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Tesla and the Nature of Creativity

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WHEREBY DEJAN RAKOVIĆ'S SCIENTIFIC ARTICLE
IS TURNED INTO A MULTIMEDIA OBJECT

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Federated Article

SIMPLE EXPLANATORY MODELS

Three simple multimedia models are extracted from the author's text with the help of the author. The phenomenological model explains the mechanism of direct creativity in metaphorical terms, so that the main insights may be applied in personal and group work, education etc. The ideological model highlights several core ideas for the purpose of making them publicly known, through an online dialog, where they'll be discussed and verified and interrelated with other ideas. The bio-physical model shows how direct creativity is explained by combining insights from quantum physics and other sources.

HOW TO READ THE MULTIMEDIA ARTICLE

By clicking on the loudspeaker icon you may listen to interviews with the author where the corresponding sections of the models are explained. Clicking on a numbered circle on a model page will bring you to the section in the research article where the corresponding ideas are discussed. Click on the numbered circle on the margin to return to the model page.

1

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Simple explanatory models

pp. 4–8

Motivational Insights

The nineteenth century developed an extremely rigid frame for natural science which formed not only science but also the general outlook of great masses of people [...] This frame was so narrow and rigid that it was difficult to find a place in it for many concepts of our language that had always belonged to its very substance, for instance, the concepts of mind, of the human soul or of life. Mind could be introduced into the general picture only as a kind of mirror of the material world [...] one may say that the most important change brought about by [the results of modern physics] consists in the dissolution of this rigid frame of concepts of the nineteenth century.



Werner Heisenberg

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Bild183-R57262.

WERNER HEISENBERG



David Bohm

Original photo: Original uploader
was Karol Langner, Wikipedia



David Peat

Original photo: Unknown

It is desirable at all times, and not merely during periods of scientific revolution, that there be the possibility of free play of the mind on fundamental questions [...] the opening up of a free and creative communication in all areas of science would constitute a tremendous extension of the scientific approach [...] what is called for is a kind of free play within the individual and society so that the mind does not become rigidly committed to a limited set of assumptions, or caught up in confusion and false play. Out of this free play could emerge the true creative potential of a society.

DAVID BOHM & DAVID PEAT

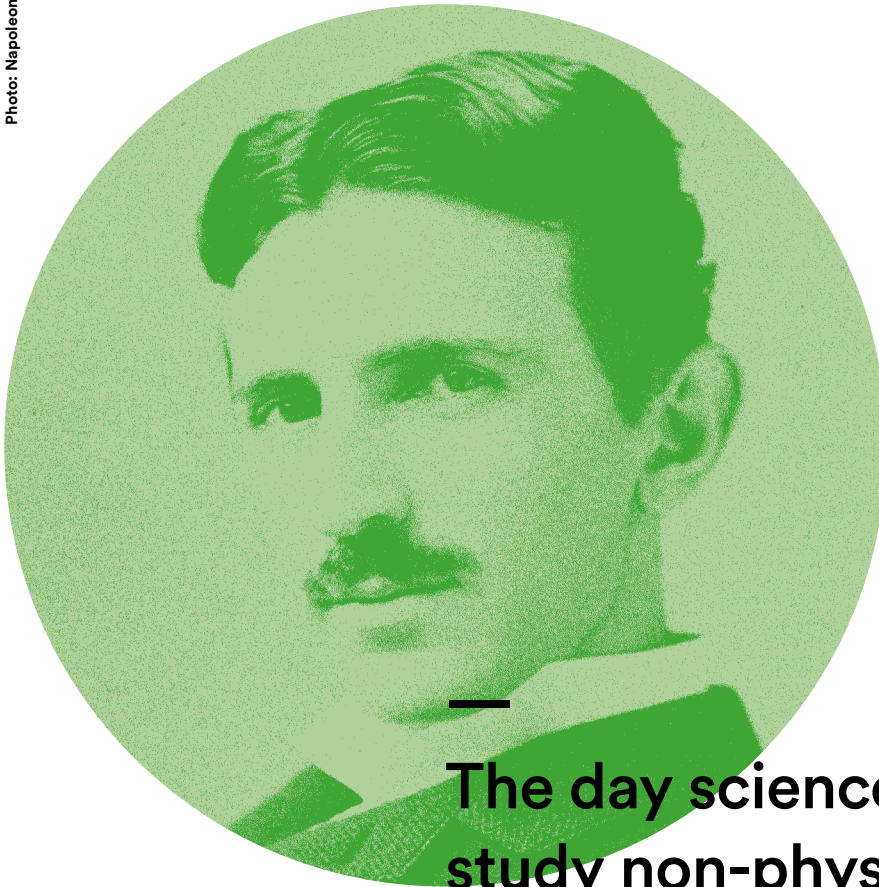
Let me recapitulate what seems to me the crucial question at this point of the human venture. Man has acquired such decisive power that his future depends essentially on how he will use it. However, the business of human life has become so complicated that he is culturally unprepared even to understand his new position clearly. As a consequence, his current predicament is not only worsening but, with the accelerated tempo of events, may become decidedly catastrophic in a not too distant future. The downward trend of human fortunes can be countered and reversed only by the advent of a new humanism essentially based on and aiming at man's cultural development, that is, a substantial improvement in human quality throughout the world.

AURELIO PECCEI



Aurelio Peccei

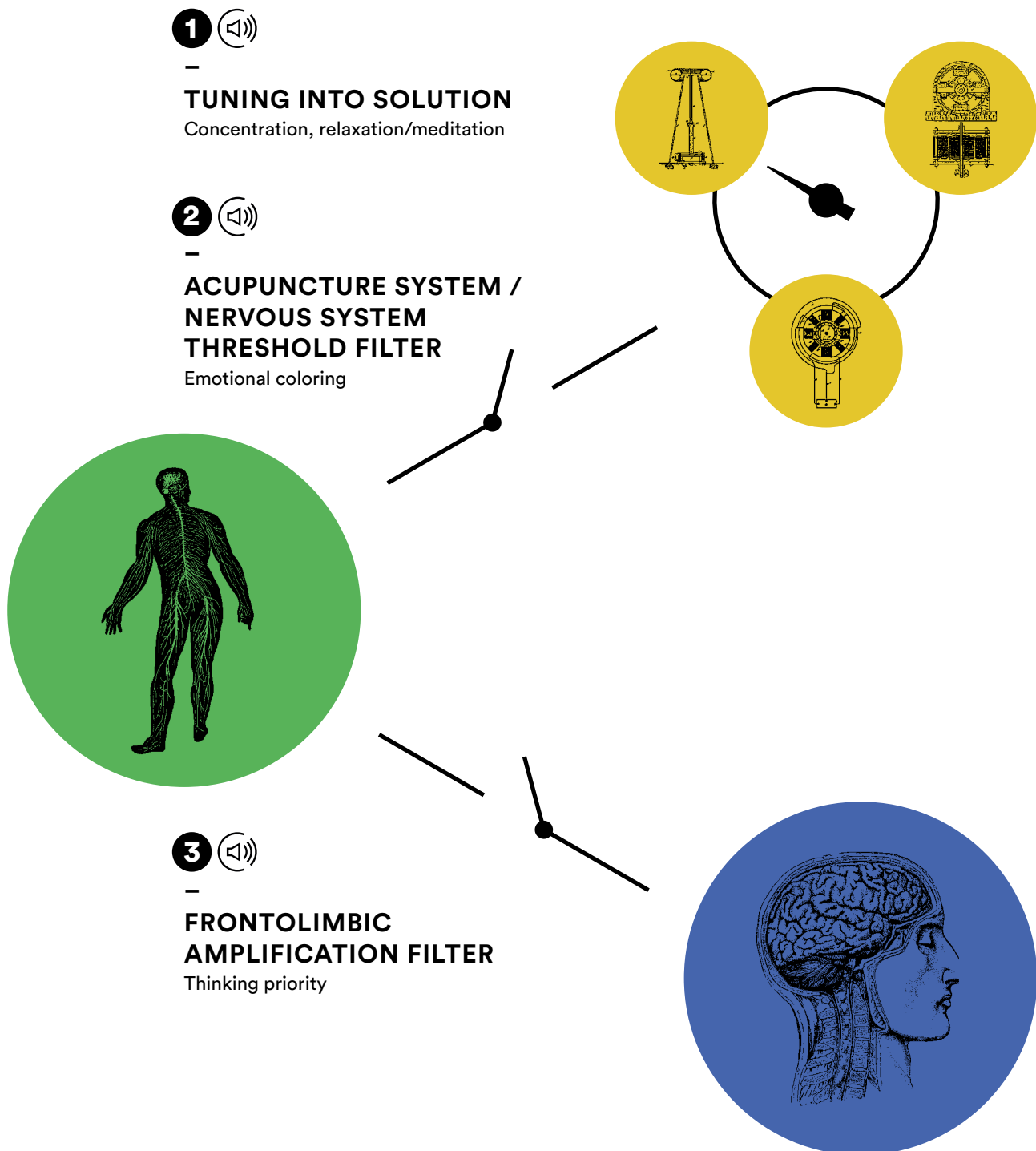
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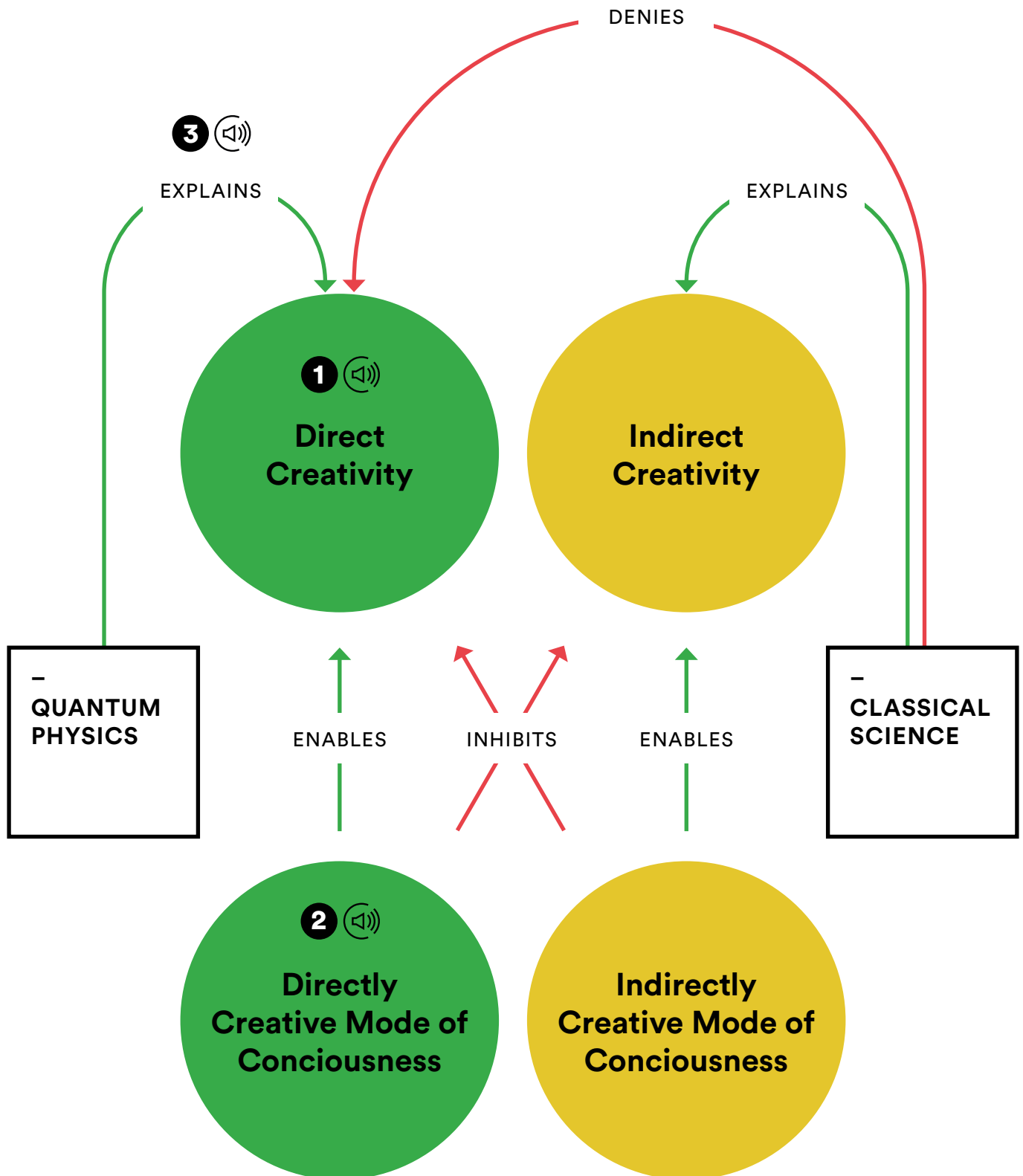
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**The day science begins to
study non-physical pheno-
mena, it will make more
progress in one decade than
in all the previous centuries
of its existence.**

NIKOLA TESLA

A Phenomenological model



B Ideological model



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© Biophysical model

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HIGHLIGHTS

1 

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Quantum physics allows for interaction types that are beyond mechanistic causality (common knowledge).

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The acupuncture system is a macroscopic quantum system (shown by Russian-Ukrainian school of microwave resonance therapy).

3 

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Mathematical isomorphism between Feynman's version of the Schrödinger equation and Hopfield's neural network model indicates that a quantum system can behave as a memory (shown by M. Peruš).

2

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Original scientific article

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Author Dejan Raković

ON NATURE AND CONTROL OF CREATIVITY: TESLA AS A CASE STUDY

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Abstract. Nikola Tesla is undoubtedly the greatest inventor in the history of electrical engineering, and what makes him especially fascinating was his unusual *mental control of creative visions*. In this paper it is pointed out that they may serve as an extraordinary ‘*case study*’ for understanding both *biophysical basis of transpersonal psychology* and *control of creative processes, in meditation and sleep*. This can presumably provide deeper understanding of this most complex cognitive issue, thus helping humankind in developing collective knowledge, experience, and wisdom.

Keywords: Nikola Tesla; Quantum-holographic nature of consciousness; Normal and altered states of consciousness; Two cognitive modes; Control of creative processes in meditation and sleep.

*When we start to study non-physical phenomena,
We will progress more in ten years than we have for centuries.*
Nikola Tesla

Introduction

Phenomenon of *deep creative insights* is known to many creators in the fields of science and art. Most frequently, after significant effort to resolve some problem, the solution suddenly appears. However, the very act of creation is going on at subconscious level, escaping from rational scientific analysis to date. That is why *Tesla’s introspective analyses* of his creative phases are so precious ‘*case study*’ [1,2] for understanding the very *biophysical nature of creativity*.

Tesla was absolutely convinced in similarity of scientific and artistic ideas: ‘*They are coming from the same source.*’ This viewpoint is similar to *Plato’s*, but Tesla did not come to that speculating philosophically, but he had *experienced the world of ideas from the boyhood*: ‘*When a word was spoken to me the image of the object it designated would present itself vividly to my vision and sometimes I was quite unable to distinguish whether what I saw was tangible or not ... Sometimes it would remain fixed in space though I pushed my hand through it. [‘quantum hologram’ [3,4], in Tesla’s quantum-coherent state of consciousness!? (D.R. note)] ... Then, instinctively, I commenced making excursions beyond the limits of the small world of which I had knowledge and saw new scenes. These were at first very blurred and indistinct, and would flit away when I tried to concentrate my attention upon them, but, by and by, I succeeded in fixing them; they gained in strength and distinctness and finally assumed the concreteness of real things. I soon discovered that my best comfort was attained if I simply went on in my vision farther and farther, getting new impressions all the time, and so began to travel – of course in my mind. Every night (and sometimes during the day) when alone, I would start my journeys.*’ [‘*Astral journeys*’ [4,5], in Tesla’s transitional quantum-coherent states of consciousness? (D.R. note)] ... *I have been practicing this until my seventeens, when my thoughts turned to inventions seriously.*’

A 1

Much later, during his stay in Budapest (1881/1882), in looking for employment after leaving his engineering studies, Tesla was beset by his need to detach ... *'the commutator from the machine'* ... He had made a ... *'decided advance'* ... in Prague (1880/1881), but knew he had to reach higher, break new ground: *'I started by first picturing in my mind a direct current machine, running it and following the changing flow ... Next I would visualize systems comprised of motors and generators and operate them in various ways. The images I saw were perfectly real and tangible'*.

His entire life force, all impulses and urges, were directed toward the solution, demanding more and more, always with him, present even in his sleep, closer to him than anything else: he had to press his thoughts to their limits, had no patience, and within weeks of starting his employment, succumbed to his ... *'incessant thinking'* ... and had *'a complete nervous breakdown'* ... His physical state had completely deteriorated. The breakdown *quicken*ed and *sharpen*ed his perspective a hundredfold, so that he ... *'could hear the ticking of a watch with three rooms between me and the time-piece. A fly alighting on a table in the room would cause a dull thud in my ear. The whistle of a locomotive ... made the chair on which I sat vibrate ... in the dark I ... could detect the presence of an object at a distance of twelve feet by a peculiar creepy sensation on the forehead ... In some instances, I have seen all the air around me filled with tongues of living flame.'* He stayed indoors, sunk in his night shirt and beddings, shivering continually under the thunder of cart wheels and horses, organ grinders, bells, and the sound of voices, incomprehensible and foreign. The air itself hurt ... His pulse fluctuated from very low to 260 beats per minute ... [By his incessant meditative efforts Tesla presumably had awaken his *'kundalini'* vital energy in the base of spine [4,6], which abruptly opened his *'doors of perception'*, usually causing permanent psychosis in persons mentally unpurified previously, but Tesla succeeded to recover owing to his *'pure soul'*, and subsequently a series of his incredible *'meditative inventions'* began (D.R. note)]

One day, a co-worker, Antal Szigeti, came to his lodging, and said that, while he had no clue as to what was ailing him, knew that a walk in the fresh air and light never harmed anyone, and pointed toward the City park, *Varosliget*, and invited him to come for a stroll ... *'We exercised every day and I gained rapidly in strength. My mind also seemed to grow more vigorous and as my thoughts turned to the subject that absorbed me I was surprised at my confidence of success. On one occasion, ever present in my recollection'* ... during a walk in the park toward the end of February, Tesla looked at the setting sun, and began to recite the glorious passage from Goethe's *Faust* [...] *'As I uttered these words, the idea came like a flash of lightning ... and in an instant the truth was revealed. I drew with a stick on the sand the diagram of my motor ... secrets of nature which ... I had wrested from her against all odds and at the peril of my existence ... See, how smoothly it runs. No commutator, no brushes, no sparking. As the current in one coil decays, in the adjacent coil it increases, coil after coil, creating new magnetic rotating fields and pushing the shaft continually.'* ... He had been right in Graz (1875/1877). The fire, the wheel, and now the electro-magnetic field ... *Perhaps the disarrangement of his senses had been necessary.* He had entered a treasure house of electricity. His life had been preserved for a purpose ... He visualized with ease the new motors: *'In less than two months, I evolved virtually all the types of motors and modifications of the system now identified with my name ... it was a mental state of happiness as complete as I have ever known in life. Ideas came in an uninterrupted stream and the only difficulty I had was to hold them fast.'*

The above Tesla's quotations undoubtedly reveal that Tesla's visions and inventions were realized in *controlled altered and transitional states of consciousness*, which are manifestations of *macroscopic quantum nature and nonlocality of consciousness*, with significant *cognitive-creative implications (and psychosomatic-transpersonal)* [4]: *quantum-coherent direct one* (religious/creative, in altered and transitional states of consciousness) and *classically-reduced indirect one* (sensory/rationally mediated, in normal states of consciousness).

Quantum-holographic bases of consciousness: psychosomatic-transpersonal and cognitive-creative implications

According to our theoretical investigations, in-deterministic manifestations of *free will* and other holistic manifestations of consciousness like *transitional states of consciousness*, *altered states of consciousness*, and *consciousness pervading body* – necessarily imply *quantum bases of consciousness* – with significant *psychosomatic-transpersonal implications* [4]. Namely, as demonstrated by *quantum-coherent characteristics* of the Russian-Ukrainian school of *microwave resonance therapy* (MRT) [7] – the *acupuncture system* is the only *macroscopic quantum system* in our body (while brain still seems not to be) which might be related to *consciousness*; and as recent theoretical investigations show that any *quantum system* has formal mathematical structure of the *quantum-holographic Hopfield-like associative neural network* [3] – then (acupuncture temporarily reprogrammable) *memory attractors of the acupuncture network* can be treated as *psychosomatic individual disorders* representing (*quantum*) *holistic records* – which might represent biophysical basis of (*quantum*)*holistic local psychosomatics* [4]! At the same time, the mentioned analogy between *mathematical formalisms of Hopfield's associative neural network* and *Feynman's propagator version of the Schrödinger equation* implies that *collective consciousness* is a possible *ontological property of the physical field itself* with various micro-quantum and macro-quantum (both non-biological and biological) excitations, which is a widely spread thesis of *Eastern esoteric/ religious traditions* – and then *memory attractors of the quantum-holographic space-time network of collective consciousness* can be treated as *psychosomatic collective disorders* representing *generalized (quantum)holistic field records* (including *interpersonal hesychastic-prayer finally-reprogrammable loads*) – which might represent *biophysical basis of (quantum)holistic global psychosomatics* [4]!

According to such a quantum-holographic picture, mystical quantum-holographic states of consciousness behave as a cosmic quantum hologram and bear information on wholeness (which resembles Hinduistic relationship *Brahman/Atman* [6]), which can be registered only in altered states of consciousness, like sleep, creative dozes, meditation, prayer... namely, as it is not under pressure of bodily environment any more, consciousness of a mystic can acquire information about cosmic quantum hologram as a whole [4]. By returning into normal state of consciousness, out of this quantum-holographic sum of information only one term is selected while others disappear, which is a characteristic of transition from quantum to classical state of consciousness (related to so called quantum collapse [4]) – thus explaining in principle non-adequate informational rationalization of any direct quantum-holographic spiritual-religious mystical experience (and hence mystics of all traditions agree that everything is clear in these states of consciousness, but that they have a problem to explain this experience to themselves and to the others!) – with significant cognitive-creative implications. This imply *two cognitive modes of consciousness*, according to the coupling strength consciousness-body-environment [4]: (1) weakly-coupled quantum-coherent direct one (*in out-of-body religious/ creative transitional and altered states of consciousness*, like prayer, meditation, creative dozes, lucid dreams...), and (2) strongly-coupled classically-reduced indirect one (*in bodily perceptively/rationally mediated normal states of consciousness*, like sensory perception, logical and scientific thinking...) – with conditions for mutual transformations. It should be pointed out that necessity of direct quantum-holographic coupling of individual and cosmic collective consciousness needs weak out-of-body quantum-communication coupling consciousness-environment, i.e. previous *reprogramming of all psychosomatic loads*: In the context of religious traditions, this implies cleansing of possessive or hedonistic emotional-mental sin/karmic connections with the world – which as loading 'mental addresses' would give rise to quantum projections of mentally-channelled tunnelled consciousness on the out-of-body environment, and thus to classically-reduced *out-of-body extrasensory observing* of the mentally-addressed environment [4]. On the same line, the efforts of mystics of all traditions to clean consciousness/soul through spiritual practice (prayer, meditation, ...) and thus to reach their final

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eschatological goal (Kingdom of God, nirvana, ...), i.e. *post-mortem* salvation (of the sin-free/karmic-free non-bounded soul) appear reasonable (which still leaves room for *personal love*, whose highest manifestation is ability and readiness for permanent and *unconditioned forgiving* (to loving person, and because of him/her to everybody else, including enemies), in spiritual prayer and (subtly related quantum-holographic) living practice; the same refers to love for relatives and friends).

So it seems that science is closing the circle, by re-discovering two cognitive modes of consciousness and at the same time by imposing its own epistemological limitations – as it was preserved for millennia in *shamanistic* tribal traditions [8], or as it was concisely described by Patanjali in *Yoga Sutras*, pointing out that mystical experience (*samadhi*) is 'filled with truth' and that 'it goes beyond inference and scriptures' [6], or as this difference between faith and knowledge was formulated at the beginning of the last century by Berdyaev in his *Philosophy of Freedom* as the difference of two modes of cognition, prayer-mediated 'comprehension of the affairs invisible' and rationally-mediated 'comprehension of the affairs visible' [9]!

Control of creative processes in meditation and sleep

It is especially interesting, in the context of well documented creative insights and extraordinary series of inventions of Nikola Tesla (directly visualized in consciousness with all functioning details of devices, without any application of Maxwell electromagnetics), to consider possibility of controlling creative processes in the framework of our theoretical investigations, which predict unusual anticipative properties of psyche in quantum-holographic short-lasting quantum-coherent transitional and altered states of consciousness (with subsequent classically-reduced extrasensory-perception of the mentally-addressed out-of-body complementary environment, which might also be Jung's 'archetype' of the problem-with-solution on the level of quantum-holographic collective consciousness, which arises associataion on Tesla's 'mental inventions' and Plato's 'world of ideas'!). After returning of the displaced consciousness upon the body, in order that transpersonally acquired information ascends to the level of normally conscious state, it is necessary to overcome two filters: acupuncture system/nervous system threshold filter (which requires 'emotional colouring' of the solving problem) and frontolimbic-amplification filter (which requires 'emotional-thinking priority' of the solving problem).

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A 3

According to our theoretical investigations, all mentioned conditions might be realized in waking quantum-coherent state of meditation (by entering in this prolonged altered state of consciousness, with mental addressing on the solved problem, which Tesla has been doing by persistent mental focusing on the solving problem as described in the introductory section!), while during the sleep state they can be realized in quantum-coherent transitional states of falling asleep and quantum-coherent stationary states of REM-sleep phases (with previous intense concentration on the solving problem before sleep, and subsequent amplification of the obtained classically-reduced answer mostly in the form of symbolic dream, which should be then correctly interpreted in the context of personal internal symbolism) [4]. Of course, for solving conceptually complex scientific problems it is necessary to be an expert in the corresponding field, in order to scientifically rationalise a solution that represents corresponding scientific shift.

The same might be applied to *artistic creative experiences* and their subsequent *expressions* [Mozart as an extraordinary example!] [4,10], while very *art-works* then behave like *mental addresses of 'archetypes'* being in contact with artists in transpersonal communications during the acts of creation (so then *deep artistic experiences* of the public might have strong *spiritual note* too, through *spontaneous mental addressing* of the artistic audience on the *masterpiece* and *emotionally-induced excitation* into transitional state of consciousness; and similarly this could be extended to *deep spiritual experiences* of the believers with their *mental addressing* on *holy icons/relics*).

Conclusion

In conclusion, it should be noted that Tesla's introspective analyses of his creative visions are so precious for understanding both *biophysical basis of transpersonal psychology* and *control of creative processes, in meditation and sleep*.

Regarding extraordinary creative ranges of Tesla's introspective experiences in these exotic states of consciousness (categorized in his time as 'non-physical' phenomena!), his conviction in introductory moto that '*when we start to study non-physical phenomena, we will progress more in ten years than we have for centuries*' becomes clearer.

This can presumably provide *deeper understanding* of this most complex cognitive issue, thus *helping humankind* in developing collective knowledge, experience, and wisdom.

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References

1. D. Mrkich, *Nikola Tesla, The European Years*, Commoners's Publishing, Ottawa, Canada, 2003.
2. D. Raković, Tesla and quantum-coherent states of consciousness: Case study for understanding quantum-holographic nature of creativity, in: D. Mirjanić (ed), *Proc. Ideas of Nikola Tesla*, ASA RS, Banja Luka, 2006.
3. M. Peruš, Neuro-quantum parallelism in mind-brain and computers, *Informatica* 20 (1996) 173-183; M. Peruš, Multi-level synergetic computation in brain, *Nonlinear Phenomena in Complex Systems* 4 (2001) 157-193.
4. D. Raković, *Integrative Biophysics, Quantum Medicine, and Quantum-Holographic Informatics: Psychosomatic-Cognitive Implications*, IASC & IEPSP, Belgrade, 2009; D. Raković, *Fundamentals of Biophysics*, 3rd ed., IASC & IEPSP, Belgrade, 2008, in Serbian; D. Raković, *Recollections, Dreams, Thoughts: About Past and Future 1984-2007. On Crossway of Quantum-Holographic and Classically-Reduced Reality*, IASC & IEPSP, Belgrade, 2008, in Serbian; www.dejanrakovic.com and referenes therein.
5. R. Monroe, *Journeys Out of the Body*, Doubleday, Garden City NY, 1971.
6. Swami Prabhavananda, Ch. Isherwood (tr.), *The Yoga Sutras of Patanjali. How to Know God*, New American Library, New York, 1969; K. Wilber, *The Atman Project*, Quest, Wheaton IL, 1980.
7. N. D. Devyatkov, O. Betskii (eds), *Biological Aspects of Low Intensity Millimetre Waves*, Seven Plus, Moscow, 1994; S. P. Sit'ko, L. N. Mkrtchian, *Introduction to Quantum Medicine*, Pattern, Kiev, 1994.
8. Č. Hadži-Nikolić, Therapeutic significance of altered states of consciousness in hallucinogenic shamanistic rituals, in: D. Raković, Dj. Koruga (eds), *Consciousness: Scientific Challenge of the 21st Century*, ECPD, Belgrade, 1995.
9. N. Berdyaev, *Philosophy of Freedom*, Logos Ant, Belgrade, 1996, Serbian transl from Russian original (1911).
10. F. Holmes, *The Life of Mozart Including his Correspondence*, Chapman & Hall, 1878, pp. 211-213.

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He graduated Engineering Physics at the Faculty of Electrical Engineering in Belgrade, and got MS and PhD degrees in theoretical physics at the Faculty of Science, University of Belgrade. During 1980/81 he completed postgraduate specialization in the group of Academician L. A. Gribov in Moscow, the renown authority in theoretical spectroscopy and quantum chemistry of molecules, polymers, and crystals. He is vice-president elect of the Materials Research Society of Serbia, and guest co-editor of 10 volumes from YUCOMAT conferences.

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He published over two hundred scientific papers and communications, and over 35 books (among them Introduction to Quantum-Informational Medicine; Integrative Biophysics, Quantum Medicine, and Quantum-Holographic Informatics; Fundamentals of Biophysics; Recollections, Dreams, Thoughts; Religion and Epistemology; Science - Religion - Society; Anti-stress Holistic Handbook; Consciousness: Scientific Challenge of the 21st Century; Biomaterials; Materials Science and Engineering).