Eastern Economic Journal, Volume XII, No. 1, January-March 1986

The Entropy Law and the Economic Process in Retrospect

Nicholas Georgescu-Roegen*

Preamble

It is twenty years since I completed the introductory essay for my 1966 **Analytical Economics** which by way of a second edition turned into the 1971 volume **The Entropy Law and the Economic Process.** Thus, the main idea--namely, that the economic process is entropic in all its **material** fibers--was carried from the first to the second volume. The reaction of my fellow economists to this idea and especially to its messages relevant to the economic life has been such that a survey of my thesis as I have expanded it through several subsequent papers should make a clarification of some issues worthwhile.[1]

The Phenomenological Gist of the Entropy Law

The concept of entropy is so involved that even physicists may go wrong with it (NGR, 1966, p. 77; 1971, p. 147). Economists who have recently approached this topic were therefore wrong in beginning and ending with the analytical formula of entropy (which in some approaches is expressed in three different ways). But entropy, like energy, force, distance, and other physical concepts, has a phenomenological meaning, the only one of primary interest for both experts and outsiders.

Let us begin by getting down to the brass tacks, as any student should do on any new matter. The road to understanding what entropy is begins with the primary distinction between **available** and **unavailable** energy. This distinction is unmistakenly anthropomorphic (more so than any other concept in the natural sciences). Indeed, energy is available or unavailable according to whether or not we, humans, can use it for our own purposes.

Beyond and above all technical formulae, the essence of the main thermodynamic laws is this: in an isolated system, the amount of energy remains constant (the first law), while the available energy continuously and irrevocably degrades into unavailable states (the second law). Let us mark well that an isolated system can exchange neither energy nor matter with its "outside." Strictly speaking, the only isolated system is the whole universe, to which Clausius (1867, p. 365) significantly referred his famous formulation as a stanza of the thermodynamic laws:

The energy of the universe is constant.

The entropy of the universe tends to a maximum.

Box 1816, Vanderbilt University, Nashville, Tennessee 37235.