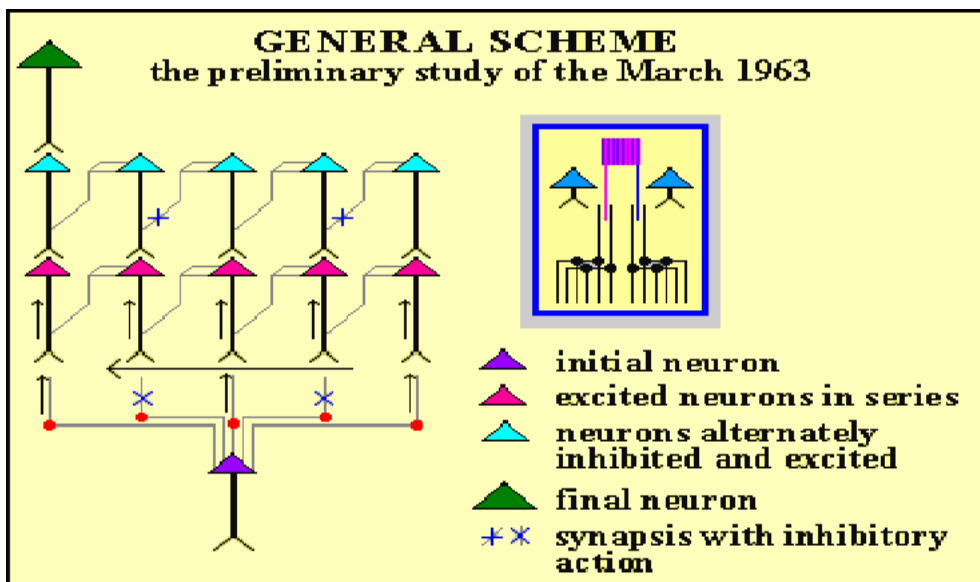
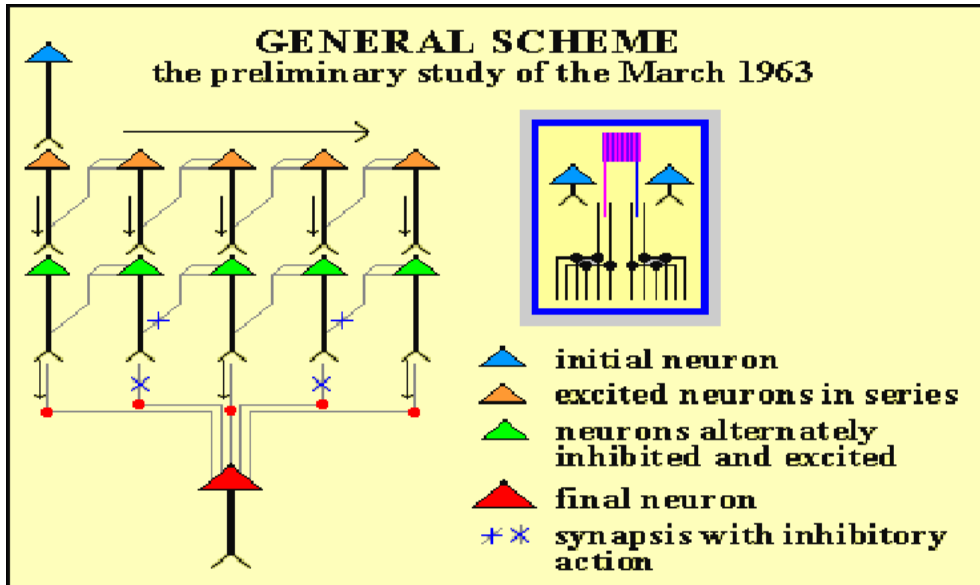


MODEL AND STRUCTURE

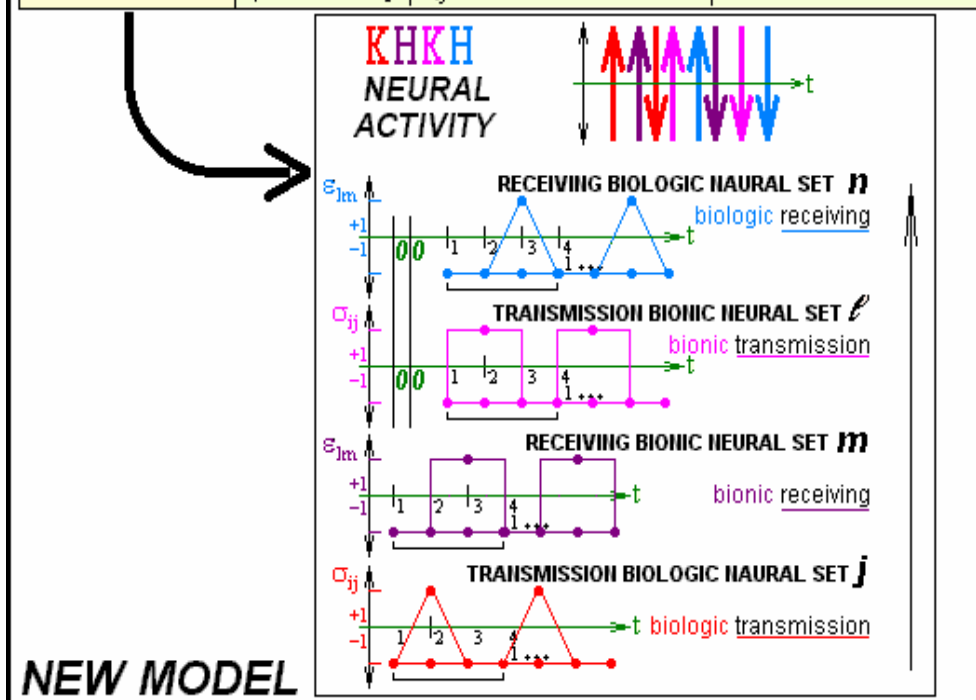
from the publication "Cyberneurophysiology", 2nd edition, march 2006
 Prof. D.P. Errigo



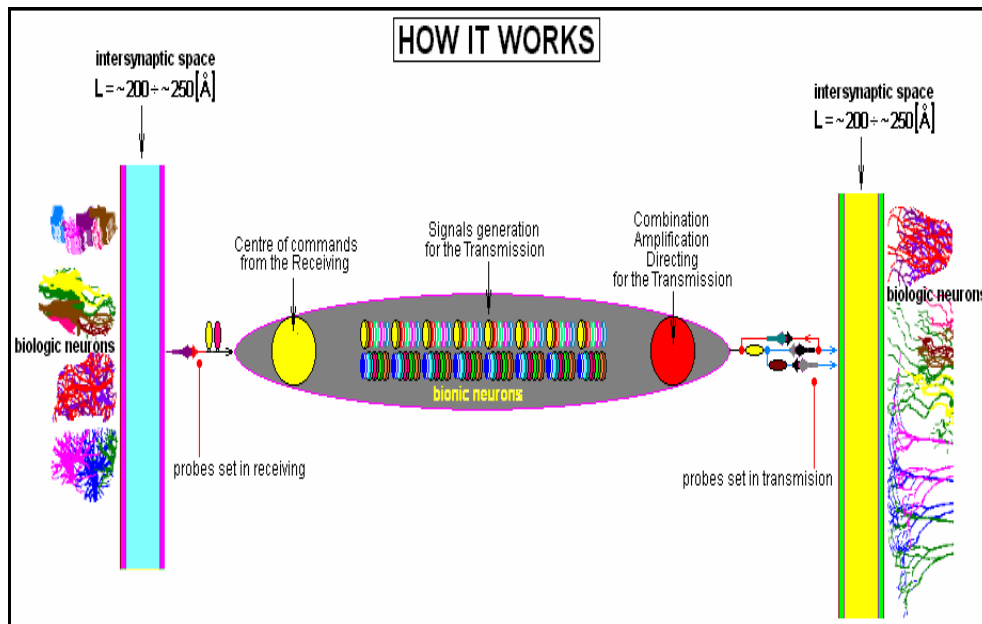
HOPFIELD'S MODEL	NEW MODEL
<p data-bbox="309 622 762 696">The time and neural activity are non-continuous.</p> <p data-bbox="309 770 828 880">The neurons are geometrically arranged in a reticule form and are connected to each other.</p> <p data-bbox="309 1066 828 1176">To the m-th neuron a variable $\sigma_m = +1$ is assigned if the neuron is active or $\sigma_m = -1$ if it is passive.</p>	<p data-bbox="844 622 1241 696">The time and neural activity are non-continuous.</p> <p data-bbox="844 734 1297 1025">The set of 2n neurons is subdivided into two subsets: n transmission (j neurons), n reception (m neurons). Both neuron subsets are connected between them by unidirectional reticule connections.</p> <p data-bbox="844 1066 1297 1283">To each neuron a variable $\sigma_j = +1$ is assigned if the neuron (of subset j) is active (in transmission) and $\epsilon_m = +1$ if the neuron (of the subset m) is active (in reception).</p> <p data-bbox="844 1290 1297 1469">To each neuron a variable $\sigma_j = -1$ is assigned if the neuron (of subset j) is passive and $\epsilon_m = -1$ if the neuron (of subset m) is passive (in reception).</p> <p data-bbox="844 1476 1265 1585"><i>The reception frequency is determined by induction from the transmission frequency.</i></p>

from Errigo's conferences, 1987-1994

TIMES, ACTIONS AND REACTIONS TABLE	$t_1 = t^*$	$\sigma_{ij} = -1$	$\varepsilon_{lm} = -1$
	$t_2 = t^* + 1$	$\sigma_{ij} = +1$ if $K_{lm}\varepsilon_{lm} > \theta_{lm}$ $\sigma_{ij} = -1$ if $K_{lm}\varepsilon_{lm} < \theta_{lm}$	$\varepsilon_{lm} = -1$
	$t_3 = t^* + 2$	$\sigma_{ij} = -1$	$\varepsilon_{lm} = +1$ if $H_{ij}\sigma_{ij} > \theta_{ij}$ $\varepsilon_{lm} = -1$ if $H_{ij}\sigma_{ij} < \theta_{ij}$
	$t_4 = t^* + 3 = t_1$	$\sigma_{ij} = -1$	$\varepsilon_{lm} = -1$
TIMES, ACTIONS AND REACTIONS TABLE	$t_1 = t^*$	$\sigma_{ij} = -1$	$\varepsilon_{lm} = -1$
	$t_2 = t^* + 1$	$\sigma_{ij} = +1$ if $K_{lm}\varepsilon_{lm} > \theta_{lm}$ $\sigma_{ij} = -1$ if $K_{lm}\varepsilon_{lm} < \theta_{lm}$	$\varepsilon_{lm} = -1$
	$t_3 = t^* + 2$	$\sigma_{ij} = -1$	$\varepsilon_{lm} = +1$ if $H_{ij}\sigma_{ij} > \theta_{ij}$ $\varepsilon_{lm} = -1$ if $H_{ij}\sigma_{ij} < \theta_{ij}$
	$t_4 = t^* + 3 = t_1$	$\sigma_{ij} = -1$	$\varepsilon_{lm} = -1$



from Errigo's conferences, 1987-1994



from Errigo's conferences, 1999-2002

The fundamentals ideas that lead to the new electro-informatics model construction:

A) From the point of view of the structure realization:

1. the artificial neural structure is composed of interconnected modular parts;
2. each interconnected modular part is composed of clusters of oscillators with variable resistance, inductance and capacities characteristics, settled among them in under-sets, ordered with permutation, disposition, and combination criteria;
3. each interconnected modular part is formed by a variable number of sets of plates of which there is just one with central link characteristics and at least another one working in non-Aristotelian logic and/or at least another one working in Aristotelian logic;
4. every plate is composed of an optimized number of oscillators (with appendages) which transmit with several different wave forms;
5. each oscillator acts in a field of intensity current, potential difference, wave form, frequency, intensity and signal typology, in a receiving conditions dependent way;

6. each oscillator behaves as an autonomous component of a neural simulation net that is assumed as a dynamic interface either towards a natural neuron or a single set or several natural neuron sets, and establishes, reciprocity and reversibility relationships in resonance;
7. each acting at Quantico level oscillator transmits informative bits in function of the quanta issue (1 bits = 2 quanta).

The natural neurotransmitters are artificially replaced by the associated generic energetic forms.

As in the natural model, in the artificial one the chaotic through a nutation cone information dispatch is selectively absorbed by the receptors which have the same frequency as the various transmitters under-stratums: the transmission and the receiving take place in iso-frequency; that is it exists just an only receiving point towards which the neurotransmitter, issued by the transmitter, will be directed;

8. any neuron acts, in his completeness, simultaneously interpreting both the cerebral lobes influences;
9. The bottom noise determines the inertia to the answer and masks the synchronicity. Every oscillators combination or permutation or disposition issues, disguised as radiation, information in iso-frequency: the emission takes place in digital form on analogical carrying wave;
10. for every plate the feed-back is also of a "Petri's Nets" kind and the serial and the parallel ones are also of a "Markov's Chain" kind; we know that we are dealing with exclusively analogical signals which respect their being digital only for the fact that they are present or absent. In order to respect this pseudo-digitalism, the switches give the emission cadence restoring or changing the immediately preceding conditions: in such a way they contribute to the formation of several serial and/or parallel kinds of feed-backs, emphasizing or decreasing the number of virtual "Petri's Nets" and of virtual "Markov's chains", which have origin: and this happens with repeatable logical sequences;
11. for each plate the oscillators set is structured and fed in Sodium-Potassium pump (and Chlorine) simulation;
12. the natural neurotransmitters are artificially replaced by the associated generic energy forms.

B) from the theoretic point of view (that is the basis for our research work which describe the production and the direction buss of the informative signals):

1. The new transmission neural model characteristics.
Observation 1: These assumptions introduce a new transmission neural model from which we deduce that the neurons, even if they structurally and functionally looks like the same among them, if they are considered

isolated, at the very the moment of the their inter-relations they assume diversified characteristics in function of their intrinsic structures.

In particular the neurotransmitter transit from a point to another of the inter-synaptic space must follow determinate quantum laws which involve the iso-frequency both in the trajectory and the initial points and conclusions of the trajectory itself.

There is, in other words, the presence of a "Feynman integral" associated to particular "extremes" of the path itself; this gives origin to a succession of times which apparently does not explicitly provide the contemporaneity.

Observation 2: We know that the stability properties of the open systems which are far from the equilibrium (and in the neural rice-transmission we are involved in this situation) can be formulated in terms of thermodynamics quantities, which present themselves as state functions. On the basis of what we say in the previous note, an integrating factor, such as to turn the "Feynman integral" into a state function, will have to exist, just to respect the minimum production entropy theorem;

2. in the trajectories in iso-frequency, the absence of the neurotransmitter is equivalent to the inhibition;
3. the neurotransmitters and in general of the messengers flow, is equivalent, in physics-mathematics simulation, to the flow cone of a plasma-jet;
4. in the neurotransmitters and messengers study, a not classical statistical distribution function, obtained by the combination of the Fermi-Dirac function with that one of Bose-Einstein, is valid;
5. two synaptic systems connected with neurotransmitters (or however messengers) sends themselves information through undulatory representations which are antecedent the arrival of the masses transmitted with quantized value on the wave lengths;
6. a Not-Aristotelian new logic is obtained applying the "de Morgan Theorem" with the exclusion of the combinations " all zero " and "all one".
7. the Lie algebra is functionally able to represent the synaptic micro-cosm;
8. the cubic matrixes algebra is able to solve the holomorphic "minimum distance" function obtained with the Lie algebra;
9. the cubic matrixes algebra does not admit the "transposed" and therefore, as regards the neurotransmitters in their hole, gives us their behavioral indeterminateness.