EMERGY SYNTHESIS 5: 
Theory and Applications of the Emergy Methodology

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A Call to Empower Gaia

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ABSTRACT

Nature doesn’t use dollars; we need a cosmic accounting system...

R. Buckminster Fuller

Since the seminal “emergy methodology” of the late H. T. Odum and colleagues essentially meets what Bucky Fuller was insisting is needed, the current issue we intend to address is, “how do we get humanity to accept this “cosmic accounting?” Obviously, participants in this event are prime candidates to help bring this about. We suggest putting the parlous state of our planet, Gaia, at the top of the list of urgent reasons for such a transformed accounting system. Then we propose to use Bucky’s insistence on “new forming, not reforming” to focus on the recapture of the “commons”—by creating appropriate “Trusts” for that purpose—which will utilize emergy and emdollars throughout its activities in behalf of the “commons”. And guiding the activities of such Trusts will be the Fuller Challenge: “To make the world work for 100% of humanity in the shortest possible time through spontaneous cooperation without ecological offense or the disadvantage of anyone.” Finally, effective organization of such Trusts will be ensured by the seminal cybernetic management strategies and praxis of the late great Stafford Beer.

PROLOGUE

By way of forewarning the reader we would be well advised to quote the words of the RAND mathematician, Richard Bellman, who once said during the opening remarks of a speech he made:

“I would like to discuss some matters of substance. In so doing I shall make some controversial statements, and in the course of this pleasant occupation, make some unpleasant remarks. Naturally, I would prefer to make only the most laudatory remarks, but occasionally there is not sufficient opportunity to indulge in this pastime.”

I quote him at the outset because I view the field of economics as the principal obstacle to more widespread use of emergy methodology, and thus the next section will address that issue.

LOOKING BACKWARD

We take it as a given that there is (in this audience and among our readers) general agreement that our planet is in dire straits: too many humans using too much of Mother Nature’s largesse while giving no adequate attention to the consequences of such planet wide “rape, pillage and plunder”. We also take it as a given that those who are familiar with the seminal insights of H. T. Odum realize that this need not be the case. If only humans could “get their act together” by employing his “environmental
accounting” methodology, it should be possible to mitigate what currently seems inevitable: “business as usual” and the utterly detrimental climate change consequences which will follow. We believe there is a way out of this parlous state, but it will require giving up some long held nonsense governing our collective behavior: namely, “Economics” as taught and practiced and “believed”. Let me try to clear the decks with some personal history.

Over 50 years ago – having begun my undergraduate work as a Physics/Chemistry major – I was unprepared for the lack of attention to issues of “measurement” and “errors” therein when (in my Junior year) I changed my major to Sociology/Anthropology. But it was a real shock to my scientific training when I pursued Graduate Degree work in City & Regional Planning and had to take a course in “Real Estate Economics.” Such utter make-believe caused me to search for an antidote, which I found in Sidney Schoeffler’s The Failures of Economics, a trenchant 1956 methodological critique from which I offer this selection (which I read to the class in response to an assignment by the Instructor):

“Having now acknowledged the one-sidedness of our approach, let us restate briefly the central point of this chapter. The record of performance of economics in the field of prediction and policy-making has been and is so very poor because the concepts employed by economists are, with few exceptions, utterly unsuited to the requirements of their task. Economists have seldom attempted, with a view to the special nature of their field of investigation, to devise their own tools of thought. They have taken their mathematics and their deductive techniques from physics, their statistics from genetics and agronomy, their systems of classification from taxonomy and chemistry, their model-construction techniques from astronomy and mechanics, and their methods of analysis of the consequences of actions from engineering. But the subject matter of economics unfortunately is quite different from that of any of these other sciences. As a result, the structure of economic analysis is not isomorphic with the structure of economic reality. In attempting to bridge the gap, economists have become accustomed to committing a considerable variety of artificialities in their collection, treatment, and interpretation of data. They artificially mechanize, artificially fixate, artificially factorize, artificially close, artificially semi close, and artificially isolate. They employ an artificial indirectness. They assume the heterogeneous to be homogeneous, the complex to be simple, the complexly related to be simply related, the unknown to be known, the variable to be fixed, the open to be closed, the connected to be isolated, and the indeterminate to be determinate. Unavoidably, therefore, predictions about economic reality which are produced with the aid of these techniques are quite undependable, and professional economics has been and continues to be a relatively ineffectual debating society.”ii

(I had an “A” before reading that out loud to the class; I ended up with a “C” in the course. A small price to pay for having immunized myself from such nonsense.)

Then came my introduction to game theory, another seminal study. J. D. Williams (Head of RAND’s Math Division) had published a charming book entitled, The Compleat Strategyst—all about 2-person, zero-sum games—which led me to meet the author and about a year later led to my joining the team that had created the “Air Defense Experiments of the Systems Research Laboratory of the Psychology Research Department of the Mathematical Analysis Division of the RAND Corporation”—an experimental study of a cybernetic organization and how it can learn to improve its performance. (But that’s for later.)

I highly recommend Robert Axelrod’s exploration of “The Evolution of Cooperation” in which he reports the results of a “computer tournament” where entrants submitted programs intended to “win” in a round robin of matches pitting each program against all others in sequential play of the Prisoner’s Dilemma game. To everyone’s surprise (except, probably, Anatol Rapoport, co-author of the book, The Prisoner’s Dilemma who submitted it) the highest scoring strategy was “TIT for TAT”: “be nice” (begin by cooperating), but “be provokable” (defect from cooperation if that is what your opponent does), but “be forgiving” (return to cooperation if your opponent does so). The incredibly simple program started with the “cooperative” choice, and then simply did in the next move what had been
done to it. Axelrod shared the results with those who had sent in entries, suggesting another such round robin tournament be played among programs modified by the now known success of “Tit for Tat”. Rapoport stuck with his original entry and again, amazed everyone by ending with the highest score. The strategy is thus not only viable, but also robust: can’t beat it even when you know the strategy!

But this really extraordinary work shed light on an evolutionary principle: cooperation beats competition; which is why organisms evolved from primitive single cells to multi-cellular and so on to humans in villages, cities, nations, and now multi-national entities (EU, e.g.).

While still working for RAND and attending graduate work (first at USC, then at UCLA) I had my first opportunity (Fall, 1958) of hearing R. Buckminster Fuller speak at UCLA’s Royce Hall Auditorium—and that occasion “changed my life”. Not only was Bucky thinking far ahead of the folks at RAND, but he also enunciated a moral insight vastly different from the military-industrial complex: instead of “us versus them” Bucky asserted it is “all of us or none of us”; Utopia or Oblivion as the title of a later work put it.

By now I was thoroughly convinced that standard mainstream economics was simply wrong, but I hadn’t found an alternative I could trust (Bucky’s dictum, quoted above, suggested Bucky himself was still seeking just such, having long before convinced himself of the absurdity of most of our “conventional economic “wisdom”).

A hundred years after the Communist Manifesto (Karl Marx and Frederick Engels, 1848) it was published a book entitled, The Capitalist Manifesto by Louis Kelso (Investment Banker and Corporate Attorney) and Mortimer Adler (of “Great Books” fame)—must be a John Birch Society right wing tract I thought—but I watched (in 1961) Mortimer Adler interviewed by then premier investigative reporter, Mike Wallace, who Adler calmly and utterly confounded. So I got the book and found it to be a very persuasive philosophical treatise about what it takes to provide a society with production and distribution systems that are economically and socially just for all. A decade later this work was followed by, Two Factor Theory: the Economics of Reality (subtitled, “How to Turn 80 Million Workers into Capitalists on Borrowed Money”) by Louis Kelso and Patricia Hetter. In the 1968 Whole Earth Catalog the reviewer of this book suggested Kelso should stop trying to convince the Establishment—who don’t want to hear about it—and go to college campuses where he will find an audience eager to listen.

Being then Chairman of the Design Department at SIUC I got the head of the Economics Department to co-sponsor a visit and talk by Louis Kelso. Alas, faculty and students from the Economics Department were “unimpressed”; but our Design students and faculty were able to meet with Kelso in a more responsive atmosphere. We learned that—since the publishing of the Kelso/Adler work in 1958 he—as an Attorney—had helped transform some 10 businesses into “wholly owned by the workers”; but since publication of his latest Two Factor Theory book (two years before his visit) he had received over 100 requests to do likewise for a wide variety of businesses. Thus he became engaged in trying to get the Federal Government to pass legislation that would make such a financial scheme readily available for any Attorney in the country to do likewise. It took Norman Kurland, working in DC to lobby Congress, to finally find a champion for such legislation: Senator Russell Long, who managed to get the “Employee Stock Ownership Plan” legislation passed by Congress and signed into law in 1976. Today there are over 10,000 firms that have used that legislation to make some 10 million workers also owners. And Norman Kurland—despite the demise of Louis Kelso in 1991—is still working to get the Congress to pass the “Capital Homestead Act” which would enable every citizen to become an owner of enterprise much as the ESOP legislation has done for workers.

But then came H. T. Odum’s Environment, Power and Society (1971) and his visit to SIUC for a summer “World Game Workshop” sponsored by the Design Department. Another life-changing event! It was obvious to all who watched HT fill every blackboard in the lecture hall with his diagrams that showed his “emergy methodology” could do all that Forrester’s “System Dynamics” could do plus do what Forrester couldn’t: fully account for all the energy flowing through the system being studied along with all the heat loss exported from the system being studied (Forrester left that out). At last: Bucky’s call for a “cosmic accounting system” seemed at hand.

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Let’s fast forward to the present and take a look around us now.

LOOKING AROUND

But alas, here it is 50 years later and things have not improved! Let me cite from a very recent book, *Real World Economics: A Post-Autistic Economics Reader* (edited by Edward Fullbrook, 2007), which attempts to be responsive to current concerns:

“The post-autistic economics movement...In Paris in June 2000, a group of economics students wrote a short petition...lambasting their curriculum and stating what they wanted instead. They passed their document among friends and posted it on the web. To everyone’s amazement, especially the students their little protest has turned out to be a tipping point of sorts. Like the late Soviet Union, mainstream economics is caught in a time warp, and when reality catches up with such worlds the events that follow nearly always take everybody by surprise... The students’ petition...assailed mainstream economics for failing to illuminate most of economic reality (hence the term ‘autistic’), and identified the causes as the establishment’s commitment to viewing the world only through the narrow neoclassical point of view; its prohibition of critical thinking towards that system of belief; and its preoccupation with meaningless formalism. The solution was simple and realizable if given the political will: dump most of the math’s, drop the prohibition on critical thinking and introduce ‘a plurality of approaches adapted to the complexity of objects analyzed’...The French students asked that their economics education be oriented primarily toward understanding the world’s economic problems (globalization, inequalities, environment, technical progress, and so on)... We no longer want to have this autistic science imposed on us. We do not ask for the impossible, but only that good sense may prevail. We hope, therefore, to be heard from very soon.”

The students’ petition (together with the sympathetic professors’ petition) gave rise to the “Post-Autistic Economics Newsletter,” a website (www.paecon.org) and the book from which I have been citing.

Regrettably, after having perused this literature, I still find it wanting. Indeed, I must agree with Hazel Henderson who, after engaging in debates with various and sundry economists for more than a decade, finally asserted: “I have been forced to conclude that economics is a form of brain damage.”

But that is not all: consider Naomi Klein’s recent work, *The Shock Doctrine: The Rise of Disaster Capitalism* in which she documents how Milton Friedman and his “Chicago Boys” have—over the last half-century—managed to spread the neoclassical free-market doctrine throughout the world, to the utter detriment of all those countries who have succumbed to this ideology—or, better, “theocracy”. I suggest that “how many angels can dance on the head of a pin”—a middle ages argument that obsessed theocrats—is woefully analogous to the Friedmanian “free-market” doctrine.

OK, so we can’t get anywhere that we want to go with current economic theory and praxis. How do we convince others that H. T. Odum’s insights are what is needed?

During one contentious argument with my dear colleague, Norman Kurland (dedicated to enabling every citizen to become an owner of viable productive assets, with which I have no disagreement), I decided to reread the seminal Kelso/Adler work and—lo and behold, I found the problem emerged in a paragraph on page 58, as follows:

“The exchange value of goods and services is, in its very nature, a matter of opinion. Only where free and workable competition exists does the value set on things to be exchanged reflect the free play of all, or at least many, buyers and sellers. Any other method of determining values must involve the imposition of an arbitrary opinion of value, an opinion held by one or more persons or an organized group; and such a determination of value, to be effective, must be imposed by force. We submit that
the human mind can conceive of no other accurate, objective, and impartial determinant of economic value, once the fallacious labor theory of value has been discarded.” (My underlining emphasis.)

A HA! That statement must have been written prior to 1958 (since the book was in print by then), whereas H. T. Odum’s seminal “donor theory of value”—obviously, a refutation of the assumption made above by Kelso/Adler—was not yet (to my knowledge) in print. At any rate, Kelso and Adler were unaware that they had failed to conceive that such an alternative as H. T. Odum came up with—which refutes their assumption that the human mind can conceive of no other…” was possible.

Now that we know how to pull the assumptions out from under the neoclassical economic, mainstream economic “theology”, how shall we go about doing so?

LOOKING FORWARD

(An aside to the reader: this is where my colleague, Corny, was to take over; but instead we agreed he would make our PowerPoint presentation)

Humanity has two extraordinary imperatives facing it: “Climate Change” and “Blessed Unrest”. The first is an inescapable “forcing function” and the latter is Paul Hawken’s title for his latest book, about “How the Largest Movement in the World Came into Being and Why No One Saw It Coming.”

The recent Nobel awards (to the organization, IPCC, and the individual, Al Gore) highlight the climate change issue. But similar awareness has not yet been given to what Hawken has elucidated. (Check out this URL: www.wiserearth.org for much, much more on what his book describes. )

However, he suggests that what he has “uncovered” amounts to “Humanity’s immune system coming into being” (and it’s about time!). The acronym, WISER, stands for “World Index of Social and Environmental Responsibility.”

Hey, if you believe your organization deserves to be listed, the website invites you to enter the relevant information: Paul Hawken asserts in the Appendix to his book that it is the first online database that can be edited by the community it serves (a rapidly growing database supported entirely by volunteers). Potentially, therefore, this website would enable “linking up” with “simpatico” organizations, to their mutual benefit.

So here is where I will make the call—to all those present, and to all who later read this—NOW is the time to come to the aid of Gaia! We must cast away the obsolete detritus of the neoclassical mainstream economics (better identified, per Naomi Klein, as “Disaster Capitalism”), replacing it with the ecologically sound, scientifically verifiable, and humanly beneficial emergy synthesis methodology that has been the focus of this Conference.

Given that both Governments and Corporations are mostly ‘part of the problem’ we will need to do some “new forming”—especially with regard to Institutions not currently in existence. Read, for example, the 2001 book by Peter Barnes (co-founder of Working Assets, a credit card company that donates 1% of its revenue to charities), Who Owns the Sky? And his more recent book, Capitalism 3.0: A Guide to Reclaiming the Commons. Let me give you the gist of Barnes’ argument: since “the commons” was effectively stolen in the 1700’s by the English gentry (via the “Enclosure Acts”), giving rise to that era’s famous ditty:

Who is the greater thief?
He who steals the goose from the Commons
Or he who steals the Commons
From the Geese?

It is time to reclaim the commons! Help to save Gaia! Help to save humanity!

If you answer the question, “who owns the sky?” by saying “all humanity does” (OK, don’t yet argue the case for “all organisms on the planet”—just take this to our current case of what “ownership” means to humans, since “all organisms” aren’t yet recognized as having ‘rights’—don’t blame me or Peter Barnes, blame the current “system”!) then you get to charge whoever wants to dump their ‘trash’ into the sky for that act.
Al Gore in Bali cited the figure, “70 million tons of carbon daily” being dumped into the atmosphere; so at a price of, say, $10 per ton of carbon so dumped—which would be charged to whoever was responsible for so dumping it—that generates an annual revenue not to be ignored!

Just consider: 70E6 tons/day x $10/ton x 365 days/year = $255.5E9/year. How about sharing that amount with every human on the planet at one share/human: get your share when you are born, it’s non-transferable during your lifetime, and your share ceases when you do. You get an annual income based upon the revenues generated by the income to the “Commons” based upon what it “costs” to protect them. [EMS accounting here! Cf. the paper presented by Dr. Sergio Ulgiati, et al, at this Conference.]

So, the more “Commons” (e.g., “Who Owns the Oceans?” etc.) the more revenue, and thus the more each human gets! Along with providing a serious incentive to ‘behave better’ to those who must pay: the polluters, those who are destroying the commons, those who have up to now been impervious to pleas to ‘cease and desist’ to change their undesirable behavior.

So how do we get from here to there?

That brings me back to RAND and its study of a cybernetic organization, the Air Defense Direction Center; and to the “father of cybernetic management,” Stafford Beer, who was able to develop for his client, Dr. Salvador Allende, President of Chile, a “cybernetic governance system,” the prototype of which had been created and installed in the Moneda Palace in time for a “test run” before the action of then US President Nixon—having directed Henry Kissinger to set the CIA in motion to destabilize Allende’s government—did not permit this seminal development to succeed. (Read Beer’s account of his effort in the CBC Massey Lectures transcribed into a 1974 book, Designing Freedom; or his 1975 book, Platform for Change; or the 1994 book edited by Roger Harnden and Allenna Leonard entitled How Many Grapes Went Into the Wine: Stafford Beer On the Art and Science of Holistic Management.)

Point being: any effort to establish one or more “Commons Trusts” to achieve better conditions for Gaia while also improving the well-being of ordinary humans on this planet will undoubtedly encounter serious resistance from the “powers that be”—those now responsible for the trouble we find ourselves in.

But there is one more contribution from the late Stafford Beer which should not be overlooked if you really are willing to try to implement a “viable world order”: one which saves Gaia from the depredations of current human behavior, and one which also benefits all living organisms on this planet, including we humans.

After the disastrous outcome of his attempt to help create a more effective governance system for Chile’s President Allende (per Nixon/Kissinger/CIA, Pinochet was responsible for not only killing the experiment, but killing Salvador Allende), Stafford Beer retreated to his Welsh cottage (no electricity, no running water: Spartan circumstances in accord with Beer’s feelings) and proceeded to invent a new cybernetic protocol intended to help deal with “what to do when the meta-level system is collapsing on your head”—or similar circumstances.

Check out his 1994 book: Beyond Dispute: the Invention of Team Syntegrity. Better yet: become a “Member of the Infoset”—one of 30 folks willing to join in a 3-5 day intensive event focused on an “opening question”, facilitated in accord with the “Syntegration” protocol prototyped by Team Syntegrity International. Both my co-author and I have had the benefit of participating (in one role or another) in over a dozen such events held in various places during the 1993–04 time. A constant in all such cases: members of the Infoset emerge—having participated in a self-organizing, democratic, participatory, non-hierarchical, affective and intensive event—with a sense of mutual respect, trust, and “old-boy/girl” network in place. Plus their consensus output!

Let me close by suggesting that what this Conference could do between now and the next Biennial is to hold a number of “Syntegrations” (30 persons/event) in a variety of places, all focused on an “opening question” such as “How do we humans reclaim the commons so as to ensure the well-being of Gaia and all its inhabitants?”

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Help is available! Colleagues able to conduct Syntegrations are still active and able to assist (indeed, a Syntegration is being held this June in Sweden by Metaphorumxii). Take the ‘design initiative’: my colleague, Garry Davis (who helped Stafford Beer initiate the “World Syntegrity Project”), has the right to run Syntegrations anywhere on this planet! And thus I am able to urge you all to: Just do it!

Thank you.

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ENDNOTES

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5 Kelso, Louis & Mortimer Adler. The Capitalist Manifesto (Random House, New York, 1958); p. 58

6 Hawken, Paul. Blessed Unrest (Viking, New York, 2007). The website stands for “World Index of Social and Environmental Responsibility”—WISER—and lists over 100,000 such entries, and is the first online database that can be edited by the community it serves.


8 Barnes, Peter. Capitalism 3.0: A Guide to Reclaiming the Commons (Berrett-Koehler, San Francisco; 2006); also freely downloadable (as a very large pdf file) from the website that has emerged since his earlier book: www.onthecommons.org


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