[1] 'Now it is obvious that a thing cannot be a form of wave motion and composed of particles at the same time - the two concepts are too different.' (Werner Heisenberg, on Quantum Theory, 1930)

[2] What the luminaries of quantum mechanics did not know, it is that observation itself is the neurological quantum computation. According to B-theory, observation is an act of quantum computing.

[3] http://en.wikipedia.org/wiki/Interaction_picture#Use_of_interaction_picture

[4] http://en.wikipedia.org/wiki/John_Archibald_Wheeler

[5] In addressing the British Association for the Advancement of Science, on 7 September 1922.

[6] http://en.wikipedia.org/wiki/Heisenberg_picture

[7] The Schrödinger picture describes the bit processes in this space, and the Heisenberg picture is about classical space bits. Classical space bits are mathematically equivalent to the information space bits as proved by Paul Dirac.
[8] "Reflectively" here means physical reality is automatically being computed, utilizing self-organized information structures such as DNA. At the higher level of DNA organization, it is done reflexively and responsively.
[9] http://en.wikipedia.org/wiki/Standard_Model
[10] http://en.wikipedia.org/wiki/Paul_dirac
[11] http://en.wikipedia.org/wiki/Interaction_picture#Use_of_interaction_picture
[12] "Evolution" here is understood to be the process of self-organization of the computational systems being considered.
[13] The closed system here is the environment where information, expressed via matter/energy, is subject to a self-organization pattern inherent within the relatively closed energy contour. The sun, our only energy source, is responsible for daily fluctuations in the energy stream to the Earth and its subsequent dissipation.
[14] Self-organization pressure corresponds to entropy rise (second law of thermodynamics) in a classical space.
[15] Humans compete socially; for example, Google versus Microsoft.

[16] A brief account is provided here, in order to set a sufficient context for defining the consciousness.
[17] http://cm.bell-labs.com/cm/ms/what/shannonday/paper.html
[18] http://news.bbc.co.uk/2/hi/health/8255112.stm

[19] http://en.wikipedia.org/wiki/Ilya_Prigogine

[20] During the self-organization process, the prior state of a system is superseded by a new state to accommodate the result of interactions with other systems or and within its self. This self-organization process is defined as computing in B-theory. The system, which is showing self-organization patterns, is defined as a computational system in B-theory.[repeated from text above]

[21] http://whatislife.stanford.edu/Homepage/LoCo_files/What-is-Life.pdf Chapter 2 and 3

[22] Externalization here is the realization of pre-determined computational patterns of reflective nature, which are produced by a DNA-defined computing base in response to interactions (in informational space).
[23] The language itself is viewed as the computational system now.
[24] From modern pilots in aviation to ordinary drivers on the road, from MBA students to researchers in molecular imaging — the visualization of data is key to understanding processes. In the same way, relatively primitive computational systems started to gain advantage — by visualizing data. Thus, we arrived at the creation of the 'outside objective' world — it was just a tool for better understanding of data.
[25] http://en.wikipedia.org/wiki/Visual_cortex
[26] http://en.wikipedia.org/wiki/Reticular_formation
[27] Pattern here is a DNA-programmed algorithm that prepares incoming interactions data for externalization. Similar techniques are used in data acquisition and knowledge representation.

[28] David Deutsch (1985) describes the quantum computing that is based on Boolean logic gates.

[29] *Synchronization: Adaptive Mechanism Linking Internal and External Dynamics*. Alex Pitti, Max Lungarella andYasuo Kuniyoshi.
[30] http://news.bbc.co.uk/2/hi/health/8255112.stm
[31] http://en.wikipedia.org/wiki/Reticular_activating_system

[32] Kanwisher, Nancy (2003), "The ventral visual object pathway in humans: Evidence from fMRI", in Chalupa, LM; Werner, JS, *The Visual Neurosciences*.

[33] The process of putting, or wiring, certain computational tasks on a hardware base, usually a chip, for better processing times and quality (to ease the reference, both informational and matter/energy spaces are used in describing, for example, the brain and its functioning).

[34] 'Our natural visual experience is more like movies.' says Nishimoto - http://www.newscientist.com/article/mg20427323.500-brain-scanners-can-tell-what-youre-thinking-about.html?full=true

[35] One example of transparency may be mathematics. It is an internalized discipline, yet its goal is to understand externalized space. It is a good question now whether mathematics serves as the bridge between the two spaces. Causality is invariable under changing spaces and our reasoning implies causation calculus, as listening implies hearing.
The invariability of causality is a single reason why we can understand each other, because it secures a standard formalism for all perceiving beings. The invariability of causality is possibly achieved through invariance of certain quantity under changing basis.
[36]For example, colors may look differently in Daltonism, and tiny fluctuations in vision perception are widespread.
[37] It is possible that dreams actually represent a continuous quantum state, because the consciousness does not interfere much in the states of dreams and creative thinking.

[38] http://en.wikipedia.org/wiki/Reticular_formation

[39] *Scientific American*, September 2009, page 94.

[40] Three hundred million people were killed in 20th century.

[41] Please see John McCarthy's review of the Sir R. Penrose's book *The Emperor's New Mind* - http://www-formal.stanford.edu/jmc/reviews/penrose1/penrose1.html

[42] http://www.research.ibm.com/people/b/bennetc/UTMX.pdf

[44] http://en.wikipedia.org/wiki/Interaction_picture#Use_of_interaction_picture

[45] The alternative to the Schrödinger picture is to switch to a rotating reference frame, which is itself being rotated by the propagator. Since the undulatory rotation is now being assumed by the reference frame itself, an undisturbed state function appears to be truly static. This is the Heisenberg picture. - http://en.wikipedia.org/wiki/Schrödinger_picture#Differential_equation_for_time_evolution_operator

[46] http://www.springerlink.com/content/xq030814w6h0778q/fulltext.pdf?page=1

[47] According to Leibniz, no event may ever occur without its cause, and Prof. Hawking et al concluded that gravity sets the causal structure of the universe. Please see more discussion on the relation of gravity and causality in the section “Gravity”.

[48] Schrödinger states:

'...living matter, while not eluding the "laws of physics" as established up to date, is likely to involve "other laws of physics" hitherto unknown, which however, once they have been revealed, will form just as integral a part of science as the former.'
Source - http://whatislife.stanford.edu/Homepage/LoCo_files/What-is-Life.pdf

[49] Evolution reversibility and the possibility of reverting to the particular state of the computational system, are not one thing.

[50] EPR experiment.

[51] ‘According to our conception, natural laws are a product of our psychological need to feel at home with nature;…’
Ernst Mach - http://www.spaceandmotion.com/Physics-Ernst-Mach.htm
Ernst Mach also inspired the Brans-Dicke theory, which was found to be consistent with observational data – http://en.wikipedia.org/wiki/Brans–Dicke_theory

[52] The alternative to the Schrödinger picture is to switch to a rotating reference frame, which is itself being rotated by the propagator. Since the undulatory rotation is now being assumed by the reference frame itself, an undisturbed state function appears to be truly static. This is the Heisenberg picture. - http://en.wikipedia.org/wiki/Schrödinger_picture#Differential_equation_for_time_evolution_operator

[53] ‘I think I can safely say that nobody understands Quantum Mechanics.’

- http://en.wikiquote.org/wiki/Richard_Feynman

[54] http://en.wikipedia.org/wiki/The_Large_Scale_Structure_of_Spacetime

[55] http://galileo.phys.virginia.edu/classes/252/symmetry/Symmetry.html

[56] http://en.wikipedia.org/wiki/Newton's_law_of_universal_gravitation#Einstein.27s_solution

[57] http://galileo.phys.virginia.edu/classes/252/symmetry/Symmetry.html

$$\left|\psi\left(x_1, x_2\right)\right|^2 = \left|\psi\left(x_2, x_1\right)\right|^2 .$$

$$\psi^{S}_{(2,3)}\left(x_1, x_2\right) = \frac{1}{\sqrt{2}}\left(\psi_{(2,3)}\left(x_1, x_2\right) + \psi_{(2,3)}\left(x_2, x_1\right)\right)$$

[58] http://galileo.phys.virginia.edu/classes/252/symmetry/Symmetry.html

$$\psi^{S}_{(2,3)}(x_1,x_2)=\frac{1}{\sqrt{2}}\left(\psi_{(2,3)}(x_1,x_2)-\psi_{(2,3)}(x_2,x_1)\right)$$

$$\left|\psi(x_1,x_2)\right|^2=\left|\psi(x_2,x_1)\right|^2$$

[59] http://galileo.phys.virginia.edu/classes/252/symmetry/Symmetry.html

[60] http://everything2.com/title/Philosophical+Corollaries+of+Schr%25F6dinger%2527s+Equation

[61] In a classical space the fastest, or the shortest calculation period is limited by the uncertainty principle, and is quantified in the Planck time constant. We cannot go faster in computing because of the fundamental limits defined by the constants. The constants, for example c- speed of light, and h – the Planck constant, make up the appearance and stability of classical space. Prof. Hawking has calculated that should the speed of the light be just one meter more or less than it is, our universe would not be functional. In information space calculations are made in no time, therefore causality is non-local in a classical space, and the entanglement phenomena is the direct evidence to this.

[62] for more details please see the sections “Quantum computing – in the brain and outside of it”, and “Entanglement”, below.

[63] http://www.aip.org/history/heisenberg/p09.htm

64 http://quantum-mind.org/penrose-hameroff/consciousevents.html

[65] Winston Churchill is said to have told George VI – Without deciphering Enigma, we would not have won the war.