Notes

(1) *Cyborg Plan Search Chronology*

- **1963**-1993: theoretical formulation of the whole plan;
- 1993-1998: first experiments on simple circuits;
- September-October 1998: theoretical global simulation of the totality of the cerebral nervous System (PROT 1);
- November 1998: first electronic simulation on reduced to a minimum elements for the communicative paths screening (PROT 2);
- March 1999: simulation and construction of the pre-prototype with chosen randomized elements (PROT 3) (see *Fig. A*);
- November 1999: informatics simulation and construction of the pre-prototype of the basic at high reproducibility modules (PROT 4) and official presentation (see *Fig. A*):
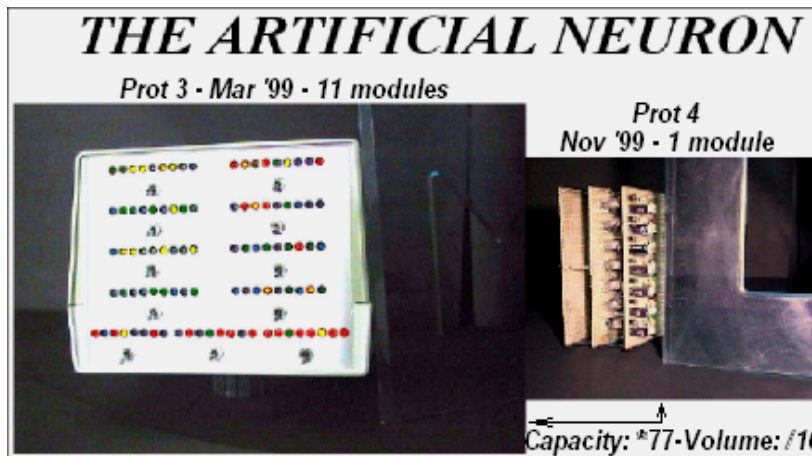

Fig. A

"Legenda" for Figure A

- December 1999: mathematical and informatics simulations of the universal basic communicative element (PROT 5). From this prototype on I make use of informatics simulation only.
- June 2000: study for the electronic simulation of the universal basic communicative element (PROT 6);
- September 2000: study for the electronic simulation of the universal communicative complete element (PROT 7);
- August 2001: the Universal Module (a PROT 7 variation) (PROT 8) Italian Patent Request;
- October 2001: Universal Module (PROT 9) simplifications;
- January 2002: universal module (PROT 10) implementation;
- March 2002: Universal Module (PROT 11) completed (practically, all the brain);
- October 2002: the universal module with all its ramifications (PROT 12): the whole brain with annexed and connected (afferent and efferent Systems);
- December 2002: PROT 12 presentation at the Symposium of the International

Neuromodulation Society in Rome.
- January 2003: the Universal branched Module simplification (PROT 13 - 1-2-3-4);
- March 2003: the universal simplified branched module implementation (PROT 14 – 1-2-3-4);
- May 2003: the configurations research for the protein and not protein peptides simulation (PROT 15 - 1-2);
- May 2003: the presentation of PROT 13 to the Conference Stroke Today in Spoleto (Italy);
- July 2003: research of the frequency-configurations for the standard messengers simulation (PROT 16 – 1-2);
- September 2003: the configuration transformation in a new structure with the connections for the right and left cerebral lobes and tissues simulation (PROT 17 - 1-2);
- October 2004: simulation of the protein coupling (bionic coupling) (PROT 18 - 1-2);
- October 2004: the Universal implemented branched module European Patent Request;
- November 2004: "Glycine" simulation (PROT 19);
- April 2005: theoretical approach for the neural dialogue (PROT 20 - 1-2);
- September 2005: neural dialogue electro-informatics simulation (PROT 21 - 1-2).

At present:
- simulation also of the calcium pump (after the simulation - from 1984 to 2005 - exclusively of the pump of Sodium-Potassium-Chlorine);
- biocompatible materials theorical analysis for the planning of similar-mildews to use as output and input probes;
- theoretical analysis of biocompatible materials for the design of interfaces cell-chip;
- structure of biocompatible materials for the construction of crystalline holographic memories implicated in input, output and feedback signals;
- after the amino acid Glycine (PROT 19) simulation, the possibility of simulation:
  - of the others 19 amino acids,
  - of the fundamental lipid (glycerol) structure,
  - of the nucleic acids components,
  - of the same nucleic acids [the target is: parts of DNA and RNA behavior simulations]. *(So as to obtain the perfect reversibility between the artificial and the biological)*,
  - *PROT 7 simplification and digital similar–analog adaptation to get different spin offs for diversified applications on the biological context (Fig. **B**, KDK, a spin off).*

*Fig. **B***

KDK is a small device for e-mail crypting and de-crypting in order to strictly safe privacy. KDK is external to the computer and connected through USB gate; it is programmed by the user in an individualized way and can be easily used to send and receive reserved messages in a safe way. In a easy to handle shape, it is formed by a pocket size box, containing 2 UBS gates and a transparent connection UBS to the PC, which can be used by whatever computer, making the message to pass through

after being crypted. KDK device works in pair or in star; either for the couple or for the star links, it exist a principal box while the other, or the others, are secondary. Only the twin-link can de-crypt and eventually answer in an analogous way to the initial message. It is not necessary that the user of the corresponding twin-link pen drive must know the crypting key-files. The key-files are charged by the owner of the principal pen drive and the second or all the others, obviously programmed in the same way, work (receiving and sending) in link with the principal or among themselves. Compared to the traditional crypting algorithms which are inserted internally in the software of the computer itself, and so easily attacked by the hackers, KDK device is much safer because it is separated (transparent respect to the System) working like a simple pen drive small box to insert at need.

The prototype device KDK, compared to the traditional crypting algorithms which are inserted internally in the software of the computer itself, and so easily attacked by the hackers, is much safer because it is separated (transparent respect to the System) working like a simple pen drive small box to insert at need. The Crypting and Decrypting operations are locally executed by the KDK System without the help of the PC to which it is connected.

This System, not linked to a classical PC structure, doesn't use in the processing, an operative System like MS-DOS, Windows, Linux…etc but it is based on a particular (similar-analog) program which has no-thing in common with other large diffusion programs like Word or others. This means that the files produced in the encrypting time haven't a structure which is, one way or another, identifiable or comparable to other devices.

(2)

We need to recall the fundamental assumption that underlies this research: *2(two) emission quanta, at a given transmission frequency, correspond to 1(one) bit, with its own frequency given by the (vectorial) sum of the same 2 quanta frequencies*. The Bit can be considered a virtual particle which can get 2 states: the state *[0]* and the state *[1]*. And only in those two states it will also have an informative value. As a virtual particle, it will acquire virtual values of mass, speed, momentum, energy, Hamiltonian, wavelength etc.

And also a (virtual) charge, since it is a particular motion within an electromagnetic field.

From now on we will avoid the subscript "v" to indicate the "virtual", as the whole argument will be all based on virtuality. As a simple hypothesis we can consider the brain section in these *Fig.s*.
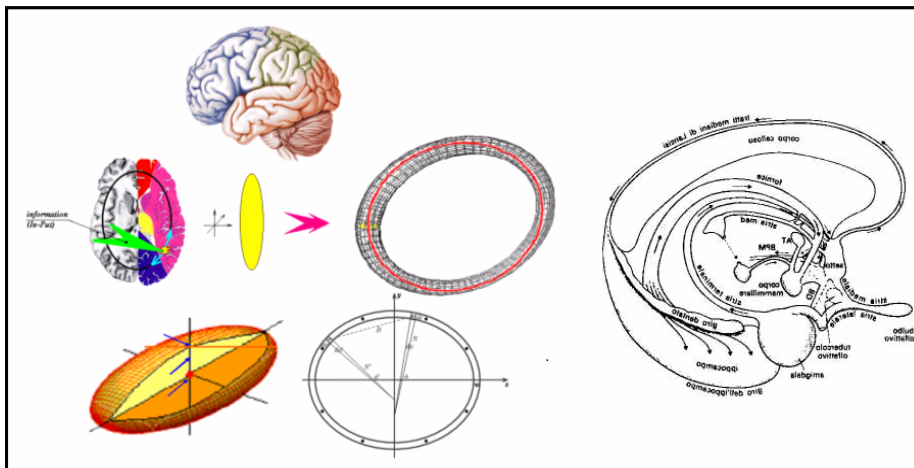
as an isolated System and like all the isolated Systems, even in it we will be in presence of

observables which evolve according to the Schrödinger's equation:

$$\partial/\partial t \; |\psi_i\rangle = -i/\nabla \mathbf{H} \; |\psi_i\rangle$$

We are now able to make an analogy with which we can compare the informative stress (capable of covering the entire indicated brain surface or at least the elliptical highlighted crown) with charge fields that originate or better that are existing and modifying themselves, W and B.

According to the Standard Electroweak Model, let us try to represent in a unified theory the week and electromagnetic pseudo-fermions interactions in an informative pseudo-bosonic sea.

The gauge symmetry that we consider is $SU_T(2) \otimes U_Y(1)$.

The pseudo-fermions are present in the Lagrangian as helicity selfstates h, where h is hold for null mass particles (*such as the connected information flows*).

Then:

$$f_L = \tfrac{1}{2}(1 - \gamma_5)f \qquad \textit{left-handed} \qquad (h = -1/2)$$

$$f_R = \tfrac{1}{2}(1 + \gamma_5)f \qquad \textit{right-handed} \qquad (h = +1/2)$$

where f is the pseudo-fermionic field and γ_5 is a Dirac matrix.

Now let's consider the left-handed pseudo-fermionic states as grouped into weak isospin doublets while the right-handed ones, such as isospin singlets:

$$\chi_L^l = \begin{pmatrix} \nu_l \\ l \end{pmatrix}_L \quad ; \quad l_R \quad \text{with } l = e, \mu, \tau$$

$$\chi_L^q = \begin{pmatrix} u \\ d \end{pmatrix}_L \quad ; \quad u_R, d_R$$

The coupling between gauge pseudo-fermions and pseudo-bosons is the standard one:

$$-g\vec{J}^\mu \cdot \vec{W}_\mu - \frac{g'}{2}(J_Y)^\mu B_\mu^0$$

where W^i and B^0 are, respectively, the two loaded vector fields , W^+ and W^- and the two neutral W^0 and B^0, able to define the gauge pseudo-bosons physical fields with the following expressions:

$$B_\mu^\pm = \frac{1}{\sqrt{2}}\left(W_\mu^1 \mp iW_\mu^2\right)$$

$$Z_\mu^0 = B_\mu^0 \cos\theta_w - W_\mu^0 \sin\theta_w$$

$$A_\mu = W_\mu^3 \cos\theta_w + B_\mu^0 \sin\theta_w$$

in which θ_w is the Weinberg angle [$\sin^2(\theta_w) \cong 0.23$].

If we now introduce the expressions of A_μ and Z_μ, we obtain for the electromagnetic current, the following expression

$$J_{em}^\mu = g\sin\theta_w \overline{\Psi}\gamma^\mu I_3 \Psi + \frac{1}{2}g'\cos\theta_w \overline{\Psi}\gamma^\mu Y\Psi$$

where I_3 is the third component of the weak isospin and Y is the hypercharge.

From the expression of the electromagnetic current we obtain also for the brain section the electroweak unification relations:

$$Q = I_3 + \frac{Y}{2}$$

$$e = g\sin\theta_w = g'\cos\theta_w$$

All mentioned above is in support of two conjectures that can show how the signals distribution within the brain works.

1. *The myelin sheath, with its appurtenances (nodes, pumps, channels), maintains unchanged the energy balance due to external forces transforming the neuron (considered as a flux tube) from a dissipative to a non-dissipative System.*
2. *The neuron nucleus recognizes the nature and the intensity of the external informative stresses and works as a screening and a track address for the subsequent trajectories of the informative stresses themselves.*

(3)

CyberNeuroPhisiology *-neologism-* (CNP: human body analog artificial simulation) concerns an hardware simulated *apparatus*, autonomously self-structuring its own software which emits informative signals and permits analog energetic exchanges and also self-configures itself with an increasing memory: i.e. a System which determines the structure that gives the function (and/or vice-versa), with memorisable analog emissions and which, as a whole, is oscillation susceptible. In particular, it is a System creating an inclusive oscillations set among complex elements, that, internally and among themselves, could be synchronous or a-synchronous, and that permit intrinsic symmetries and net symmetries and probabilistic solutions in their global structure. Finally it is an artificial inter-communicating with his biological analogous Entity (see: Bionethics). The outcome of this communication is the essential problem that we have: as e.g. the successive and deriving problem concerning the D-H matrixes substantial incompleteness for robotic applications and some other analogous. Today we can find kinds of circuit that, with the VLS1 help, put at disposal Hopfield implementing variant circuits and other nets like ART1. In simpler models than ART, e.g. the feed-forwards, we use the descent-gradient/Hebb-rules which let to find a well defined training algorithm for NN: this is translated, among the other things, in simple multiplexer summative components. In the recurring nets, as in Hopfield', there are opportunely locked circuits making clustering operations easy. And these are some examples among a lot. I think, as it really is, that *biological* Nature does not use digital signals: she exclusively permits (because there is an energetic and temporal inertia connected to extra-currents) an also partially digitalized emission, with analog signals towards every direction and time. That is to say that she determines quantized events whose discretized information follows a well precise quantum Logic, but it is not subjected to the usual rules of quantum mechanics. Such discretized information must follow statistic, an so probabilistic, laws that are neither Maxwell-Boltzman', nor Bose-Einstein' or Fermi-Dirac, but intermediate and "including". As a matter of fact the weights calculus in Nature can not follow the mere artificial trans-mission circuits rules and so, e.g., it does not follow literally Kosko BAM that, always e.g., achieves stability as energetic minimum when the due to feed-back oscillations are completely damped. I am fully convinced, at least up now, that in order to simulate Nature herself, methods as the pattern-matching ones are not yet, and for certain aspects, fundamentals for the implementation of a System which is sensible to environment. In fact I think that *biological* Nature must have a kind of super-net which organizes the net's weights also through other nets' weights (but in an innovative way as to the traditional), and doesn't have a specific software successively inserted in his hardware. I.e. what Nature has organized "ab initio" is at the same time either hardware or software. In a simulated artificial super-net, the "sine qua non" condition is to put gnosiologically somewhere *a centre* which is the *global coordinato*r which can have or determine an intrinsic "almost natural" genetic super-algorithm that, at its turn, can sub-stay, as a foundation, to all those other genetic algorithms which constitute themselves as partial and specific innovative nets controlling and directing the whole. For this purpose we can define a barely formal but intuitive analogy that I tried to follow. The organism is like a super-net coordinating the whole (but of which we don't know the centre): the organ or the tissue or both are one or more partial and specific nets; and the cell is a single artificial circuits cluster simulating the biological in their complexity. I think that the true solution consists in starting from a correct circuit, identifiable also varying either the Hopfield neural transmission model and other mathematics referring models. Today my experimental outcome is the modelling of multi-stratus analog chips as basement of a cerebral

complexity super-parallel computer. It is an innovative hardware which needs no kind of software because it can autonomously, dynamically and automatically make it up "itself". The System does not only organize itself but it makes continually reference to itself, as it was autopoietic, i.e. it is based on processes and their reciprocal relations and among their feed-backs. In such a way, according to Maturana, the limits defining the natural organisms are fixed. But, as this case concerns bionic elements, we are here much nearer to Chew boot-strap (among hadrons), as there is the forming of relations nets among linked states, sometimes without a pre-established but probabilistically determinable, even if only dynamically, limit. At last in this way we can establish the interdependence between process and structure, which refers to a probable gnosiologic and epistemological end of the dichotomous and occidental mind-material comparison: the fundamental Manichean relation with all its implications.

(4)

Bionethics *-neologism-* **(Bio-N-Ethics):** in many countries there is a great interchange of ideas between a laic and a religious world vision. Bionethics enters in this debate, widening the laic vision and trying to enlarge the bioethics concept to an autonomous, self-sufficient and thinking engine (a Cyborg) that inevitably will be constructed within this century. Research is now trying to extend the studies on human ethic to implement the robots' memory just to fix in them relationship behaviour. It concerns "robonethics", that is a "techno-ethic" directed specialization. But this constitutes only a sectional and a merely hu-man vision and so unfit to a global approach. Bionethics begins considering human beings at first only partially bionic, than still partially bionic but who can become almost totally bionic, up to totally bionic individuals. We must also consider how a partially or totally bionic individual could form or enter in a group, a community and a society, through his new active participation: that is a more or less physiologically different individual presence. That's why Bionethics becomes the new social living foundation: and from this we must derive a new kind of artificial intelligence plan (AI) asking mainly the follo-wing question: *"whom will the new Robot be image and likeness of?"* For this purpose some years ago Cyberneurophysiology is born with a long demonstration about an initial conjecture (or mental experiment) based on the existence of artificial behaviours emulating natural ones that can be transferred into reality (see: Cyberneurophysiology). Among the effects of this "transference" we also see emerging what forces to face new problems that is which is defined Bionethics: ethics applied to bionics. This appears no more founded on those factors that generally form the evaluation characteristics which are usually based on bioethics parameters or on the existing official, usual and un-completed robotic project conceptions. The new concept foundation is based on a specific assumption:" the biological natural Entities sub-set and the Cyborg Entities sub-set, both emerging for differentiation, in their inner self or better into the set containing them (that is the complex society set), could be compared to particles sub-sets in evolution into a single, maybe also deformable, container-System". The Bionethics concept is born and nourishes it-self in the overwhelming of the last human race taboo: that one of the brain substitution. The Brain-Mind identity, as is at present formulated, seems in fact to be the last obstacle. This can however be over-come considering the brain as a highly specialised engine, but just an engine, And this against restructionism that leads to a simplification that considers an existing fixed space in which mind, spirit and soul are located. While with this my new vision, they are cause and fruit of a global harmony: i.e. even a deep physic alteration does not remove or substantially alter their presence. A new ethic-moral, juridical and pedagogic problem arises connected either to this new vision feasibility and its comprehension or even to its acceptation that is the inter-relation with a new race which theoretically could emerge or derive from the actual.