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EPILOGUE

Polarity has been considered as "the directional arrow of Evolution" leading from the primordial, *intrinsic* electro-bipolarity born in the abiotic phase and amplified in the prebiotic phase through the electro-structural polarity of macromolecules, to the induced, newly called *extrinsic* biopolarizations achieved in the biotic phase (see Addenda **III**).

In this evolutionary view of Polarity, the advent of progressively complexified developmental polarities, capable of overstepping elementary self-assembly processes, has been achieved by the *take-over* of a positional genetic information increasingly competent in its gradiential expression of morphogenetic molecules. However, in this genetic take-over, the intrinsic electrical bipolarity could be conserved through its fruitful exploitation of the unique dipolar and vectorial electrostatic proprieties of hydrogen bonding, prototyped in the H_2O network, developed in the first biomolecules and the intra- or inter-molecular H bonds of α-helical - β-sheet proteins respectively, and finally amplified in the informational base sequence of DNA coding for the most complex polar bioaxiations. Endowed with both electro-structural and informational polarity contents, the H bonding can thus be considered as the unifying principle of continuity in the evolutive complexification of Polarity from its intrinsic, physico-chemical fundamentals to its extrinsic, genetically-controlled but epigenetically, environmentally-modulated polar bioaxiations as sequentially summarized in the following synopsis:

Scale of Polarity complexity

1) electrical (-magnetic) bipolarity:
   a) subatomic asymmetries (+/- electric charges, N/S magnetic poles),
   b) atomic (H), molecular inorganic (H_2O, etc.) and organic (amino acids, etc.) dipoles, and H electrostatic bonds;

2) electrical-structural bipolarity:
   a) informational (nucleic acids),
   b) translational macromolecules (polypeptides - proteins, etc.);

3) structural bipolarity:
   a) cytoskeleton (actin, myosin, tubulins),
   b) viral self-assemblies.

4) physical-chemostructural polarizations:
   a) physical effectors (light-induced charge separation, etc.);
   b) chemostructural effectors (crystals → light polarization, semi-superconductors → electric fields).

5) electrical-structural pericellular biopolarizations:
   a) transversal ("perpendicular") through
      plasma and organellar membrane (a^1) conformations,
      (a^2) energy transduction and (a^3) electric potentials;
   b) tangential ("planar") along
      (b^1) apical-basolateral, epithelial and
      (b^2) longitudinal, axonal membranes (action potentials);

6) structural-functional intracellular biopolarizations:
   a) monopolar (a^1) molecular intermembranar targetings,
      (a^2) vesicular traffics and (a^3) energetic motors;
   b) bipolar (b^1) homo-symmetric mitoses,
      (b^2) hetero-asymmetric cell divisions;

7) genetical-developmental biopolarities:
   a) apical (a^1) monopolar and (a^2) bipolar growth patterns;
   b) axial (b^1) anterior-posterior, (b^2) dorsal-ventral,
      (b^3) bilateral (chiral) differentiation patterns;

8) environmental polar movements:
   a) cellular tactisms (chemo-, photo-, etc.)
   b) organismic tropisms (chemo-, photo-, gravi-, galvano-, polaro-).

From now on, we expect to use this first integrating frame to further select "New Trends in Polarity" from the ground-line of the encyclopedic information assembled since 1989 in our Survey and its Addenda.

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