**Principles of the self-organizing system**

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Ross Ashby, Professor Jeffrey Goldstein

1 Adelphi University


**Introduction**

The brilliant British psychiatrist, neuroscientist, and mathematician Ross Ashby was one of the pioneers in early and mid-phase cybernetics and thereby one of the leading progenitors of modern complexity theory. Not one to take either commonly used terms or popular notions for granted, Ashby probed deeply into the meaning of supposedly self-organizing systems. At the time of the following article, he had been working on a mathematical formalism of his *homeostat*, a hypothetical machine established on an axiomatic, set theoretical foundation that was supposed to offer a sufficient description of a living organism’s learning and adaptive intelligence. Ashby’s homeostat had a small number of essential variables serving to maintain its operation over a wide range of environmental conditions so that if the latter changed and thereby shifted the variables beyond the range where the homeostat could safely function, a new ‘higher’ level of the machine was activated in order to randomly reset the lower level’s internal connections or organization (see Dupuy, 2000). Like the role of random mutations during evolution, if the new range set at random proved functional, the homeostat survived, otherwise it expired.

One of Ashby’s goals was to repudiate that interpretation of the notion of self-organization, one commonly held to this day, which would have it that either a machine or a living organism could by itself change its own organization (or, in his phraseology, the functional mappings). For Ashby, self-organization in this sense was a bit of superfluous metaphysics since he believed not only could his formalism by itself completely delineate the homeostat’s lower level organization, the adaptive novelty of his homeostat was purely the result of its upper level randomization that could reorganize the lower level and not some innate propensity for autonomous change. We offer Ashby’s careful reasoning here as an enlightening guide for coming to terms with key ideas in complexity theory whose genuine significance lies less with facile bandying about and more with an intensive and extensive examination of the underlying assumptions.

The original article can be downloaded from [here](#).

**References**