

5 PRINCIPLES

Five of the great principles that govern the formation, evolution and destiny of the universe and its contents are given here in a very general form. The universality of these principles may only be postulated, but they appear to be operating in all known systems. Whether taken into the New Age or not, these principles will be there.

- **The Second Law of Thermodynamics.** One of the most important functions in an ecological complex is performed by the scavengers—the vultures who devour carrion, the bacteria who break down feces. For living structures to endure, dead structures must be demolished. The great scavenger of the universe is the Second Law of Thermodynamics. It fragments structures, diffuses energy and reduces order to chaos. The Second Law acting by itself, in the absence of any countering morphogenetic principle, assures that the ultimate destiny of the world is maximum diffusion in extension space and maximum homogeneity in similarity space.
- **The Principle of Plenitude.** Above the level of organization at which systems are capable of self-replication, they seek to convert as much of the matter of the universe as possible into their own likeness. They do this not only through replication itself but through creating environmental conditions favorable to the survival of themselves and disadvantageous to their competitors. This activity has been observed on every level from molecules in interstellar space to aggregates of human beings. This Principle of Plenitude is a facet of a deeper and more general presently unformulated morphogenetic principle.
- **Deutsch's Theorems.** There are two: The first applies to existing hierarchical systems in which a malfunction occurs at level i . The theorem states that correction or healing can be effected only by establishing an alternate channel of communication that bypasses level i , placing levels $(i - 1)$ and $(i + 1)$ in direct contact.

The second theorem applies to the emergence or transformation of a system with i levels to one with $(i + 1)$ levels. The theorem states that a system of level $(i + 1)$ cannot be created out of systems of level i , except by blocking out the i th or top level. The emergent system must be synthesized from the $(i - 1)$ or lower levels. This means that, in all transformational or emergent change, the top echelon is irrelevant or counterproductive and must be bypassed.

- **Departure and Return.** Among the great number of cyclical processes occurring in the universe, the cyclical isolation of systems—called here, departure and return—is of foremost importance as a morphogenetic process. It serves both to increase variety and optimize survivability. Genotype/phenotype, sleep/waking, dark age/renaissance are all examples of cyclical isolation. An alternative high level/low level of interaction manifests itself as concentration/diffusion in extension space and as homogenization/heterogenization in similarity space.
- **Mach's Principle.** This is the great antireductionist principle that holds that the total system imposes its nature on each of its parts. The constants of nature, the properties of particles, atoms, molecules, the laws of physics and chemistry are what they are because of the properties of the universe as a whole.

In a less restrictive way, the traditional ideas of similarities or isomorphisms between parts and whole, microcosmos and macrocosmos, 'as below, so above,' etc., are forms of Mach's Principle, but with neither a bottom-up (reductionist) nor top-down (machian) direction of causality.