

ORDER, DISORDER AND COMPLEXITY: THE UNIQUENESS OF THE LIVING STATE

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Great confusions prevail in the literature concerning the relations between the notions of "order" and "disorder" on the hand, and that of "life" on the other. The introduction of yet another term, namely, "complexity," resolves much of the difficulties. Bennett's definition of complexity as a function of a sequence's computability from its shortest possible algorithm is applied to the structure of the living organism. The uniqueness of biological organization must be characterized not only by its mathematical properties, as in the case of order and disorder. Rather, it is the understanding of the physical processes that *generate* biological organization that capture its physical uniqueness. Biological processes manifest an apparent reversal of the ordinary degradation of energy. Whereas in inanimate systems kinetic energy degrades into heat, as dictated by the Second Law, living organisms manifest the reverse convergence of initial microscopic motions into ordered macroscopic action. The mechanisms allowing such feats are pointed out.