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As you get into the study of the Second Law you come more and more into contact with economics, the formal discipline as well as the everyday practice. After all, the Second Law was first recognized in the process of uncovering the limitations to efficiency of the steam engine. It is an economic statement to say that every action costs something, something which can be described as the transfer of "free" energy into "bound" energy. When anything happens there is a transfer of low entropy energy/material out of the environment and a subsequent transfer back into the environment of that same energy/material in a state of higher entropy. And that's an economic statement too — "You must eat to live."

In terms of non renewable resources the worlds finite stock of low entropy material is diminished by its every use. Whether the stock is to be used "economically" or efficiently in the pursuit of "proper" goals is the big question. Nicholas Georgescu-Roegen puts that question in terms of the total amount of life the earth can support. The total number of person-years is a function of the total earth stock of low entropy material, which is finite. When that stock is depleted then decent livlihood is no longer supportable. When it costs the equivalent of two barrels of oil to take one from the ground, entropy accounting prohibits taking it. The morality of depleting low entropy stocks for frivolous purposes, and ~~then~~ ^{thus} diminishing the amount of life the earth can support becomes vital.

Some economists incorporate this kind of thinking into their teaching and others do not. Hazel Henderson, Nicholas Georgescu-Roegen, Herman Daly, E. F. Schumacher, and some others do. Herman Kahn, Milton Friedman, and most "orthodox" economists do not. Orthodox economics says that as things become more scarce they become more costly and, the story goes, this results in the "market solution", which historically and invariably, produces substitutes or stimulates technology to make the use of higher entropy material feasible, or even brings on radically different ways to meet need. "Let the market work" is their response to talk of scarcity and worry about the depletion of earth stocks.

Recommended reading: Nicholas Georgescu-Roegen, The Entropy Law and The Economic Process. Herman Daly, Toward a Steady State Economy and Steady State Economics. Herman Kahn, The Next Two Hundred Years. E. F. Schumacher, Small is Beautiful. Hazel Henderson, Creating Alternative Futures.

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There is a man in Port Royal, Kentucky I wish were my cousin. His name is Wendell Berry and he has written some remarkable things. You would find his book The Unsettling of America a deeply stirring, profoundly disturbing, work of comprehension and description of the ecological status of our farming effort. The following quote comes out of an essay of his, The Gift of Good Land, a biblical argument for ecological responsibility. It was sent to me by Dr. Clay Stalnaker.

I wish to deal directly at last with my own long held belief that Christianity as usually presented by its organizations, is not earthly enough — that a valid spiritual life in this world must have a practice and practicality —

it must have material result (I am well aware that in this belief I am not alone) the good land is not given as a reward. It is made clear (Deuteronomy, Numbers, Romans) that the people chosen for this gift do not deserve it, for they are a "stiffnecked" people and have been "wicked and fathless". To such a people such a gift can only be given as moral predicament: having failed to deserve it beforehand they must prove worthy of it afterwards: they must use it well, or they will not continue long in it. . . . We must take care among other things, of the land, which is never a possession, but an inheritance to the living, borrowed from the unborn the inflexible rule is that the source must be preserved. You may eat the harvest, but you must save seed, and you must preserve the fertility of the fields This obviously is a perfect paradigm of ecological and agricultural discipline in which the idea of inheritance is necessarily paramount. What we are talking about, of course, is an extremely elaborate understanding of charity. It is so elaborate because of the perception that charity by its very nature cannot be selective, that it is so to speak out of human control. It cannot be selective because between any two humans, or any two creatures, all Creation exists as a bond. Charity cannot be just human, any more than it can be just Jewish or just Samaritan. Once begun, wherever it begins, it cannot stop until it includes all Creation, for all creatures are parts of a whole upon which each is dependent, and it is a contradiction in terms to love your neighbor and despise the great inheritance on which all life depends. Charity even for one person does not make sense except in terms of an effort to love all Creation in response to the Creator's love for it.

Well, read that a couple of times and then contemplate this statement from Dun's Review, July 1980, The Next Crisis by Niles Howard. (Joe Kelleher sent it in)

Most troubling . . . is the fact that a significant portion of the country's topsoil is simply vanishing. Weakened by overuse and poor tillage it is being washed into rivers and blown away as dust at an annual rate of . . . the equivalent of three million acres.

In terms of the Second Law the loss of topsoil is the loss of low entropy material. Again in terms of the Second Law and its moral imperative low entropy must be conserved, given up reluctantly. Wendell Berry's brilliant interpretation of the Bible, quoted above, is the poet's statement of the economy that love and charity require; that is commanded by the Creator, and which the human is constrained to observe, or to die, by the inexorable workings of the laws of thermodynamics.

In early July the Land Stewardship Council of North Carolina was incorporated. Its purpose is to "try to sensitize and educate people to our responsibility of stewardship to protect the land, a Hebraic concept of man's responsibility to and for the land" said Reverend Lex Mathews of the Episcopal Diocese of North Carolina. The quote comes out of the Raleigh News and Observer. The formation of the Stewardship Council is a major step toward the adoption of a biblical regard for the land. Hurrah!

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On the 7th of August at the Presbyterian Student Center, 27 Horne Street, Raleigh, at 7:30 pm there will be a meeting of the Second Law study group, where the first half of Hazel Henderson's Creating Alternative Futures will be discussed. Dr. Thomas Berry of the Riverdale Center for Religious Research will be present as will several others. We will talk about Mrs. Henderson's book for a couple of hours and perhaps get into the disagreement between classical economics and entropy economics.

Please call to let us know if you are coming. We need to know how many to prepare for.