basic odors [K3].

In this framework one can make guesses about the profile of the bicameral consciousness assuming that schizophrenics are bicameral men living in wrong time and place.

1. The evolution of modern man meant evolution of the entanglement profile of semitrance. Today 'Godly communications' are experienced as ideas and emotions whereas bicameral man experienced them as sensory hallucinations. Presumably right brain dominated as the locus of semitrance communication as suggested by the higher average intensity of EEG in right brain hemisphere of schizophrenic. Also cognitive semitrance was possible but the higher level selves were much more primitive than their modern followers since their intelligence was sum of much lower intelligences over much smaller number of individuals.

2. The brain of ancient man was part of time in entangled state but unstable against transition to split brain state induced by stress such that right brain subself was unstable against the entanglement with collective consciousness leading to semitrance in several sensory modalities. This occurred when ancient man got tired or encountered some novel situation causing stress. The anterior commissure connecting Wernicke area and corresponding area on right side is thicker in the brain of schizophrenic: this favors auditory communications between the Wernicke regions and auditory semitrance. Note that thoughts are a special case of auditory experience in TGD framework [K3] so that the replacement of 'God's voice' talking through the right hemisphere with thoughts experienced via left hemisphere (Wernicke region?) as internal speech is a rather natural mechanism leading from bicamerality to modernity.

2.3 Various aspects of semitrance state

2.3.1 Social interactions and semitrance

'Synchrony of the personal chemistries' is example of those aspects of social interactions involve aspects which are difficult to understand if one assumes that we are robots sending messages to each other. Social messages contain perhaps much more than the formal information understood and expressed by the left brain hemisphere. Certainly the emotional content of the message is crucial and is believed to be expressed and understood by the right hemisphere. This makes it often possible to intuitively 'know' whether person is lying. Semitrance involving entanglement between the right hemispheres of the communicators with some higher level self provides a mechanism might make possible this telepathy like emotional communication. Facial and bodily expression of emotion is probably not enough: autists perhaps lack the ability to fall in emotional semitrance. This would explain their ability to discriminate between faces and nonliving things. This hypothesis could be tested by comparing the EEG:s of autistic and healthy persons.

Trust is a crucial prerequisite of the survival of society and every human relationship. It requires something which might be regarded as partial regression to a child like state. Presumably it is this 'regression', the readiness to give up part of right brain consciousness, that makes semitrance possible. One example of semitrance is what happens in a group of good friends having good time together. The wittiness and rapidity of communications is something which is difficult to understand unless one is willing to accept that collective group self and group subselves are also participating the discussion through participants.

Semitrance mechanism is probably also involved in the communication of individuals: the self of a charismatic person is able to get 'hypnotic' grasp about other people by semitrance mechanism. People who live long time together in close relationship (married couples) or those who have fallen in love, perhaps form 'you+me' self rather stably. The claimed ability of close friends to communicate with each other non-verbally could also be based on 'you+me' self. It is often said that in close relationships mutual trust makes if possible for partners to purposefully 'regress' to childlike state which is prerequisite for semitrance. The state of falling in love is often indeed regarded as psychotic. That many of us lose their ability to fall in love when getting older, might be due to the lost ability to fall in childlike semitrance state anymore.

2.3.2 Semitrance and childhood

'Ontogeny recapitulates phylogeny' principle suggests that the development of individual repeats the evolution of human consciousness and early childhood should correspond to the period during which child spends considerable fraction of time in semitrance with right brain hemisphere entangled with the collective consciousness formed by the parents and family. Childhood is indeed often regarded as the era of paradise. Rather interestingly, small children turn their head to the direction of music even when their attention is directed to mother [26]. If music can induce semitrance

one can understand the importance of lullabies. Many children develop non-existing playmates: perhaps the playmate is some higher level self.

It would not be surprising if collective self would talk to child with the voices of her mother and father and that child would experience mother and father as Goddess and God. This would explain the psychology behind God-father and Goddess-mother associations and also the very strong reactive attitudes towards religion, especially at young age. Interesting question relates to the fact that many children of modern age do not have mother and father gods.

What could be the signatures of the right brain semitrance state in case of a small child? If right brain is most of the time entangled with higher level selves and if right brain hemisphere is responsible for the holistic aspects of perception and cognition, children should not have holistic view about their own body. The drawings of young children are indeed more like collections of features, in particular, the holistic view about body should be lacking. The drawings of primitive man are similar. The coherence of the motions of left and right eye might serve as a measure for entangled-ness of right and left brain hemispheres: the eye motions of very young babies are indeed incoherent.

EEG emerges at the age of about year in frequency region 4-8 Hz stably. 8 Hz corresponds to the frequency defined by the duration of memetic codeword and smaller magnetic transition frequencies should be associated with emotions. Child gets EEG temporarily in lap of her mother already at the age of 6 months. At the age of one year child learns also her first words. It would be interesting to know what happens in the emotional development of a child at this age. In TGD framework also our sensory qualia involve in essential manner ELF frequencies in EEG range, our personal higher level selves. This would suggest that the consciousness of a very young child differs dramatically from that of adult: she sees but in an entirely different manner from the manner we do.

2.3.3 Semitrance and exceptional mental abilities

Schizophrenics are often capable of incredible feats of endurance: for instance, catatonics can keep same posture for days. Socrates is one of the best known example of a catatonic of this kind. Sacks tells in his book [29] a fascinating story about his patient who was mentally retarded but could remember compositions of Bach and entire encyclopedia of music. Sacks tells also about idiot savant twins with intelligence quotient of 60 having amazing numerical abilities despite that they could not understand even the simplest mathematical concepts. For instance, twins 'saw' that the number of matches scattered along floor was 111 and also 'saw' the decomposition of integer to factors and primality. A mechanism explaining this based on the formation of wholes by quantum entanglement is proposed in [H3]. Indian self-taught number-theoretical genius Ramajunan told that he got his formulas from his personal God. These feats lose some of their mystery if higher level selves are involved.

2.3.4 Music and semitrance

The basic difference between song and speech is that the pitch in song varies discontinuously whereas in speech it varies continuously in narrow region of about one fifth of octave (the interval $C - E_b$ approximately). Rhythmic beat represents second basic difference. Music can stimulate emotions which we cannot even experience as a response to the events of everyday life.

In TGD framework speech and music could be seen as languages of thought and emotion. TGD predicts that memetic code [L1] realizes the language of cognition in terms of nerve pulse patterns of duration about .14 seconds in left hemisphere: this corresponds to frequency of about 7.1 Hz. Music in turn provides the language of emotion in which the relationships between frequencies and rhythmic elements express the content of emotion. The tempo of music could be closely related with the magnetic transition frequency associated with some 'ELF self' involved. Typically the

duration of single bar is about second and few pulses per second is the typical frequency of basic rhythmic pulses. Perhaps it is not accident that the range of frequencies in the EEG of young child is 4-8 Hz.

Right brain is the musical brain hemisphere. Anaesthetization of the left hemisphere in Wada test leads to a loss of speech but many patients can still sing. Also patients with haemorrhages on the left hemisphere can often express them singing. Even the removal of the entire left hemisphere can leave the ability to sing. Electrical stimulation of the right hemisphere produces hallucinations of singing and music. We react to speech dominantly with our left hemisphere whereas right hemisphere is activated more by music. For instance, if music is feeded to both ears with the same intensity, the music feeded in left ear is remembered and perceived better. Right hemisphere also distinguishes between melodies.

Many musicians seem to be more bicameral than average people in the sense that they spend more time in semitrance state. The ability to remember entire compositions could involve semitrance mechanism. Mozart could be perhaps seen as an example of a bicameral musician having miraculous music memory, hearing his compositions as wholes and behaving much like a child in this private life. Sacks tells in his book about a severely retarded man having miraculous ability to remember, understand and enjoy music pieces. This is consistent with the idea that emotional and cognitive intelligences are separate mental abilities.

One mysterious feature of music is that some compositions have ability to establish themselves as 'classics'. If themes and compositions are emotional representations of memes, one could see classics as survivors in the memetic fight for survival. Music induces deep emotional experiences, also religious experiences, and surviving music pieces could be also seen as idols, pictures of 'Gods'. I find it difficult to understand the deep affect of the pop music of my youth to my generation unless it expressed something essential about the collective mental landscape of that generation not expressible using only language.

2.3.5 Poetry and semitrance

Modern poetry could perhaps be regarded as intermediate between thought and emotion: as a language using both words and elements of music to express ideas. Ancient poetry would in turn be dictated in semitrance as God's voice. In his book [26] Jaynes represents an analysis of ancient poetry relating it to music. Here only some comments about this analysis are made. Epics of Greeks by the aoidoi was heard and spoken as poetry. Also Veda was poetry dictated to Rishis or prophets and Hebrew prophets were often poets. Also schizophrenics often talk in verse. Translating Jaynes views to TGD framework, one can say that early poets were in right brain semitrance state which later developed to trance state (Plato regarded poetry as divine madness) and ultimately to the modern form in which poems were consciously composed in inspiration, which corresponds in TGD semitrance state to which the linguistic regions of both hemispheres participate. Note however that in TGD framework only the mode of communication changed from auditory hallucinations to cognitive and emotional communications.

Poems like music are rhythmical: perhaps the frequency involved with the beat corresponds to ELF frequency involved with the contact helping to 'stay in touch with Muses'. The basic rhythm of Greece poetry was dactylic hexameter. As in music the pitch varied discontinuously: basic unit being GCC. Constant pitch is used also in orthodox divine service. The role of rhyme is interesting. Syllables involve characteristic frequency distribution: since rhymes favor same vowels they favor also similar frequency distributions. This might lead to a resonance effect in which verses resonate with the mental images of the earlier verses reverberating in neural circuits and establish repetitive structures with repetition frequency defined by the duration of verse also favoring establishment of entanglement. Jaynes believes that first poems were sung and the use of music instrument helped to get the divine inspiration by stimulating semitrance state in the linguistic regions of the right brain hemisphere. Lullabies presumably have the same effect in child.

Jaynes sees ancient poetry as the emergence of long term memories at the level of individuals. Beautiful Muses, daughters of Mnemosyne, which later came to mean memory, singing in unison expressed stories about past whereas prophets told predictions for future. The transformation of the communications of the higher level selves from sensory hallucinations to thoughts and emotions could explain why modern poets do not receive their poems from Muses. What is fascinating that Muses appear in plural. This might be related to the ability of right brain hemisphere to represent musical instruments and voices as separate subselves whereas ordinary speech corresponds to single subself.

2.3.6 Semitrance and the development of human civilization

TGD based vision about evolution of civilization modifies Jaynes's views. During evolution the profile of semitrance was changed: the voices of gods were transformed to abstract emotions and thoughts and the time spent in semitrance was shortened. Thoughts indeed merge spontaneously and are much more than reactions to sensory input: the great rise of mathematics and philosophy few centuries B.C. was dramatic example about transformation of the world of spirits, demons and gods to the world of abstract ideas. Also moods and emotions can be regarded as communications involving semitrance mechanism allowing to guide individuals in more delicate manner than just giving commands. Long term goals involve communication of this kind. The need of the collective selves to survive manifests itself as rules of behavior, moral. The notion of moral as a 'voice of conscience' is consistent with the assumption that collective self expressed its will as auditory hallucinations for primitive man and with the idea that thoughts and emotions have replaced direct auditory hallucinations in this communication. TGD based model of sensory modalities explains thoughts as internal speech which is special case of auditory experiencing.

The tragic consequence of semitrance mechanism was the loss of face-to-face sensory contact with Gods. Celestialization of the visible Gods is the basic theme of Old Testament. Later Nietzsche announced the death of gods and postmodernism tells that also great narratives are dead. Conscious sensory 'face-to-face' communication with collective consciousness, 'God', occurs only during religious experiences and during dreams. In ancient societies dreams were indeed taken as messages of God and also nowadays many individuals do so.

There are all kinds of collective selves, also demon like creatures. It would not be surprising if demonic collective selves would not favor political leaders able and willing to listen to them in crisis situations. Jung proposed that a collective self which he called 'Wotan' was behind the rise of Nazism. There are many stories about political leaders believing in dreams and omens and asking advice from crystal gazers. Many leaders have been schizophrenic personalities (Jeanne d'Arc, Stalin, Hitler): it might be that just the ability to hear the voice of the collective consciousness gave them the self-confidences and charisma making them leaders. Needless to say, the examples of Stalin and Hitler show that the collective selves with intelligence of a stone-age village god are not sufficiently intelligent to lead modern nations.

3 Semitrance and mental disorders

Jaynes identified schizophrenic as a bicameral man in modern society and went to make a prediction that right brain contains hallucinatory regions. This prediction has been verified [28, 24]. In TGD framework the picture of Jaynes generalizes to a more general vision about mental illness. It seems that semitrance mechanism might provide considerable insight into various types of mental abnormalities and one could perhaps regard various mental disorders as abnormalities in communication. Both semitrance communication between various levels of self hierarchy and communication between brain hemispheres are involved.

3.1 Schizophrenia and semitrance

Jaynes's hypothesis that schizophrenic is a bicameral man living in modern society explains basic facts about schizophrenia. It is also consistent with the historical evidence: according to Jaynes [26] schizophrenia was described for the first time as insanity at about 400 B.C. when modern subjectivity had established itself. As will be found Jaynes's hypothesis generalizes to TGD context in natural manner.

3.1.1 General wisdom about schizophrenia

About 1 per cent of population suffers from schizophrenia, milder form of disease is schizotypal personality disorder suffered by 2-3 per cent of population. Neuroscientific approach to schizophrenia regards schizophrenia primarily as a disorder of cognition [27] although it is also disorder of perception, emotion and social relationships. Kraepelin suggests that schizophrenia is basically a splitting of the cognitive side of the personality from the affective or emotional side: the correlation between emotional responses and real situation may be lacking: schizophrenic can laugh in situation in which he should cry. Schizophrenia resembles manic depressive disorder in that it involves negative (nonpsychotic) and positive(psychotic) periods. During the non-psychotic episodes symptoms, referred to as negative symptoms, are social isolation and withdrawal; odd behavior and ideas; neglect of personal hygiene; blunted affect. Psychotic episodes are characterized by what are called positive symptoms: loss of the reality testing; various hallucinations, in particular auditory hallucinations; delusions (aberrant beliefs); incoherent thinking; confusion. In paranoid schizophrenia megalomania and delusions of persecution dominate.

There is strong evidence that schizophrenia is partly genetic abnormality [27]. Some schizophrenics have prominent anatomic changes in their brain. There is also evidence for physiological mechanisms. Antipsychotic drugs improve dramatically the treatment of the psychotic phase of illness. It is known that antipsychotic drugs block dopamine receptors and it was therefore thought that the excess of dopamine transmission is important factor in schizophrenia. It is also known that blood flow in the frontal lobes of schizophrenics is reduced and is not further enhanced during intellectual tasks[27]. This is consistent with the interpretation of schizophrenia as a cognitive disorder. This has led to the suggestion that there is an increase in the activity of the mesolimbic component of the dopaminergic system and a reduction in the activity of the prefrontal area which accounts for the negative symptoms. It has however become clear that abnormalities in the dopaminergic transmission do not account for all aspects of schizophrenia. Although antipsychotic drugs occupy dopamine receptors very quickly, there is a delay of 1-2 weeks in the appearance of therapeutic effects. Thus it seems that antipsychotic effects are secondary to other consequences induced by the binding of the drugs to receptors. It is quite plausible that modifications of gene expression might be induced in cells responding to dopamine.

In TGD context Jaynes's hypothesis means roughly following.

1. The left brain hemisphere of the schizophrenic spends abnormally brief fraction of time in cognitive semitrance so that the cognitive self-narrative of the schizophrenic does not satisfy the requirements posed by the modern society relying on abstractions. Also the emotional self-narrative provided by the right brain hemisphere is poorer than normally. This explains reduced linguistic and cognitive abilities and emotional flatness.
2. The lack of proper cognitive and emotional self-narratives is compensated by a sensory self-narrative made possible by right brain semitrance and communicated to the left brain hemisphere as sensory hallucinations. This hypothesis explains the splitting of sensory field to part representing 'real world' and the part communicated by collective consciousness to left hemisphere. During negative period schizophrenic the contact of the left brain of schizophrenic to 'Gods' is split and schizophrenic experiences desperate alienation.

3. Compensation requires that the inhibition of the right hemisphere by the left hemisphere is weaker than normally. For a schizophrenic the left and right brain presumably de-entangle to higher degree than for a normal person. The reduced activity of frontal lobes and the increased activity of some parts of paleobrain are consistent with this hypothesis. Dopamine is one of the neurotransmitters responsible for the activity of brain regions and antipsychotic drugs indeed affect the abnormal dopamine levels. The abnormal dopamine levels are very probably related to the reduction of the inhibition of right brain hemisphere by left one.
4. Presumably the time fraction spent in right brain semitrance is higher and the average duration of the semitrance period is longer. Also the probability of right brain semitrance induced by stress is presumably higher than normally. This allows to understand why stress induces positive symptoms of schizophrenia so easily.

3.1.2 More about symptoms of schizophrenia

Thoughts and emotions received from higher level selves and the sensory holism of the right brain hemisphere save the healthy person from the loss of 'analog I' (using the term of Jaynes). In schizophrenia situation is different and the decay of personality and concrete loss of the boundaries of body, is one of the most terrifying experiences of a schizophrenic. The loss of 'analog I' results from two mechanisms. First, the left brain of a schizophrenic fails to receive cognitive self-narrative about 'I'. Secondly, during sensory semitrance right brain hemisphere does not provide a concrete sensory representation for the holistic aspects of body. The story of Oliver Sacks about Dr. P. [29] illustrates in moving manner the notions of cognitive holism and the loss of sensory holism. Dr. P. had lost holistic visual consciousness due to a tumor in right occipital lobe and this led to rather amazing symptoms. Dr. P. elegantly characterizes glove as a 'Geometric shape containing five elongated bags' but is not able to recognize the function of glove. Dr. P. also sees faces as mere collections of features. Music however provides Dr. P. with partial sensory holism: he is able to recognize persons through their 'body music' and sings himself through the everyday activities like clothing and eating. Perhaps this is nothing but entanglement of right brain Wernicke area with higher level self.

Schizophrenics find it difficult to draw their bodies: this is used as a diagnostic test. This difficulty presumably reflects both the decay of the cognitive self picture formed by left brain and the loss of the right brained sensory model of self caused by abnormally long periods of entanglement with higher level selves. Eye motions of schizophrenics are also abnormal: the coherence of motions of right and left eye is not so good as in case of a healthy person. It might be that this is partly due to the semitrance of the regions of right brain controlling eye motions.

The breakdown of the personal narrative reflecting itself also as a loss of personal time is also regarded as a symptom of schizophrenia. If personal narrative is told by higher level selves to person using basically language and if schizophrenia is cognitive disorder, it is not a wonder that this narrative breaks down and in worst situations leads to the loss of self.

Voices and other sensory hallucinations can be interpreted as resulting from the semitrance of right brain sensory regions. Voices can be malevolent and persecuting as to drive schizophrenic to flee or attack some-one. Voices can also act as benevolent guides in the daily activities of the schizophrenic. Voices can even induce religious ecstasy. TGD suggest that the higher level selves talking which these voices are indeed malevolent or benevolent as also human beings are. An open question is whether the patient could to some degree decide with which selves to entangle. This might be the case: suggestions by authorities can affect very dramatically the hallucinations and even eliminate them [26]. Of course, the experience about the malevolence or benevolence of the voice might be due to cognitive disorder of patient.

The megalomania of the paranoid schizophrenic is probably related to the experience of being a selected messenger hearing God's voice. This interpretation is with that prophets seem to also

have been persons able to directly hear God's voice. The experience of a paranoid schizophrenics about being persecuted need not be a mere hallucination. Social games are played all the time in modern society. This leads schizophrenic to an extremely stressing situation: schizophrenic hears the authoritative voices of the collective group self telling the truth and the conflicting messages told by human mouths. The painful and stressing nature of social communications explains also why social isolation is one of the symptoms of schizophrenia and why schizophrenics are so suspicious. This leads to isolation and behavior promoting isolation such as neglect of personal hygiene: negative symptoms result from the avoidance of social stress inducing positive symptoms. Normal person receives the messages of the collective selves as thoughts and emotions which are not so authoritative and in conflicting situations they can be blamed to be only reckless imagination. Suicide is extreme example of the authority of the voices: it would be perhaps better to say that person does not perform suicide but is murdered.

Automatisms are one important aspect of schizophrenia. Schizophrenic cannot resist the authority of the voice telling him to do things which he would not do normally. The emotional state of the schizophrenic need not be consistent with what he is doing: schizophrenic can dance or sing without being happy or can laugh when he is unhappy. This suggests that also the communication of emotions fails. Command automatisms are one example of automatisms. Patient is very apt to suggestions of authority and can remain in in some posture for hours if physician suggests this. This might be due to a hypnotic suggestion involving direct entanglement with the brain of authority. Also completely unconscious automatisms are possible and can be understood as activities not involving the mediation of the left brain hemisphere. For instance, patient may feel that someone else is moving his tongue or cannot stop his mouth from singing. In the framework of TGD patient is indeed 'half-possessed' by the demon like higher level self. Echolalia is one of the most amazing schizophrenia like disorders: patient can mimic the speech, facial expressions and gestures of other persons like automaton. Semitrance involving entanglement of motor regions of the right brain hemisphere with the brain of another person explains this. Also hallucinatory echolalia in which one cannot identify higher authority as any known person is possible.

Flattening of affect and loss of emotions occurs also often during both the positive and negative periods of schizophrenia. This is consistent with the hypothesis that higher level selves communicate with schizophrenic via sensory hallucinations rather than thoughts and emotions.

3.1.3 About neurophysiological signatures of schizophrenia

Jaynes [26] mentions also several signatures of schizophrenia related to EEG, brain anatomy and neurochemistry. These signatures are consistent with the assumption that schizophrenic is more sensitive to semitrance induced by stress; that the fraction of time spent in semitrance is higher than in case of normal person and that the profile of semitrance communications favors sensory experience instead of cognition and emotion.

1. The average EEG is slightly more intense in the left brain hemisphere of a healthy person whereas for schizophrenic the roles of left and right brain are changed. As already noticed, TGD based approach predicts that standing EEG waves make possible entanglement with higher level selves. Thus the assumption that EEG dominance correlates with the presence of standing EEG waves making possible the entanglement with higher level selves, explains this asymmetry.
2. Sensory deprivation increases dramatically and rapidly EEG activity. The effect of sensory deprivation is easy to understand: in case of a schizophrenic right and left hemispheres are more loosely entangled than in case of healthy person: during unentangled state right brain hemisphere or parts of it fall asleep when so that semitrance and hallucinations result. Healthy person simply gets drowsy and falls even asleep in the absence of sensory stimuli.

3. The EEG of a healthy person exhibits slight right or left brain dominance with a period about one minute: in case of a schizophrenic this period is about four minutes. EEG seems to stuck in left/right mode. This means that the probability of the right brain hemisphere to fall asleep during the 4 minute period of intensified EEG is high so that sensory semitrance can result. The longer period might be an attempt to enhance the reduced probability to fall in cognitive left brain hemisphere semitrance in order to save cognitive self-narrative. The longer period however implies higher probability for the schizophrenic to fall in sensory semitrance during the psychotic period of the disease.

This can be understood more quantitatively as follows. The simplest assumption is that the probability of the hemisphere to 'fall asleep' during time interval Δt is $dp = \lambda \Delta t$, where constant. The probability to fall in semitrance in interval $(t, t + dt)$ is

$$dP = (1 - P(t))\lambda dt \ ,$$

which gives for the probability of not falling in semitrance during interval t of enhanced EEG activity

$$P = \exp(-\lambda t)$$

For schizophrenic the probability P_s to not suffer hallucination is

$$P_s = P_h^4 \ ,$$

where P_h is corresponding probability for healthy person. In case of a schizophrenic λ is anomalously small for the left brain hemisphere but could have normal value for the right hemisphere. Already this simple model gives a rough quantitative grasp about difference of healthy and schizophrenic person.

In his book Jaynes made the hypothesis that the linguistic regions of right brain are the hallucinatory regions of schizophrenic. It has been found that neural activity in various parts of right hemisphere increases during the auditory hallucinations of schizophrenic [28, 24]. This would suggest that also other regions of the right hemisphere are involved with hallucinations. TGD indeed suggests that in case of schizophrenic also other than linguistic regions are in semitrance.

The bundles of axons in corpus callosum connecting right and left brain are by 1 mm thicker for schizophrenic than for healthy person. This suggests more intense sensory communication from the right hemisphere to the left hemisphere favoring the generation of sensory hallucinations. Note that auditory hallucinations are presumably associated with the anterior commissure connecting Wernicke area to its counterpart in right brain hemisphere.

3.1.4 What good in schizophrenia?

Defectological view sees schizophrenia as a collection of defects whereas evolutionary psychology sees schizophrenic as an inhabitant of wrong time and place. Schizophrenics differ from ordinary people in several aspects helping adaptation to more primitive society. Schizophrenics have much more livelier perceptive landscape than the normal ones. For instance, visual perception is known to be sharper. The blocking of alpha waves as a reaction to sudden sensory stimuli occurs faster than in healthy persons. Schizophrenics can work hardly for much longer times and are able to tremendous feats of endurance. Catantonia is one example: schizophrenic can spend days in a posture which normal person could not tolerate more than a minute. All kinds of explanations for the ability of ancient men to build pyramids and other architectonic miracles have been proposed but the incredible endurance of bicameral men is the most plausible explanation. These feats do

not reflect endurance of an ordinary human being but of a higher level self using schizophrenic as instrument.

3.1.5 Nature or nurture?, possible cures?

Schizophrenia seems to be both genetic disease and disease of self-organization of brain. Self-organization aspect makes schizophrenia a genuine quantum disease (or abnormality). Schizophrenia can be seen as the failure of the left brain hemisphere of a schizophrenic to cognitively self-organize to the level achieved by normal persons. More concretely, the de-entanglement of the sensory regions of the brain hemispheres occurs too easily and is followed by the trance of the corresponding right brain regions. Also the profile of the semitrance communications is abnormal. This defect could be associated with some aspects of personality only and they could be perhaps characterized by effective cognitive ages with various types deducible from EEG pattern of the patient. If self-organization aspect dominates over genetic factors, suitable external stimuli could perhaps make possible healthy self-organization. The symptoms of schizophrenia appear at the verge of the adult age which suggests that schizophrenia is to high degree this kind of disorder.

If self-organization aspect dominates and schizophrenia is inability to achieve full cognitive age, the EEG of children should have some (not necessarily all) characteristics of a schizophrenic person. One could check whether the above listed EEG signatures characterize also the EEG of children. Especially interesting in this respect is the 8 minute period of schizophrenic EEG as compared to the 2 minute period of a healthy persons making the probability of the semitrance state high.

One could image the elimination of the positive symptoms of the schizophrenia by electrically stimulating appropriate regions of patient's brain using electric implants to make falling to semitrance less probable and to reduce the fraction of time spent in semitrance nearer to its normal value. The total elimination of semitrance would however transform positive symptoms to negative ones and would split the communication with higher level selves, which seems to be essential for the self-narrative. Also the inhibition of the right left brain communication is one manner to eliminate hallucinations and presumably the effect of antipsychotics is based on this inhibition. One could however consider possibility of inducing left brain hemisphere semitrance to improve cognitive communications with higher level selves.

Social isolation of the schizophrenic is presumably due to the contradictory messages received by semitrance mechanism and via externalized communications. Therefore schizophrenic might be completely happy in the social environment where this discrepancy is absent. Thus genuine love, respect and acceptance are perhaps the most effective manner to reduce the sufferings of the schizophrenic.

3.1.6 Tourette's syndrome

Tourette's syndrome is a mental disorder having close resemblances with schizophrenia and it seems that the reduction of the entanglement between the speech regions of right and left brain hemispheres could explain this. It is not however obvious whether entanglement with higher level selves is involved or not. For a description of Tourette's syndrome reader the books of Jaynes [26] is recommended. Sacks tells in his 'Man who mistook his wife for a hat' tells also a story about Tourette's syndrome.

Tourette's syndrome usually shows its first symptoms in childhood at the age of five or sometimes earlier. In the beginning the symptoms are mild: facial twitch or bad word out of context. This develop to uncontrollable emission of obscenities, grunts, barks, or profanities in the middle of otherwise normal speech. Tourettians are extremely 'sensory': they love to feel things by touching and even by tasting them. They have ticking like appearance and are enormously spontaneous in their behavior. Tourettians are often artistically gifted. Tourettians can cope in society due to modern medication. They are fully conscious of their state and have bivalent attitude to their

state: they suffer from it but feel that they would lose something valuable in normal state of mind. Sacks tells about a Tourettian how resolved the problem by coming week-end Tourettian living ordinary life during working days! Tourette's syndrome involves abnormal brain wave patterns, some central nervous system damage, and usually left handedness.

The symptoms of Tourette's syndrome bring into mind a continual fight between two personalities: the second personality intrudes continuously to the activities of the dominating personality. This situation resembles split brain personality to that occurring when the physical connection between brain hemispheres is cut. Perhaps some regions of left hemisphere have abnormally weak entanglement with the corresponding regions of the left hemisphere so that right and left hemisphere are competing for the usage of speech organs. It is not clear whether semitrance mechanism could be involved so that Tourettian would be 'semi-possessed'.

3.2 Disorders of mood

In neuropsychology one distinguishes between moods and affective responses [27]. Moods are long lasting emotional states whereas affective responses are direct emotional reactions. Euphoria, elation, pleasure, surprise, anger, anxiety, disappointment, grief, sadness, despair, depression are normal affective responses. In disorders of mood three of these responses become abnormally strong: euphoria (manic disorder), depression and anxiety.

One can distinguish between unipolar depression and bipolar depression (manic-depressive disorder). Unipolar depression can be reactive, endogenous or atypical(!). In endogenous case (melancholy) symptoms are depression with diurnal variations (mornings are especially difficult), insomnia and frequent awakenings with early morning waking, anorexia, psychomotor agitation and mental pain, loss of interest to almost all activity and lack of response to pleasurable stimuli (ahedonia). Endogenous depression does not lead to emotional or intellectual underactivity. Reactive depression results from a specific stress, like loss of job, family member, etc... and is not so pervasive as endogeneous depression. Maniac 'suffers' from euphoric periods. Elevated, expansive or irritable mood lasting at least one week, over-activity, over-talkativeness (or hypergrafia), social intrusiveness, increased energy and libido, pressure of ideas, grandiosity, decreased need for sleep, reckless involvements. Perhaps manic-depressive and creative person differ in that creative person has some well defined long term goal to which he/she can direct this immense energy.

The key feature of the panic disorders is fear: arousal, restlessness, heightened responsiveness, sweating, racing heart, increased blood pressure, dry mouth, a desire to run or escape, and avoidance behavior. There are two basic types of anxiety disorder. Panic attacks are brief, recurrent, spontaneous episodes of terror without any clearly identifiable cause. Generalized anxiety is long lasting (lasting for six months or longer). The symptoms are motor tension, autonomic hyperactivity, vigilance and scanning (feeling on edge, exaggerated startle response, difficulty in concentrating).

Reductionistic neuroscientists seem to forget social factors in attempts to understand mental disorders. They cannot but agree that reactive depression correlates with a personal loss but do not mention social factors in case of melancholy. The natural guess would however be that melancholy differs from reactive depression in that it correlates with long lasting stress such as loneliness or some unachieved long term goal. Of course, melancholy in turn favors the continuation of this situation. One could also wonder whether it is really sensible to talk about disorder of mood when mood actually reflects very faithfully the actual social situation. It is known that genetic factors are important in various forms of depressions. But again, genetic factors could help to build an individual whose fate is to question for the values and beliefs of the community and the hostile reaction of the community could be the primary cause of depression and even physiological changes.

3.3 Mental disease as communication disorder?

TGD suggests modification of the standard views about mental disorders. Basic principle in biochemistry and control and coordination of living matter is dynamic equilibrium in which inhibitory and excitatory effects cancel each other in equilibrium: a good example of this principle at work is the process of standing still. There is abundant evidence that the structures of the left and right hemisphere have inhibiting effects on each other: there is a temptation to regard this inhibition as a particular example of a general principle. The mutual inhibition could also be seen as a mechanism guaranteeing division of labor: symmetric functioning leading to redundancy is not possible. The failure of the mutual inhibition could be seen as a general mechanism of mental illness so that the metaphor of mental balance would be much more than metaphor. Standard neuroscience favors this view.

TGD suggests however a different view. One could also see mental illness as a failure of communication between brain hemispheres and higher level selves. Messages of higher level selves could be simply misunderstood or not received at all. For instance, the communication of emotions could be inconsistent with communication of subjective and geometric memories whose comparison should determine the emotions. In this picture the sensory hallucinations of a schizophrenic and prolonged periods of hemisphere dominance could be seen as an attempt to compensate the poor cognitive semitrance communications of the left hemisphere with higher level selves. The lack of the right brain inhibition by left brain indeed allows right brain hemisphere to communicate the messages of the collective consciousness to the left hemisphere.

Empirical facts about lesions of brain make it possible to test the idea about mental disease as a disorder of communications. When temporal lobe epilepsy is caused by a lesion of the left temporal lobe, 90 per cent of patients develop the symptoms of paranoid schizophrenia with massive auditory hallucinations. If the lesion is on the right temporal lobe, patients tend to develop manic-depressive symptoms. This suggests that schizophrenia and manic-depressive disorder are mirror images of each other. Indeed, negative and positive symptoms of schizophrenia correspond to the depressive and manic periods of manic-depressive psychosis. Schizophrenia and manic-depressive psychosis are indeed somehow dual: the positive period of schizophrenia is more like passive experiencing of hallucinations whereas the manic period of manic-depressive psychosis involves over-activity and the lack of emotional guidance leading to reckless involvements. This could be understood if left brain is passive thinker and right brain is active decision maker. In absence of the guidance of the higher level selves patient behaves abnormally. This duality supports the view that both brain hemispheres of a healthy person participate to semitrance communications. Complete symmetry would suggest that also left-to-right lobe communications are possible. In case of manic-depressive disorder these communications should occur during the manic period of disease and should be suppressed during the depressive period.

In this conceptual framework one could understand why both schizophrenia, manic depressive disorder and anxiety disorder have two different manifestations and semitrance mechanism suggests a unified view about these disorders.

1. Defects of left (schizophrenia) or right (manic depressive disease, anxiety disorder) brain semitrance communications are the basic characteristic of these diseases. Brain tries to compensate the lacking communications: the opposite healthy brain hemisphere is still capable of effective semitrance communications and tries to help the opposite hemisphere by communicating it the guidance it receives from higher level selves. Unfortunately, this compensation is not complete and is present only during active period of disease and lacks during the passive period.
2. The fraction of time spent by the healthy hemisphere in semitrance involving communications with opposite hemisphere, call it briefly τ , could be an important parameter measuring the character of illness in all these three cases. During the passive period (period of negative

symptoms in schizophrenia/depression/panic disorder) τ is abnormally low and patient is like a rejected child and in the absence of telepathic guidance and encouragement patient finds social contacts difficult and tends to withdraw from social interaction. During active periods (positive symptoms/manic period/general anxiety disorder) τ is abnormally high giving rise to the sensory hallucinations of the schizophrenic and to the euphoria and social intrusiveness of the person suffering manic disorder. In case of the anxiety disorder even the presence of left-to-right brain communication is unable to save patient from the general anxiety disorder, which gets even worse in the absence of this communication.

4 Semitrance, trance and altered states of consciousness

It seems that semitrance mechanism could also provide understanding about various altered states of consciousness. In some cases it is difficult to draw a borderline between trance and semitrance and therefore also trance like states are discussed in the following.

4.1 Sleep, trance and dreams

Sleep and trance are unconscious states from the point of view of individual although higher level self is certainly conscious. The distinction between sleep and trance provides an interesting challenge for quantum theories of consciousness. During trance state entire brain is strongly entangled and human body serves effectively as organ of the higher level self. Concerning the interpretation of the sleep state, the first hint comes from the observation that the wake-up from sleep occurs much more easily than from trance state. This suggests that entanglement is now weak and near to the critical value. There is also evidence for some kind of information processing occurring in brain during sleep state.

Quantum computing have been suggested as a metaphor for the information processing performed by brain. The information processing performed by a quantum computer is unconscious in TGD framework and in case of an ideal quantum computer occurs just at the border of conscious and unconscious state so that entanglement is as weak as it can be. This would suggest that quantum computing like activities indeed occur during sleep. Of course, quantum computing in the strict sense of the word is probably too restricted a notion to be applied in case of biological structures. It might be however that the unconscious information processing by brain known believed to occur during sleep is analogous to quantum computing.

Trance states involve the entanglement of entire brain with higher level self. The claimed ability of mediums to communicate with dead and induce aspirations of dead relatives could be based on ability of the medium to entangle with the collective consciousness of the participants of the sitting as well as to induce semitrance in the participants. The semitrance of the participants is also essential for the formation of the collective self. Sleepwalking probably also represents a trance state in which sleeper serves as a motor organ of the collective self. The many variants of religious possession, such as talking with languages, could be regarded as trance states. Shamanism and oracles represent also examples of trance states. In this case trance state is induced artificially.

Hypnosis presumably involves the entanglement of the hypnotizer with part of subject person's brain which thus becomes part of the hypnotizer. Swinging pendulum is a classical auxiliary tool used to induce hypnosis. Perhaps the rhythm of the swinging pendulum corresponds to a relevant EEG frequency associated with the collective self formed by the hypnotizer and subject person. Concentrating attention to the pendulum might induce semitrance (at least it causes dizziness). The attention of the subject person is concentrated to the pendulum and to the voice of hypnotizer and the scope of consciousness is gradually reduced. It is not clear whether the final

state is semitrance or total trance. Semitrance option is consistent with the fact that schizophrenics are very apt to suggestions.

During dreams only part of brain is conscious and this in principle makes possible communications from those parts of brain which are in semitrance. Of course, it is quite possible that brain generates the dreams itself. Both dreams dominated by auditory and visual experiences and dreams consisting of internal speech are possible. Dreams are often passive (lucid dreams are an exception) which would suggest that sensory semitrance mechanism involving either or both hemispheres is indeed involved. This of course does not exclude the possibility of active generation of hallucinations as occurs during lucid dreaming. Communication (generating mental images/waking up subselves in receiver) can be also bi-directional. Even fetus seems to have periods of REM sleep. An interesting question is whether it possesses EEG like activity at higher frequencies say 60-70 Hz associated with REM dream. If so, our dreaming state would be much like return to prenatal consciousness involving semitrance with sensory hallucinations. Ordinary state of consciousness could quite well involve also very short intervals of trance during which higher level selves communicate with entire brain but unconsciously. An interesting question relates to how much the EEG profile in REM sleep (average EEG frequency is 65 Hz) resembles the profile associated with the visual and auditory hallucinations of schizophrenics. Interestingly, many (not all) schizophrenics spend abnormally short time in REM sleep. Perhaps the total time spend in semitrance is what matters.

4.2 Altered states of consciousness

4.2.1 Religious and similar experiences

Various religious experiences are excellent candidates for semitrance states and could correspond to the entanglement with the highest levels of the self hierarchy possible for human. Persinger's work [33] related to the effects of ELF em fields to brain provides support for the notion that topological field quanta of ELF em fields are correlates of the higher level selves. Stimulation of the right hemisphere using various patterns of magnetic pulses of duration of about millisecond with frequency between 1 and 50 Hz generates various kinds of altered states of consciousness. The basic experience is sensing the presence of something which can be benevolent or malevolent. Obviously this something must inform subject person about its presence via semitrance mechanism. Seeing angels are typical religious experiences and have obvious explanation as right brain semitrance.

Persinger explains UFO experiences as modern versions of religious experience allowed by the non-religious culture we live in [33]. This is what also TGD predicts: it is left brain which interprets the messages of higher level self using the available belief system and conceptual framework. Persinger's view is materialistic: he sees religious experiences as mere neural activity coupled with geo-electromagnetic fields. Also changes in Earth's magnetic often induce altered states of consciousness and there is strong statistical evidence about the effects of the magnetic storms on the well being of the patients of the mental hospitals. These effects are consistent with semitrance hypothesis and the hypothesis that magnetic and Z^0 magnetic transition frequencies provide spectroscopy of consciousness [K3]. Note however that the endogenous magnetic field $B_{end} = 2B_E/5 = .2$ Gauss explaining various findings about ELF effects on brain is not identical with the Earth's magnetic field B_E and could be interpreted as "dark" magnetic field accompanying it [M3]. Experiences in which person meets deceased relatives can be produced with highly reliable methods [22]. Semitrance mechanism provides explanation for these experience and suggests that some levels of personal electromagnetic self hierarchy survive in 'physical' death.

There are also experiences not identifiable as semitrance experiences. For instance, meditative experiences in which mind is totally empty belong to this class of experiences. TGD based explanation of these states as states of 'whole-body consciousness' relies on the notion of irreducible self having by definition no subselves (mental images). These kind of states presumably involve

mutual entanglement of the left and right hemispheres. One could say that irreducible selves are for consciousness what elementary particles are for physics.

4.2.2 Telepathy, clairvoyance and identification experiences

In [H4] I have considered the explanation of phenomena like telepathy, clairvoyance and group consciousness. These experiences can be explained in terms of semitrance mechanism involving entanglement with ELF selves assuming that rather abstract concepts exist physically as higher level selves as TGD indeed predicts.

Especially fascinating are identification experiences [25] [H4]. The objects with which person can identify range from elementary particle, via objects of inorganic and organic world (like animals, the mothers of all dead soldiers, etc..) to entire Cosmos. It is not obvious whether a mere semitrance is sufficient to explain identification experiences. TGD provides a more general mechanism making possible transpersonal consciousness. For definiteness assume that right brain hemisphere is in trance state and that left brain experiences a phase transition increasing the p-adic prime characterizing it so that this prime becomes larger than equal to the p-adic prime characterizing higher level self entangled with the right hemisphere. In this kind of situation remembered extended state of consciousness results if left brain hemisphere entangles with the latter system. Various religious and enlightenment experiences could perhaps be understood as examples of this kind of experience. In particular, Brahman=Atman experience in which person identifies herself with God, following semitrance experience about direct personal contact with God, could represent this kind of experience.

Perhaps enlightenment can be identified with what might be called 'loving state'. 'Loving state' involves extension of self and should therefore make possible to affect the state of other living beings by semitrance mechanism. TGD predicts that DNA can be in self state and its binary structure suggests the possibility of semitrance states. There is empirical evidence that people in 'loving state' can affect the degree of winding of DNA [21]. The coherence of ECG is used in these experiments as a measure for how deep the 'loving state' is and the degree of the winding of DNA correlates with the intention to wind (unwind) DNA.

4.3 Stephan's case

'Stephan's case' was one of the stimuli which made me conscious about the challenge of formulating precisely how different levels of the self hierarchy can communicate with each other. I learned about Stephan's case via email correspondence with Stephan's mother. Stephan was a victim of brain injury and his survival was regarded by several specialists as a "miracle" from the viewpoint of standard medicine. There were also some other miracle like occurrences during the period after accident and they could perhaps be interpreted in terms of trance and semitrance states. In the sequel Stephan's case is discussed as a possible example of entanglement with higher level selves involving trance and semitrance mechanisms.

I hasten to admit that my personal knowledge about practical medicine is very restricted and that I must therefore stay at general level in my interpretations. Second reservation: these interpretations are the first attempt to apply TGD inspired theory of consciousness to individual person and must therefore be taken with grain of salt. I learned from Stephan's case from Stephan's mother who contacted with me and asked whether TGD approach to consciousness could say something about Stephan's case. In the following I will use excerpts from the correspondence with Stephan's mother to describe what happened.

There is additional aspect related to Stephan's case about which I became conscious only when trying to learn about body consciousness. This aspect is related genetic engineering involving unholy alliance of science and business. To learn what is really involved, it is good to read Mae-Wan Ho's article about the dangers of genetic engineering [18]. The most hard-nosed genetic

engineers are ready to build headless humans to provide spare parts for the more lucky ones. The justification for this comes from the basic dogma of neuroscience. No brain, no consciousness. I feel horror when trying to imagine what it is to be a conscious human without head and losing gradually organs. Limb today, liver tomorrow, next week heart, and so on. What does this helpless living creature experience?

4.3.1 What happened?

In the following is the report of Stephan's mother about the accident.

Accident

Stephan had just turned 21 and was travelling with a friend to see his grandparents in Oklahoma. They got as far as a State Park campground outside of New Orleans. The vehicle Stephan's friend was driving clipped a wooden sign too close to the narrow park road, which catapulted the side-view mirror assembly into the passenger window. It hit Stephan over the left eye, bounced and hit him at least 2 more times, and shattered his face and skull into more than 100 pieces. Displacement of bone fragments dissected the left internal carotid artery, caused 2 pseudoaneurysms in the left middle meningeal artery, and shear injury caused formation of a carotico-cavernous fistula where the vessel tunnels through the base of the skull.

Records state that first aid was rendered by an elderly priest who was walking near the accident scene, and who used to be a physician. He applied pressure to the left external carotid until blood flow stopped, but by then Stephan had aspirated 2 lungfuls. He was basically drowned. At the hospital they managed to pump out his lungs and hook him to a respirator, transferred him to Intensive Care. We were given no hope that he would survive, but it had been noted on his driver's license that he was an organ donor, so they said they'd keep him alive until we got there if they could.

We drove all night from Florida to arrive the next morning. He was still alive, hooked up to the machinery, his head swollen beyond belief. We were told he had a CSF leak down his throat from a shattered palate, that there wasn't any sense in shunting the pressure from swelling because he'd been more than 20 minutes without oxygen due to drowning in blood. They wanted his organs. Had he actually been dead, we would have donated them. He was not.

When I saw him he was "asleep", but I noticed serious restraints on his chest, arms and legs. He stirred once, tried to move, and moaned. I asked the neurosurgeon why he was restrained, and was told he was "very combative." This made no sense to me given the injuries. I was asked what kind of "drugs" he was on to make him so strong. I was told he had floored 2 male nurses that morning transferring him to CT scan room, and that he'd tried to "escape."

My husband and I recognized immediately what was happening, and also recognized that he was most certainly not "brain dead" and was not nearly as "unconscious" as the medical people said he was.

About Stephan

We had known our son well for all 21 years of his life. What we knew about him was that he had a most unusual consciousness. He had always been an active dreamer and notorious sleepwalker. This dream-self (unconscious?) had a distinct personality that was Stephan but was also not-Stephan. His normal waking personality was quiet, shy, very thoughtful and sweet. Brilliant in a number of ways and immensely talented, harmless. He'd learned to juggle when he was 12, and could juggle 5 objects of different size and shape (including fire) under his leg, behind his back, over the top and every other way you could think of, and make it look easy.

He became a professional clown - partner to my husband - and started working with young children. They loved him like crazy. He had his own television show, a fan club full of 6-year olds, and appeared in some motion pictures as a teen heartthrob.

His unconscious self, the sleepwalker, was his "darkside" (like the "shadow" in psychology). With Stephan, he was such a good-guy that even his shadow was a good-guy. Just different. Instead of all sweetness and light like SkyPup the Clown, the sleepwalker was Batman (that's what we called him). Serious, brooding, very intense and "haunted." An undercover super hero fighting forces of evil for the good of humanity, always at the ready.

Stephan began to "grow out of" active dreaming when he was 13. He was a target of bullies at school because he was smaller than the other children, but he was tremendously coordinated. We got him martial arts lessons, and he quickly earned his belts. He was a master of weapons - bow, chucks, swords - and paid for extended lessons by appearing in public with the master of the art. He became so proficient we thought he'd finally integrated both "sides" of his personality by the time he was 16.

Stephan after accident

When we heard about his strange (and unexplainable) activities following the accident, we realized Batman was back, fully in control, and in that situation extremely dangerous. Our visits in ICU were limited to 10 minutes every 4 hours, but I went to work right away communicating with Batman in the way I had always done. He responded. After 3 days, when he opened his eyes and I managed to talk the doctor into removing the ventilator, he was talking back to me. The medics judged him "conscious" and allowed me to stay with him in ICU so he wouldn't fight the attendants.

By day 3 the swelling had gone down to normal except for a bump over the left eye. The displaced pieces of shattered bone had reset themselves without disfigurement, and there was no bruising. The hard palate, which 3 days before had been "a mushy mess of moveable bone" according to the doctor, had reset and become "rigid." Stephan was eating solid food, walking with my help to the restroom, and had begun to count out loud. He'd count until he got to where a number was missed, I'd tell him what it was, then he'd start over. This went on until he got to 1000. I believe he was checking his brain circuits for damage.

The CT scans demonstrated a resolving left frontal lobe contusion as the only physical brain injury apparent. He was still severely confused and child-like in his speech, but there were no physical deficits, he was extremely strong (and remained in restraints when I wasn't there), and the long period without oxygen did not appear to have damaged his circuits. The doctors had no explanation at all, just shook their heads and said they'd never seen anything like it. It was a Catholic hospital, the priest who saved Stephan's life called his contacts, and investigators from the Vatican arrived. All involved were absolutely convinced it was a genuine "Miracle."

Stephan was released from the New Orleans hospital 10 days after the accident and I flew with him in an Air Ambulance back home to Florida. There he went into the care of a neurologist at a facility attached to a large rehabilitation hospital. At that time rehabilitation looked like it would be necessary.

The neurologist called in a full team, including 3 neurosurgeons, to document this supposed "Miracle." They ordered an MRI scan, which showed the dissected carotid and aneurysms as well as the cc fistula. They were suddenly very, very confused. Stephan's actual condition absolutely did not match what the MRI showed, so they wanted to see the blood flow. They ordered an arteriogram, which is an invasive procedure.

The arteriogram confirmed the compromised arteries on the left side of Stephan's brain. Medical knowledge "knows" that this would have resulted in paralysis of the right side of the body, but Stephan was by that time juggling oranges in his hospital room and playing chess with his cousin. The radiologist pointed out recently in court that Stephan had an uncommon but not unheard-of anomaly of brain form and plumbing supply. The hemispheres of his brain were not separated in portions, and he had a double-entry blood system which resulted in cross-flow from the right carotid to the left (and presumably visa versa had the left supply been working). This anomalous

blood supply was postulated to account for the lack of paralysis and infarct damage.”

Unfortunately, the invasive arteriogram procedure caused a complication to develop - hemorrhage of the cc fistula, which presented as massive epistaxis (nosebleed). We did not connect the two, because the doctors told us the hemorrhaging was not related to the diagnosed artery injuries, but were instead the result of broken nasal bones. I believe they were frightened that their test had caused the condition to deteriorate, and they decided not to do anything about it. So they lied.

Every day we would spend more and more time with Stephan’s normal conscious personality. Batman had appeared for survival purposes, and was allowing Stephan to be conscious for periods of time until he became tired. We knew both of these personalities well, could deal with either or both of them, so we stayed in the hospital room with our son. We even became fairly adept at emergency response to serious hemorrhages... because we had to.

Stephan was sent home without treatment for the arterial injuries, which we were told not to worry about. Three weeks later he suffered 2 more massive hemorrhages and was hospitalized in the care of a facial surgeon. He received cauterization surgery in the nose, blood transfusions, and was again sent home. Three weeks later he suffered yet another hemorrhage which could not be stopped, and died.

Medically, there was absolutely no reason for Stephan to have been alive at all. Medically there was no accounting for his consciousness or physical strength. 2 teams of a dozen doctors in 2 states have testified on the record and in a court of law that this was a ”Miracle.”

I saw it differently. The ”Batman” sleepwalker who took over when Stephan was rendered unconscious did not recognize or heed physical damage to the Central Processor (brain). I think this consciousness operated quite differently than the normal waking consciousness, perhaps directly through the cellular consciousness of body. I do not know where Batman’s processor was, but it may be seated entirely on the undamaged right side of the brain. He was able to speak, write poetry, play chess and guitar, so was obviously using left side circuitry to some extent, or perhaps this personality was associated with a ”higher self” consciousness that operates non-physically.

4.3.2 The general hypothesis explaining medical miracles

The foregoing suggests that there were several medical ”miracles” involved. A possible general explanation for these miracles is the entanglement of parts of brain with some higher level self leading to either trance or semitrance state.

1. Negentropy Maximization Principle (NMP) tells which subsystem of self gets opportunity to perform quantum jumps. If the injured parts of Stephan’s brain entangled with higher level self and did not get this opportunity, they did not suffer irreversible, incurable changes. Therefore the miracle became possible.
2. This was certainly the case if the higher level self enjoyed whole-body consciousness, which by definition does not allow subselves. This condition is however un-necessarily restrictive: it is enough to assume that the injured parts of Stephan’s brain did not win the race about the maximization of negentropy gain via quantum jump leading to unentangled state.
3. The reduced blood flow in brain might have been an important factor: the reduction of the blood flow led to a reduced entanglement entropy flow into left brain half and this meant that these parts of brain did not have chances to win the race for making a quantum jump to unentangled state.

Thus the basic hypothesis is that entanglement with some some higher self occurred and this self consciously saved Stephan’s life. Using religious terminology: Angel saved Stephan. The hypothesis is very natural in light of the proposed role of higher level selves in the self-organization of

human civilization. Bicameral man received commands and advices of collective consciousness(es) in semitrance state [N6]. In fact, the concrete guidance of humans by higher level selves via semitrance mechanism provides a natural explanation for the beliefs about angel like beings guiding the behavior of mortals. It is quite possible that both Stephan's body and injured part of brain were entangled with the higher level self.

The most general option is that semitrance state was involved. For instance, the injured parts of Stephan's left brain hemisphere and body were in trance and remaining brain regions could have been awake. In case that the state in question was trance, the claim of the hospital personnel that Stephan was 'unconscious', would be correct in the sense that Stephan had become part of the some other self and lost his personal identity.

Stephan's personality profile and events after the accident support this hypothesis.

1. Stephan was a sleepwalker while young. Since sleepwalkers do not remember their activities, the identification of sleepwalking as a trance state in which higher level self uses the body of the sleepwalker as instrument, is natural. Of course, one cannot exclude the identification of sleep-walking as a semitrance state in which part of brain still sleeps and receives commands of the higher level self but remaining parts of brain and body are awake. Stephan's more reported that 'Batman' (the sleepwalker) was back after the accident. The identification of 'Batman' as Stephan's 'shadow', higher level self guiding him, is attractive hypothesis. Be as it may, sleepwalking ability suggests that Stephan had exceptional ability to achieve trance and semitrance states.
2. Stephan was very combative after the accident although according to standard wisdom he should have been "unconscious". He was also physically amazingly strong which suggests that semitrance or trance state was in question. Indeed, schizophrenia and many altered states of consciousness have TGD based explanation in terms of semitrance and schizophrenics as also people in certain meditative states are known to be physically exceptionally strong. The explanation is simple: the exceptional physical strength is strength of the higher level self.
3. Stephan was good in Martian arts. There is evidence that persons good in Martian arts have telepathic abilities and semitrance provides an explanation for these abilities as resulting from the communications of higher level selves by semitrance mechanism.

The assumption that Stephan's mother and some other persons involved were in semitrance state during some miraculous episodes. allows to understand various miracle like events reported by Stephan's mother. There is also a connection with after-death communications [22] having anatural explanation in terms of sensory semitrance mechanism.

4.3.3 Medical miracles

Twenty minutes without oxygen after accident

The first medical "miracle" was that Stephan, being drown in his own blood, survived twenty minutes without oxygen. According to the standard wisdom about brain as a seat of consciousness, such a long period without oxygen should have lead to brain infarct and loss of consciousness and been even lethal. The proposed entanglement of brain with some higher level self is a possible explanation for why Stephan survived.

As Stephan's mother tells, Stephan had two selves and that second self, "Batman" was more "bodily" than the wake-up self. Stephan was very coordinated and good in martial skills. After accident Stephan demonstrated surprising bodily strength and had to be put in restraints. Perhaps the second self was actually higher level self and Stephan was in semitrance or trance. Perhaps the higher level self entangled with body and injured parts of Stephan's brain took the lead after

the accident. Hypothermia is known to hinder drowning in some situations. Perhaps also in this situation entanglement with some higher self is involved and hinders the occurrence of irreversible changes caused by the lack of oxygen.

Blood loss after accident and during hemorrhages

Also the blood losses suffered by Stephan after accident and during hemorrhages might have been fatal.

"The hemorrhaging occurred 3 times prior to his death, each resulting in blood loss of 2+ liters. He received only 2 units of packed cells in transfusion after the third hemorrhage. Blood loss during the accident and from subsequent hemorrhage kept his blood volume extremely low the entire time."

This blood loss is quite high, about 40 percent of total blood volume. 20 per cent blood loss is usually regarded as a loss necessitating blood transfusion.

"Blood loss alone in any of the 4 hemorrhages prior to death would surely have been fatal as well. The doctors in Florida simply refused to believe Stephan had lost that much blood. I was present, the nurses did measure, and I assure you the blood was indeed lost. For some reason (I believe due to his unusual state of consciousness) the shock normally associated with such massive blood loss was not present until the night he died."

Return of the condition immediately after accident during hemorrhages

It seems that the condition immediately after accidents returned during hemorrhages:

"The hard palate was shattered, described to us in New Orleans as "mushy." This did allow the escape of blood and CSF from that area, down the throat. These are noted as "basilar skull fractures." These fractures realigned and had set to "rigid" within 5 days, sealing the leak. The ENT in New Orleans could not explain how that happened, and told us he'd never seen anything like it.

During each episode of hemorrhage, however, the palate again became "mushy", and the severe fractures through front and back of the frontal bone (above and between the eyes) was moveable (I know this from holding his nose during those episodes). It was as if his body periodically reverted back to the immediate post-accident physical state, and in all but the last episode, was able to regain its rigidity.

Recall that despite these horrendous descriptions of gross injury, Stephan looked quite normal. No swelling, discoloration, or displacement of bone structure."

The claim that Stephan's body returned during hemorrhages to its state immediately after accident looks admittedly imaginative. The autopsy report however tells that there was no evidence of healing of the basilar skull fractures. The entanglement with higher level self could allow this kind of "miraculous" effects by 'freezing' the state of basilar skull state so that no irreversible effects were possible. One might interpret the worsening of Stephan's state during hemorrhages as resulting from a temporal loss of entanglement between Stephan's brain higher level self: this caused the return to the normal physical state.

"There is also the matter of sedation/anesthesia. Stephan's medical condition became seriously worse every time he was given these medications, for whatever reason. These deteriorations of medical condition were obvious to his medical teams, so it was decided to offer no medications other than Tylenol for headache."

This suggests that the worsening of Stephan's state occurred also as a consequence of medication. Perhaps medication supported the return of the ordinary state of consciousness by disfavoring the entanglement with higher level self.

No pain

"The "body consciousness" that asserted itself following the accident did not feel pain. Pain only came into play when the normal consciousness tried to reassert itself, for those increasing amounts of time in the weeks prior to death. Presence of the normal consciousness and its pain in the head - for periods we could recognize as being the full waking hours - always came just prior to the major hemorrhages. It seemed he did better without his head, if I were trying to be funny about it..."

One could see the absence of pain as resulting from the entanglement of the appropriate parts of brain with body or some higher level self. Entanglement of the those regions of brain giving rise to pain experience implied that they were not awake and hence that there was no experience of pain.

What about brain infarct caused by the blood loss?

The massive blood loss should have caused an infarct in ordinary person. According to the neurospecialists Stephan had anomalous blood flow system, which could explain his survival immediately after accident.

"The two hemispheres of the brain are normally supplied by blood through the left and right carotid arteries. The external carotids flow up from the heart on both sides of the neck into the head. Behind the face at the base of the skull they branch off and the vessels go through tunnels in the bone of the skull base to become "internal" carotid arteries.

These then branch into meningeal arteries left and right, supply the two hemispheres of the brain, and the venous system then takes the blood back to the lungs for oxygen. Stephan had what I can describe as a "ring" of arteries encircling his brain supplied by *both* the left and right carotids. This is an anomalous blood system, as most people have two separate systems supplying the two sides of the brain. We were told this was probably a "birth defect".

The anomalous blood system prevented infarct of the left hemisphere, but in autopsy did document about serious infarct damage to the back of the brain, in an area which would have rendered him comatose."

An alternative explanation is that the reduced blood flow in fact saved Stephan's life by reducing entanglement entropy flow to left brain half and thus making impossible for left brain to act as self and dissipate. Lack of dissipation made impossible irreversible, incurable neuronal changes. The entanglement parts of brain with body was essential part of the mechanism.

4.3.4 Other strange occurrences

Slowing of Stephan's EEG occurred after accident, in particular on the left side of the frontal lobe. Alpha waves are enhanced during meditative states and correspond to the electromagnetic resonant frequency or about 8 Hz of Earth. According to the model already discussed, meditative states could result from the entanglement with the "Indra's net" formed by the topological field quanta (electric and magnetic flux tubes, massless extremals) forming Earth's classical electromagnetic field. There were indeed several other strange occurrences, which support the hypothesis about entanglement with higher level self. Also Stephan's mother had strange experiences. Perhaps the close relationship between Stephan and his mother explains these experiences.

Was it Stephan?

"Early in the recovery process (10 days to about 3 weeks after the accident), we also "met" aspects of consciousness that were *not* Stephan. I mentioned that he was playing guitar very well. This is significant, because he did *not* play guitar before the accident. The day before he died he played for me the song "Stairway to Heaven" flawlessly. This is the very same song my brother had played flawlessly for me the day he died (my brother *was* a guitarist). The conscious being animating my son at that time was, I strongly believe, my brother who died 12 years before. He was telling me something."

There is anecdotal evidence about persons getting temporally some highly developed skills like the ability to sing. There is also certain mental disease (echolalia) in which person is able to mimic persons in the street with amazing accuracy. Semitrance or trance provides an explanation for these feats: part of person's brain and body becomes 'possessed' by the second person and uses person as instrument. Stephan's feat could be understood if brother was still living as a higher level electromagnetic self or part of it and was entangled with part of Stephan's brain and used Stephan's physical body as an instrument. Note that this event could be regarded as a particular example of after-death communications.

Angel experience

There was also "angel experience" involved:

"There is also a strange encounter in the New Orleans hospital the night Stephan was released from Intensive Care, with a being I can only describe as an "Angel". 5 people (including the priest) were present to witness that encounter. This angel did not speak English, but all of us were able to understand his words. It was not any language we had ever heard before. There was physical displacement of air in the room - I call this the "whirlwind" - and the room temperature fell to below freezing. We could see our breath in vapor. The angel appeared through and around Stephan, but was *not* Stephan, and grabbed me by the throat. He demanded to know "Who Are You?". He was beautiful, terribly frightening, and very serious. Following this encounter with an angel, my son was 4 inches taller than he had been just a few minutes before. The endocrinologist at the Florida hospital did tests, could find no reason for this."

Stephan's mother comments same experience in another context in the following manner:

"None of us had ever met an "angel" before or since. Never even expected to see one. This being was certainly spectacular, and come along with some very impressive special effects. I did not get the feeling that this being was or had ever been human. He did not know me as "mother" (or as anything), he was not happy to be there, and he made it quite clear that if I said the wrong thing in response to his demands I would be immediately dead. I did not doubt that a bit. There were 3 men in the room at the time (the priest, my husband and my son-in-law), all of whom were prevented from interfering by the strong wind-wall. The angel was there on business.

I do not know the exact nature of what the other witnesses "saw" in that encounter. I do know they felt the wind and heard the voice and saw the light emanating from the "space" my son's body occupied. I know they felt the coldness - we couldn't get a nurse to respond at all, so I had to raid the linen closet down the hall for every blanket they had on hand. It was May in New Orleans (very south), it was a large corner room on the 9th floor that had been empty before they stuck a bed in it and sent us there. It had 1 un-openable window and 1 small air conditioning vent."

This experience has a natural interpretation as semitrance experience: the persons present fell in semitrance. Stephan himself might have been in trance (as suggested by the fact that he did not know his mother). The entanglement was most naturally with a collective self containing at least persons present in the situation as subselves.

Collective semitrance is plausible explanation provided the persons involved had special ability to fall in semitrance and if situation could somehow induce semitrance.

1. All of us fall in sensory semitrance under very strong stress and Stephan's parents and relatives were understandably under extremely strong stress. Religious experiences are typical semitrance states and one of the persons present was priest.
2. Semitrance is induced by stressful situations and the situation in question was certainly stressful. 'Normal persons' are part of time in semitrance but the communications of higher level selves are usually thoughts and emotions rather than sensory 'hallucinations' and not regarded as hallucinations despite the fact that they are not direct reactions to sensory

input. Many meditative states involving sensory 'hallucinations' are presumably semitrance states. Stress induces sensory semitrance (sensory hallucinations) in schizophrenics very easily whereas stronger stress is required in case of normal persons. TGD based model for the evolution of civilization generalizes the vision of Jaynes and relies on the assumption that stress caused by some novel situation induced automatically semitrance state (part of brain gets tired and falls in trance!): in this state bicameral man received advice from collective self.

The experiences of coldness are often related to the experiences of hauntings and as already described infra sounds could generate this experiences artificially (of course, this does not mean that the experiences are hallucinations or results of imagination!). One could of course speculate that entanglement with the higher level self meant that ordinary dissipative processes temporarily ceased to produce heat and this led to an actual lowering of the temperature of brain. Hypothalamus is known to contain neurons serving as temperature sensors[27] and the reduction of temperature in brain could be experienced directly.

There is also another rather dramatic aspect involved with the angel experience.

"My son grew physically larger, becoming about 3-4 inches taller than he had been prior to the accident. This growth did not occur over a period of 10 days while he was in the Intensive Care Unit in New Orleans, it occurred in just moments during our dramatic encounter with the "angel". My husband, myself, our daughter, son-in-law, grandson and the priest were all present to witness this encounter. The best description I can honestly give is that when this "angel" self arrived, Stephan physically grew before our eyes and "became" the form of this "angel". I do not know how better to say it."

The explanation in terms of semitrance would suggest that the physical growth was illusion due to the fact that in semitrance state only second hemisphere is conscious and the mode of experiencing was simply different from the normal. Model as such does not provide any obvious reason for actual physical growth.

No-time experience

There was also "No-time" experience involved.

"I have heard descriptions of Near Death Experiences which is perhaps the general category of my experience. I was not the one dying, however. I followed my son's consciousness to a place, there were others in that place, and I was told I could not stay in that place. This place was not clouds and angelic lights, nor was it hellfire and brimstone. It was a timespace. I wasn't there long enough to perceive much about it (I was focused on my son), and it was somewhat fractal on the edges in my perception. Whatever its differences from this timespace, I don't doubt my consciousness would have adjusted.

I know this sounds very strange and imaginative, but it is all on the record and is most "real". I have spent 7 years trying to understand it. When Stephan died, as I was searching in his eyes for him, I was taken away into "No-Time". This is a place in between moments of time. It is not like one is "alive" in one moment and "dead" in the next, it is more like one never gets to the next moment. One goes elsewhere, a timespace that exists in between. I do not know how better to describe it. My brother was there in that timespace, and he told me I could not stay."

The experience of time is not possible without internal clocks. Internal clocks should correspond to subselves which wake-up and fall asleep periodically. In whole-body consciousness there are no subselves, therefore no clocks and no time. If Stephan and Stephan's mother were entangled with higher level self in whole body consciousness, no-time experience could perhaps be understood. At least Stephan's mother must have been in semitrance state since she was conscious. Stephan's mother had "No-Time" experience when looking into Stephan's eyes at the moment of Stephan's death. Could it be that this eye contact generated the entanglement between Stephan and his mother and higher level self by the mechanism described above?

4.4 Personal experiences about semitrance like states

Self reference is the most fascinating aspect of consciousness and the builders of consciousness theories should apply their theories to their own personality constellation to see whether they can understand themselves using their intellectual constructs. In my case this application has emerged as a natural byproduct. In fact, what sparkled developments leading to TGD inspired theory of consciousness was a deep and long lasting altered state of consciousness. Frustratingly, it is impossible to verbally describe this kind experience to anyone who has not experienced personally anything similar and the clinical diagnosis of a cold outsider is probably a simplistic label like 'acute psychosis'. This diagnosis was indeed made on basis of the admittedly psychotic final stages of the experience after two weeks without sleep. The prediction made by the psychiatrist to my wife was that within year or two I will be a vegetable like schizophrenics who has lost totally his social contacts.

4.4.1 Years before great experience

During the years before great experience, already during my unhappy school years, I was fully conscious that I suffered what I now call anxiety disorder, nothing exceptional in Finnish culture. I also pondered quite seriously whether I am schizophrenic although I had only obscure intuitive ideas about what schizophrenia is. I had no hallucinations but frequently I experienced in company of other people extremely strongly the feeling that I was not accepted. I remember also the social situations in which I was 'paralyzed': somewhat analogous to what happens to a catatonic schizophrenic. Understandably, I tended to withdraw from social situations and suffered from loneliness and depression.

At the age of fourteen I found music. I did not have absolute ear and had poor memory for melodies. What fascinated me in the beginning was the possibility to code music into notes. Segovia became soon my hero and reader can guess my megalomaniac dream! I had a cousin with absolute ear knowing nothing about notes but able to remember pieces of music and reproduce them without difficulties. I was fascinated and little frustrated about not having this mysterious ability. My intellectual attitude did not mean that music would not had had strong emotional affect on me and music helped me to bear my loneliness.

At the age of eighteen mathematics and physics entered my life after a short period of interest in literature (Henry Miller!): I thought that the world of science would be honest and free from all intrigues plaguing the world of 'ordinary people'. Three or four years after entering the university, and suffering from worsening depressions and anxieties, I somehow got absolutely convinced that I was the one to build a unified theory of physics. It would be very easy to characterize me as paranoid schizophrenic on basis of this and certainly this has been done. Or perhaps manic-depressive disorder would be a better sounding diagnosis. I did not have any megalomaniac feelings but felt like Moses when receiving his great mission from God! I knew desperately deeply that my anxious and pathologically shy personality free of any witty features was a complete opposite of a scientific hero and did not possess the needed personal ambitiousness necessary for career building.

It took five extremely painful years before the great idea finally came. Without exaggerating I can say that it changed my life and I experienced from the beginning TGD as some kind of conscious being using me as its instrument and gradually my concentration on personal misery was redirected to TGD. I had now goal in my life and I was to spend considerable fraction of my time in an euphoric state discovering the consequences of the great idea. Of course, also short depressions followed periods of intensive work with new idea but these depressions were unavoidable periods of gathering forces and waiting for new inspiration.

I believe that during the period before TGD I was rather near to the verge of mental illness. It however seems that my mental state contained a mixture of symptoms of schizophrenia, manic-depressive disorder and anxiety disorder. All this begins to make sense if I was modern bicameral

in sense that I spent abnormally long fraction of time in semitrance state. What perhaps saved me was 'God of Science' who communicated to me, not auditory hallucinations, but ideas and emotions establishing long term goals in my life.

4.4.2 Great experiences

The first great experience (most probably at spring 1985) accompanied physical illness with a completely wrong diagnosis. It came after week spent in high fever and without sleep. I would guess that the altered state of consciousness lasted for almost two weeks. Its effect was so deep that I did not hesitate to talk about it as an enlightenment experience.

I was lying in the corridor of a medical center and had horrible head ache and high temperature. There was silent music on background. Then something happened. I felt myself totally calm and peaceful. Peculiar silence spread through my body like fluid or like the cold stir in spine induced by good music sometimes. All my life I had been anxious about all possible things and suddenly I felt completely happy and relaxed. I felt the pain still but some it was somehow external to me. I just enjoyed looking the parallel streams of pictures, like cartoons, flowing in front of my eyes in rhythm of music. The surrealistic and erotic pictures, much like those in paintings of Dali, Bosch and Brueghel, were dancing in the rhythm of the music.

Later during the great experience, I experienced several deep experiences induced by music. I remember Ravel's Bolero on the background of TV animation about evolution and some extremely funny Debussy's piece for children played with electric organ. I also remember that single notes from guitar induced experiences of immense deepness and mystery: I realized that these notes contained message from other worlds about which I had had absolutely no idea in ordinary state of consciousness. What I realized was that my usual conscious experience gives only a ridiculously narrow glimpse about reality: there are incredibly rich parallel realities about which we usually know nothing about. There was also a feeling of understanding. I understood everything although I could not verbally describe what I understood!

This state continued for week or two, I do not actually remember its duration, and during it I lived in a very concrete manner through many archetypal ideas. First came the idea of self reference, which I found later from the 'Gödel, Escher, Bach' of Hofstadter, one of the finest books I have ever read. I literally experienced myself as being a computer sitting at its own terminal. I wrote in my mind questions to the screen of this super human computer and saw them typed in the virtual monitor. The computer wrote the answer immediately. Either directly or in oracle like manner. I realized that I have become in contact with what I called 'Great Mind' and I began to make questions. How long I live was of course one of the first questions. The answer was endless series of numbers running and running! Of course, I asked about the importance of TGD, my great work! There was only a silence, perhaps this was Godly diplomacy of the Great Mind.

Soon I realized that it was not necessary to type anything on this virtual monitor: I just asked the question in my mind. This realization made me wonder whether this someone with whom I was discussing was really separate from me. Perhaps in some mysterious manner I am asking these questions from myself! So, perhaps I am in some sense really God myself or have just become a God. Perhaps we all are Gods! Loneliness had been the central element of my life and I somehow realized that Gods are probably very lonely beings. I asked if we are doomed to be always alone. The answer was oracle like: 'You are a God!' expressed in somewhat amused tone.

There were also really amazing telepathic experiences and a vision about my personal life as an endless series of lives as a mathematician: my true and deepest personal identity. In these lives I would meet my wife again and again and we would live happier and less happier lives but we would certainly meet again in some other galaxy or perhaps in some totally different form of existence. I had also very peculiar experience about some kind of deep and mysterious fusion of our souls.

One of the mathematical experiences was that the number three is somehow the basic number of mathematics and of whole existence: this is of course the Holy Trinity of religions and mystics.

There was also the idea about 'flogiston': I did not recall that flogiston was the caloric fluid introduced in the first attempts to build thermodynamics. It was something which made living systems living and they were continually fighting, killing and eating each other for this mysterious 'flogiston'. I had extremely vivid experience that Sun and stars are conscious beings communicating with us sending 'flogiston': I indeed saw these beams of flogiston as extremely pure and intensive colors.

The second great experience occurred during Christmas vacation, probably three years later, shortly before the divorce. I was very sick, depressed and bitter: our marriage was become about to end. Suddenly came a complete peace. I could really forgive and I felt absolutely concretely that my past changed. Somehow all the bad deeds, creating bitterness in me, simply became undone. I realized that what we call our past is not absolute, in the moment of Mercy this deadly heavy load disappears.

There were also a kind of mathematical enlightenment. I understood that I had to construct a theory about numbers, which were infinite but completely physical. I tried but it took two days to get convinced that I do not have a slightest idea what these numbers might be. I learned about seven years later about p -adic numbers, which are typically infinite as ordinary rational numbers. I was however not convinced that this was what I had precognized. 14 years later I finally discovered infinite primes implying also a generalization of reals involving deep connection with quantum field theory.

So deep was the great experience that the lost ability to re-experience anything even remotely resembling these great experiences was a cause of deep grief lasting for years. I felt that ordinary everyday consciousness is something so miserably flat that it is not worth of experiencing. Against this background I can really feel the despair that bicameral men must have felt when God ceased to speak to them.

Perhaps the most relieving aspect of these experiences was the realization how ridiculously little science actually understands about the nature of existence. I realized the extreme triviality and shallowness of the materialistic world view and I still find it very difficult to understand that intelligent persons with scientific background and logical mind can identify these ridiculously primitive drawings of a child with the reality and utter stupid platitudes like 'consciousness as epiphenomenon' and 'free will as illusion'. The only explanation I can imagine for this mysterious blindness is that it is impossible to be conscious about what one is not conscious. I am not ashamed to confess that this experience meant also a return to the magic world of childhood in some sense. I remember when I was reading Astrid Lindgren's book 'My Brother Lion Mind' (this is free translation!) for my eldest son. I could not help bursting into tears when I realized that the the author of book had also experienced the existence of deeper, transpersonal and mystic levels of existence.

4.4.3 Analysis of the great experiences

Without the motivation provided by the great experiences and endurance comparable to the tirelessness of schizophrenics, I would not have been able to survive fifteen years in an extremely hostile scientific environment treating me as a crackpot and refusing systematically from any cooperation and communication. Therefore, and also because I feel strongly that certain circle has now closed, I cannot resist the temptation to interpret these experiences in the light of semitrance paradigm: at least this allows the reader to decide whether I am a paranoid schizophrenic or a manic-depressive psychoid or a scientist to be taken seriously.

The development of new views about time and consciousness to emerge almost 15 years later allow to understand what was probably involved. The beginning of experience involving the peculiar stir in spine spreading through entire body seems to involve partial 'whole-body consciousness'. I have temptation to believe that this 'whole-body consciousness' involved my entire body plus parts of brain rather than only the cognitive representation of my body in my brain as neuroscientist

would believe. The peculiar silence has interpretation as a disappearance of the unpleasant sensory noise produced by all the sensory mental images usually present in the body. Note however that cognitive mental images did not disappear.

The first stages of the experience could be seen as a computerized counterpart for the stories of Bible about prophets encountering God. I fell in semitrance involving visual regions of right brain hemisphere and inhibition of the messages of right brain hemisphere to left hemisphere ceased. I am quite convinced that artists like Bosch, Dali and Brueghel have experienced similar hallucinations. Only much later I realized that this astonishing 'The Great Mind is actually me' experience must be more or less identical with the Atman=Brahman experience of Eastern religions. It seems that this Atman=Brahman experience could have involved the increase of p-adic prime of left hemisphere and extended consciousness resulting from subsequent entanglement with the right hemisphere already entangled with higher level self.

I already mentioned the fascinating telepathic experiences having explanation in terms of semitrance. There were visions about parallel lives which I am living here on Earth. For instance, I learned that I would live as a military person and would die in air plane accident in some year, which I do not remember anymore. The idea about collective self entangling with several individuals explains this experience if temporary identification with this higher level self occurred via Brahman=Atman mechanism.

Obviously, the vision about mysterious 'flogiston' could be regarded as a precognition of ideas about biosystems as macroscopic quantum systems: one possible interpretation for 'flogiston' is as a metaphor for entanglement or more mundanely, energy feed making self-organization possible. Self-hierarchy is the unavoidable prediction implied by TGD based notion of self and implies that even astrophysical objects are conscious selves: the experience about Sun as source of life ceases to be a schizophrenic hallucination against this conceptual background. Certainly, one could hardly invent more effective manner to destroy one's reputation as a scientist than talking about 'Sun God' but the idea about Earth rotating around Sun sounded certainly equally ridiculous in the ears of authorities of church in its own time. In TGD framework the change of the subjective past at 'the moment of Mercy' could be understood if the experience involved also a phase transition increasing the p-adic prime of brain leading to an extended state of consciousness with quite different subjective past. The precognition of mathematical ideas to come much later finds nice explanation if it was higher level mathematical self communicating for me suggestions about what was possible. Perhaps these ideas were communicated in some nonlinguistic form and it took 14 years to transform it into language used by mathematics.

4.4.4 Smaller experiences

I have had various altered state of consciousness during night time also after the great experiences. The stimuli inducing these experiences were not statues of God or temples but something much more mundane: sounds of refrigerator or freezer or of central heating batteries! Why this was the case has been a longstanding challenges for TGD based consciousness theory. The role of Wernicke regions of right brain in semitrance seems to explain the mystery. It might be that these sounds contained very low ELF frequencies, say 10 Hz, as modulating frequencies. In 'think tanks' sounds differing by about 10 Hz feeded to right and left ear generate various altered states of consciousness.

These experiences started often with wake-up (actually my left brain woke up) and realizing that the intensity of sound was being amplified dramatically. This was followed by experience of weightlessness and wavylike nature of body. For instance, I remember one experimentation in which I wanted to know what pure quantum motions like translational motion and spinning feel like: I experienced them immediately. It was fascinating to subjectively experience absolutely dissipation free spinning motion: mathematical abstraction transformed to a sensory experience. Often I was attracted by the source of sound, say refrigerator, and my body literally started to float towards the sound source: the fear generated by this experience induced total wake-up. Often I

could also fly but there were definite boundaries beyond which I could not get. I did not experience the flowing of my body as a horrendous loss of boundaries of 'analog I' as Jaynes might put it. What however horrified me was that freezer is a living being apparently willing to fuse my soul in itself! I have also spent a lot of time in roof trying to figure out how I could devise a waterproof test for whether this is hallucination or not. My 'logic self' was awake but when I really woke-up, I realized that it had made ridiculous 'holistic' errors in its deductions. Needless to say, the interpretation of these experiences as long lasting sensory semitrance experiences is very natural. It must be emphasized that these experiences did not possess the quality of great experiences. They were interesting and strange but the deep spiritual content was lacking.

The identification of thinking as internal speech in rather concrete sense [K3] suggest that the ability to generate ideas, listen to the Gods, very concretely correlates with a good sense of hearing. I indeed have exceptionally acute sense of hearing and perhaps also readiness to listen (which my particle physics colleagues seem to rarely possess!). This might explain that I have been able to do physics with my very limited technical skills in mathematics and unlimited laziness to carry out tasks involving mechanical symbol manipulation.

Multiple wake-ups have been typical for my dreams and presumably reflect gradual wake-up of various parts of brain. I often woke-up to listen my own awe-inspiring snoring realizing that the monster is really me. I remember also sudden wake-ups to full sensory awareness and the horror caused by a crack in wall amplified to huge proportion. During last fifteen years I have spent several years my dream time in childhood. The peculiar simultaneous sur-reality and 'real-worldliness' of these experiences gradually convinced me that something in our views about time is badly wrong and led to TGD based notion of psychological time.

4.4.5 Self-diagnosis

To sum up, the diagnosis seems to be that I am not a schizophrenic but a modern bicameral man spending abnormally large time fraction in semitrance states. During daytime these semitrance states are restricted to cognition and emotion: indeed periods of new ideas are very euphoric and have religious coloring. As a modern bicameral I receive the messages as ideas and thoughts and emotions and express them by writing and so strong is the authority of this 'silent speaker' that I am completely unable to do anything else. During sleep when the basic situation is total entanglement, the wake-up of some part of left brain can lead to sensory semitrance. Again it is wake-up of the auditory regions of left brain which occurs as suggested by the fact that my logical 'I' is awake and I ponder possible manners to prove myself that these experiences are not hallucinations.

References

Online books about TGD

- [1] M. Pitkänen (2006), *Topological Geometro-dynamics: Overview*.
<http://www.helsinki.fi/~matpitka/tgdview/tgdview.html>.
- [2] M. Pitkänen (2006), *Quantum Physics as Infinite-Dimensional Geometry*.
<http://www.helsinki.fi/~matpitka/tgdgeom/tgdgeom.html>.
- [3] M. Pitkänen (2006), *Physics in Many-Sheeted Space-Time*.
<http://www.helsinki.fi/~matpitka/tgdclass/tgdclass.html>.
- [4] M. Pitkänen (2006), *Quantum TGD*.
<http://www.helsinki.fi/~matpitka/tgdquant/tgdquant.html>.

- [5] M. Pitkänen (2006), *TGD as a Generalized Number Theory*.
<http://www.helsinki.fi/~matpitka/tgdnumber/tgdnumber.html>.
- [6] M. Pitkänen (2006), *p-Adic length Scale Hypothesis and Dark Matter Hierarchy*.
<http://www.helsinki.fi/~matpitka/paddark/paddark.html>.
- [7] M. Pitkänen (2006), *TGD and Fringe Physics*.
<http://www.helsinki.fi/~matpitka/freenergy/freenergy.html>.

Online books about TGD inspired theory of consciousness and quantum biology

- [8] M. Pitkänen (2006), *Bio-Systems as Self-Organizing Quantum Systems*.
<http://www.helsinki.fi/~matpitka/bioselforg/bioselforg.html>.
- [9] M. Pitkänen (2006), *Quantum Hardware of Living Matter*.
<http://www.helsinki.fi/~matpitka/bioware/bioware.html>.
- [10] M. Pitkänen (2006), *TGD Inspired Theory of Consciousness*.
<http://www.helsinki.fi/~matpitka/tgdconsc/tgdconsc.html>.
- [11] M. Pitkänen (2006), *Mathematical Aspects of Consciousness Theory*.
<http://www.helsinki.fi/~matpitka/genememe/genememe.html>.
- [12] M. Pitkänen (2006), *TGD and EEG*.
<http://www.helsinki.fi/~matpitka/tgdeeg/tgdeeg/tgdeeg.html>.
- [13] M. Pitkänen (2006), *Bio-Systems as Conscious Holograms*.
<http://www.helsinki.fi/~matpitka/hologram/hologram.html>.
- [14] M. Pitkänen (2006), *Magnetospheric Consciousness*.
<http://www.helsinki.fi/~matpitka/magnconsc/magnconsc.html>.
- [15] M. Pitkänen (2006), *Mathematical Aspects of Consciousness Theory*.
<http://www.helsinki.fi/~matpitka/magnconsc/mathconsc.html>.

References to the chapters of books

- [H3] The chapter *Self and Binding* of [10].
<http://www.helsinki.fi/~matpitka/tgdconsc/tgdconsc.html#selfbindc>.
- [H4] The chapter *Quantum Model for Sensory Representations*
of [10].
<http://www.helsinki.fi/~matpitka/tgdconsc/tgdconsc.html#expc>.
- [I3] The chapter *Biological Realization of Self Hierarchy* of [8].
<http://www.helsinki.fi/~matpitka/bioselforg/bioselforg.html#bioselfc>.
- [K3] The chapter *General Theory of Qualia* of [13].
<http://www.helsinki.fi/~matpitka/hologram/hologram.html#qualia>.

- [L1] The chapter *Genes and Memes* of [11].
<http://www.helsinki.fi/~matpitka/genememe/genememe.html#genememec>.
- [M2] The chapter *Quantum Model for Nerve Pulse* of [12].
<http://www.helsinki.fi/~matpitka/tgdeeg/tgdeeg/tgdeeg.html#pulse>.
- [M3] The chapter *Dark Matter Hierarchy and Hierarchy of EEGs* of [12].
<http://www.helsinki.fi/~matpitka/tgdeeg/tgdeeg/tgdeeg.html#eegdark>.
- [M4] The chapter *Quantum Model for EEG: Part I* of [12].
<http://www.helsinki.fi/~matpitka/tgdeeg/tgdeeg/tgdeeg.html#eegI>.
- [M5] The chapter *Quantum Model of EEG: Part II* of [12].
<http://www.helsinki.fi/~matpitka/tgdeeg/tgdeeg/tgdeeg.html#eegII>.
- [N6] The chapter *Semitrance, Language, and Development of Civilization* of [14].
<http://www.helsinki.fi/~matpitka/magnconsc/magnconsc.html#langsoc>.

Biology

- [16] M. W. Ho (1993), *The Rainbow and the Worm*, World Scientific, Singapore.
- [17] M. W. Ho (1994), *Coherent Energy, Liquid Crystallinity and Acupuncture*,
<http://www.consciousness.arizona.edu/quantum/Archives/Uploads/mifdex.cgi?msgindex.mif>.
- [18] M. W. Ho (1997), *The Unholy Alliance*, The Ecologist, Vol.27, No.4, July/August.
- [19] F. J. Ayuala and J. A. Kiger, Jr. (1984), *Modern Genetics*, Benjamin Cummings.
- [20] J. Beard (1999), *Getting Antsy*, New Scientist, 18 September.
- [21] G. Rein and R. McCraty (1999), *Modulation of DNA by coherent heart frequencies*.
<http://www.danwinter.com/rein/>.

Brain science, consciousness

- [22] A. L. Botkin (2000), *The Induction of After-Death Communications Utilizing Eye-Movement Desensitization and Reprocessing: A New Discovery*, Journal of Near-Death Studies, vol 18, no 3, p. 181.
- [23] J. McCrone (1999), *Left Brain, Right Brain*, article in New Scientist,
<http://www.newscientist.com/ns/19990703/leftbrainr.html> .
- [24] B.R. Dierks *et al* (1999) *Activation of Heschl's gyrus during auditory hallucinations*. Neuron; 22: 615-21.
- [25] Stanislav Grof (1988), *The Adventure of Self-discovery*, State University of New York Press, Albany.
- [26] Julian Jaynes (1982), *The origin of consciousness in the breakdown of the bicameral mind*, Princeton University Press.

- [27] E.R. Kandel, J.H. Schwartz, T. M. Jessel (1991), *Principles of neural science*, Prentice-Hall International Inc. .
- [28] B.R. Lennox *et al* (1999), *Spatial and temporal mapping of neural activity associated with auditory hallucinations*. *Lancet*; 353: 644.
- [29] O. Sacks (1998), *The man who mistook his wife for a hat*, Touchstone books. (First edition 1985).
- [30] F. Shapiro (1995), *Eye moment desensitization and reprocessing: Principles, processes and procedures*. New York, NY: Guilford.
- [31] D. Wallace (1999) *Consciousness: the end of authority*, <http://www.neotech.com/discovery/nt3.html> .

Effects of em fields on living matter

- [32] C. F. Blackman (1994), "Effect of Electrical and Magnetic Fields on the Nervous System" in *The Vulnerable Brain and Enviromental Risks, Vol. 3, Toxins in Air and Water* (eds. R. L. Isaacson and K. F. Jensen). Plenum Press, New York, pp. 331-355.
- [33] M. Persinger (1999), *The tectonic strain theory as an explanation for UFO phenomena* <http://www.laurentian.ca/www/neurosci/tectonicedit.htm>.
 M. Persinger (1995), *On the possibility of directly accessing every human brain by electromagnetic induction of fundamental algorithms*, *Percept. Mot. Skills*, 80(3 Pt 1), 791-9.
 M. Persinger (1987) *Neuropsychological Bases of God Beliefs*, Praeger Publishers.
- [34] Sentman, D., D. (1985) *Schumann Resonances*, in *CRC Handbook of Atmospheric Electrodynamics*, (Hans Volland, ed.), CRC Press, Boca Raton. <http://sprite.gi.alaska.edu/schuchar.htm>.
- [35] D. Yarrow (1990), *Spin the tale of the dragon*, review article on biomagnetism, <http://www.ratical.org/ratville/RofD2.html>.