Design of a Life: Sustainability and the Inquirer/Researcher Alias Designer in an Evolving World System

ARNE COLLEN

Saybrook Institute, 450 Pacific, San Francisco, CA 94133 USA

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Taking the individual human being as a point of reference, this paper examines the sustainability of oneself as a contribution to human society and the biosphere in an evolving world. The proactive role as inquirer/researcher alias designer leads to active inquiry and design of one's life with influential consequences on the lives of other human beings and planetary life forms. To sustain a tenable position between the constructive and destructive forces of contemporary existence, a conscientious and ethical stance becomes central in one's self-understanding of life fulfillment and the pragmatic nature of one's actions in the world.

KEYWORDS: changeability, decision making, designing, life span development, ethics, evolution, human science, methodology, planning, pragmatics, sustainability, systems

INTRODUCTION

My point of departure for this paper was a rereading of C. West Churchman's *Thought and Wisdom*, in which he states "...we humans were born into a world where decisions to act cut off the realization of all sorts of possible designs of human living, finally and forever." (1982, p. 10)

To decide means to "cut," in this case to cut one's choices one from the others. Such actions occur a myriad of times each day, day after day, until eventually one accumulates a lifetime. Whether to put on black or brown socks in the morning or take tea or coffee in the late afternoon, one considers typical of the smaller pedestrian decisions of everyday life. They are superseded by more complicated and

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difficult decisions. For example, the decision to invite friends to dinner involves answering such questions as who to invite, when to invite them, what to serve, what to wear, and what to ready for house guests? Although most decisions may appear rather mundane in respect to the design of a life, there are more superordinate level decisions that require many days filled with lower level decisions, which move one toward completion of a higher order decision making process. These more abstract decisions, for example, involve deciding to marry, accept a job offer, buy or rent a home. At the highest level are those decisions which typically take a substantial portion of one's lifetime. Projecting one's imagination into the future, one attempts to decide upon an ideal mate, family, career, and type of home, that is in the United States what is called the "American dream."

One develops a sense of hierarchy—a hierarchy of decisions and decision making. One's decision hierarchy also represents one's interests, desires, and priorities that stand invisibly behind one's actions. Again, these actions fill up one's day, day after day, to accumulate a lifetime. Although a conceptual and perhaps intellectual scheme, nevertheless, one's sense and implicit use of the hierarchy are invaluable to the conduct of life. It should be evident that sustainability is intimately and reciprocally tied to both decision making and the design of a life. More complex decisions require the supportive coordination and sequential integration of simpler decisions. Lower level decisions sustain higher level decision making. The decision hierarchy is complementary to and likely a related form of Maslow's (1962) hierarchy of needs.

One may choose to view this hierarchy and decision making as an approach to design, which in turn may be applied to the design of one's life. Accordingly, the knowledge base and available methodology in the fields of decision making and design science become relevant to life span development and lifestyle. Ideally, one would hope also that through a deepened understanding of these constructs, one becomes more conscience and willfully engaged in proactive and responsible contributions to self, society, humanity, and sustainability of the biosphere.

However, before proceeding further, one note of caution. Most of humanity still does not have the opportunities to attain fulfillment beyond lower level decisions. Moreover, despite and because of the

abundance of human desire, interest, and intent, environs will not sustain indefinitely the growing masses of human life.

Churchman's reflections (1982) provide a fitting impetus as well as introduction to this paper, for the constructs mentioned above form the basis of application of human science research methodology (Collen, 1995) to the design of a life. That is to say, if one takes seriously the notion of design of one's life, then one can quickly come to the realization that several key constructs and parameters of human science research methodology are directly relevant to the design of a life. In the limited application of this methodology, I shall tend to favor an etymological-linguistic hermeneutic to work through the convergence of constructs, and shall take a constructively critical stance.

SUSTAINABILITY

When one utters or writes the word "sustain" or "sustainability," the intended meaning may not be clear. The use of the term may not even be the best choice of word to communicate the intended message. To sustain has several denotative meanings (Table I). Unless clarity is brought to discourse of this and other constructs, genuine communication is an uphill struggle and the context becomes pregnant with misunderstanding. Given the importance of the construct in relation to our current global predicament, I view the time taken to study the entries in Table I as no idle exercise. No doubt all meanings in Table I are in vogue.

It is germane to the discussion that "sustainable," and hence "sustainability," refers to the capacity "of being, or being maintained or endured." The meanings of the construct certainly range from the personal to the global levels. I infer the strongest lean toward the political and ethical (Denotations 1–5 and 7–9), and there is one reference to the biological (Denotation 6). What further interests me is that these meanings appear largely stagnant and nonsystemic. Although one might import some process emphasis, action and process serve the maintenance, control, and preservation of what is. Systemic approaches which have attempted to accept and work with such conceptions occurred earlier in this century; for

Table I
Denotations of Sustain*

(1) to support the efforts, conduct, or cause of.
(2) to uphold the validity or rightfulness of; to support as valid, sound, correct, true, or just.
(3) to keep (a person or community, the mind, or spirit, etc.) from failing or giving away.
(4) to keep in being; to cause to continue in a certain state; to keep or maintain at a proper level or standard; to preserve the status of.
(5) to keep going, keep up (an action or process, material object); to keep up without intermission; to carry on (a conflict or contest).
(6) to support life in; to provide for the life or bodily needs of; to furnish with the necessities of life; to keep oneself; to support (life, nature) with necessaries.
(7) to provide for the upkeep of (an institution, establishment, estate, etc.).
(8) to endure without failing or giving away; to bear up against, withstand.
(9) to undergo, experience, have to submit to (evil, hardship, or damage); to have inflicted upon one, suffer the infliction of; to bear a burden of.

* from *The Compact Oxford English Dictionary* 1989, Second edition. New York: Oxford University Press, p. 1976.

example, see Buckley (1968). They are represented by such constructs as steady states, equilibrium, and first order cybernetics.

Two points of further clarification. First, rhetoric may not result in an added definition to the dictionary that sustainability can mean more than sustaining what is. But acceptance of a new and emergent definition would be consistent with parallel developments in the advancement and philosophy of science over the course of this century, namely, the study of complex systems, leading to enhanced importance of such constructs as irreversibility, nonlinear dynamics, and uncertainty (Prigigone and Stengers, 1984; Gleick, 1987). Second, whether the paradigmatic shift from mechanistic to systemic and the study of physical and biological systems apply directly to human social evolution should be approached cautiously. The relation between the two areas may be more theoretic-perspectivistic and isomorphic (Bertalanffy, 1968) rather than veridical, isometric, and reductionistic. Given the favorably received schemes of multilayering realities, for example in Bertalanffy (1968), Jantsch (1980), and Prigigone and Stengers (1984), the rules of translation (and transformation) between/among realms must be carefully articulated, else we may operate too implicitly and fall prey to pseudoscientific explanations (Radner and Radner, 1982).

It seems to me that the dictionary definitions miss a quality intended in the use of the construct sustainability in contemporary discussions of the global predicament, which at some level come down to one's daily routine and a self-reflective inner dialog on the meaning and design of one's life. But the political and ethical tenor of the definitions still apply. The added value involves the conceptual connection between sustainability and evolution.

CHANGE, DEVELOPMENT, AND EVOLUTION

The Heraclitean phrase "you cannot step into the same river twice" and von Baer's Law "ontology is the recapitulation of phylogeny" are two of the many popular expressions conveying the multiple meanings of relationship among the constructs change, development, and evolution. Table II presents the key denotative meanings of these terms pertinent to this paper. The study of this text reveals great overlap of meaning, likely promoting their interchangeability in lay usage.

Connotative meanings of these terms accompanying the denotative overlap. Their connotations tend to interject some subtle distinctions to recommend the careful use of these terms in scientific contexts. Along side their specialized application to certain fields of study, such as mathematics and music, one basis of distinction is longevity; another basis is permanence. There are other bases, but these two are selected for illustrative purposes. To communicate the point, one might argue that the constructs may be ranked in longevity, whereby change connotes the shorter lived, development tends to last longer than change, and evolution takes the longest time to occur. My most familiar point in favor of this ranking comes from human life span research (Baltes et al., 1977). Whether one focuses on the physical, psychological, or social aspects, this distinction among the three constructs appears to have pragmatic and theoretical value for scientists. Often interwoven into the same argumentation, the same rank order appears in regard to permanence.

A more systemic perspective toward the three constructs may be highlighted by considering them as referents to dynamic negentropic

Table II
Denotations of Change, Development, and Evolution*

Change

(1) the act or fact of putting or taking another; substitution of one thing for another; succession of one thing in place of another; substitution of other conditions or circumstances.
(2) the act of alteration of the state or quality of anything; the fact of becoming other than what it was; variation; mutation; modification.
(3) that which is or may be substituted for another of the same kind.

Development

(1) a gradual unfolding, a bringing to fuller view; a fuller disclosure or working out of the details of anything, as a plan, scheme, plot of a novel.
(2) evolution or bringing out from a latent or elementary condition; the production of a natural force, energy, or new form of matter.
(3) the growth and unfolding of what is in the germ, the condition of that which is developed; the evolutionary process; the act or process of developing (e.g. a mine, estate, tract of land); the economic advancement of a region or people.
(4) gradual advancement through progressive stages, growth from within.
(5) a developed or well-grown condition; a state in which anything is in vigorous life or action.
(6) the developed result or product, a developed form of some earlier and more rudimentary organism, structure, or system.
(7) *Math.* the process by which any mathematical expression is changed into another of equivalent value or meaning, and of more expanded form; the expanded form itself.
(8) *Mus.* the unfolding of the qualities or capacities of a musical phrase or subject by modifications of melody, harmony, tonality, rhythm, etc., esp. in a composition of elaborate form, as a sonata; the part of a movement in which this takes place.

Evolution

(1) the process of unrolling, opening out, or disengaging from an envelope; the opening out or unfolding of what is wrapped up (e.g. roll, bud, etc.); figure the spreading out before the mental vision; the appearance in orderly succession of a long train of events.
(2) emergence or protrusion from the folds of an envelope.
(3) the process of disengaging or giving off (gas, heat, light); an instance of this process.
(4) *Math.* the unfolding or opening out of a curve; *Arith.* the extraction of any root from any given power, the reverse of involution.
(5) the process of developing or working out in detail, what is implicitly or potentially contained in an idea or principle, the development of a design, argument, etc.
(6) *Biol.* the process of developing from a rudimentary to a mature or complete state; *Theo. Preformation* the hypothesis that the embryo or germ, instead of being brought into existence by fecundation, is the development or expansion of a pre-existing form, which contains the rudiments of all the parts of the future organism; *Theo. Evol.* the origination of species, as conceived by those who attribute it to a process of development from earlier forms.

Table II *(Continued)*

(7) the development or growth, in its inherent tendencies, of anything that may be compared to a living organism (e.g. political constitution, language, science, etc.), sometimes contrasted with revolution; the rise or origination of anything by natural development, as distinguished from its production by a specific act (e.g. "growing" as opposed to "being made.").
(8) the formation of the heavenly bodies according to the received theory which supposes it to have taken place by the concentration and consolidation of cosmic matter.
(9) in recent philosophical speculation used in a more comprehensive sense, of which [Denotations] 6, 7, and 8 are regarded as special applications, *social evolution*, the development of human societies.

* from *The Compact Oxford English Dictionary* 1989, Second edition. New York: Oxford University Press, pp. 235, 423, and 540–541.

processes, bearing in mind the isomorphic caution noted above, when one sweeps across the physical, biological, psychological, and social realms of human phenomena and the sciences. The constructs may be represented as three nested though fluid spaces of interrelationship. This conceptualization is presented in Figure 1. On the one hand (a), consistent with the bases of distinction mentioned above, the unfolding may proceed from many micro-level changes through intermediate stages of development, and eventually to broadened macro-level evolutionary processes. On the other hand (b), change may be designated the chief rubric within which development and evolution represent more specialized cases, respectively; that is to say, although there are numerous kinds of change and all entities change, fewer develop, and still fewer evolve. Fluidity among realms is indicated via the two vertical lines in the figure.

In short, discussions on the subjects of the sustainability and social evolution of the human species require some clarity on the interrelationships among these focal constructs. Given the heavy residual meaning of sustainability (Table I), counterintuitive to discussions of human social evolution, and the complexity of interrelationships (Figure 1), one may wish to consider more emphasis on *changeability* of the human predicament rather than sustainability.

I realize many view such a shift of focus as but a rhetorical dismissible gesture. However, balancing my enthusiasm for the continued advancements and benefits of science is the sobering escalation of

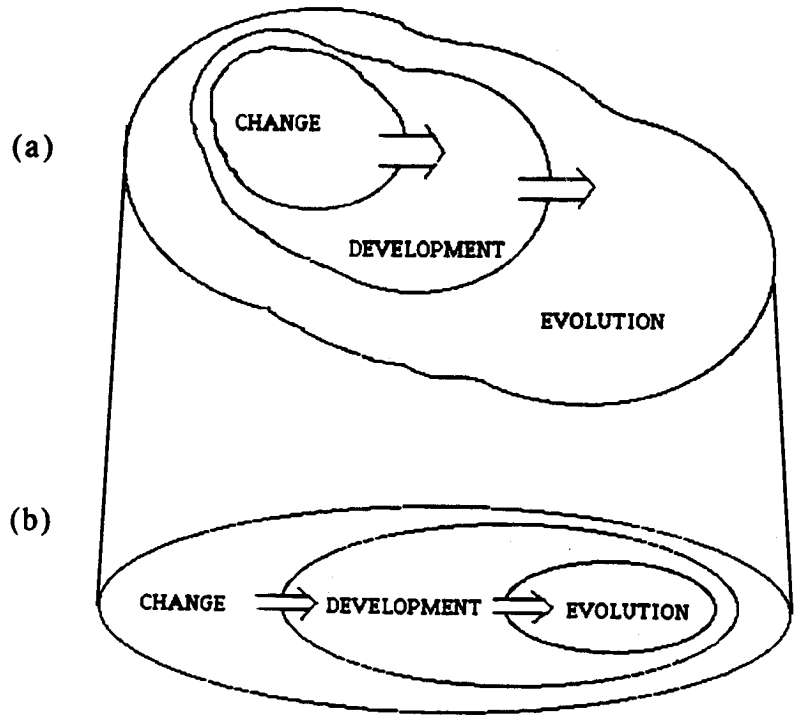

Figure 1 Nested Interrelationships among Change, Development, and Evolution (from Collen, A. (1994a)).

human masses, sufferings, and dramatic biospheric altercations by the hands of humanity in this century alone (Figure 2). We have abundant evidence of the sustainability of the human species, yet insufficient evidence, whether through science or politics, that we shall forestall the human race from overrunning the biosphere to the point of catastrophic ecological collapse.

It is difficult to deny the conclusion that it is a human-centered world. We impact our world by what we do, and what we do has consequences far beyond what we can perceive in our immediate environment. Entrapment in semantics aside, it seems to me, the current problematique is more genuinely about changeability, not sustainability; note for example, Collen (1994), Gore (1992), and Harman (1988). The critical question is: Can we redesign our social institutions, routines and habits of daily life to change the course of

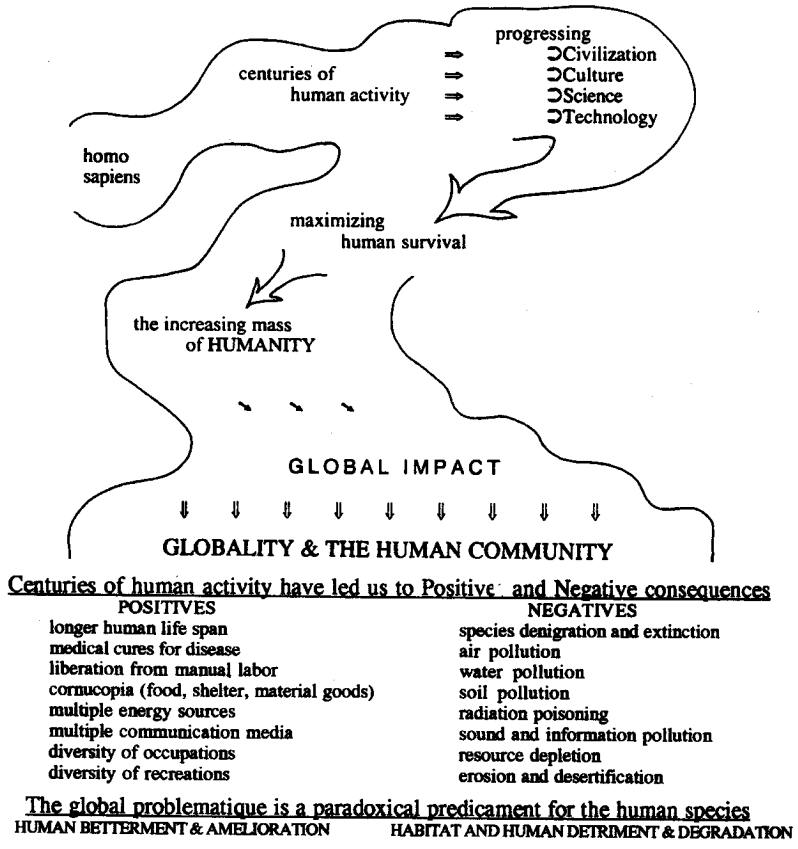

Figure 2 The Confluence of Human Activity (from Collen, A. (1994a)).

human social evolution? Until more radical, even revolutionary changes occur, there may be little to be optimistic about, when—given the course of human activity leading to our present predicament—I contemplate the future life of my children and grandchildren on this planet.

The design of a life, therefore, depends on many contextual aspects that must be assumed in order to sustain the numerous decisions one makes to design and attain one's ideal lifestyle. Though for the person, the immediate focus may be a local preoccupation, it has become ever mandatory that one's actions include taking responsibility for the impact of one's actions

on others, minimizing the aversive consequences on macro-level organizations of humanity and ecology, and incorporating the notion of ecological amelioration of the quality of life for yet unborn generations. Moreover, societal expectations are rising that design decisions must include ethics, pragmatics, and praxiology; note for example, Churchman (1982), Collen (1994b), Collen and Minati (1993), and Gasparski et al. (1996).

Sustenance implies availability of resources, a luxury currently open to a small and privileged portion of humanity, according to the criteria of the benefactors that set a high standard of living (i.e. first world country). Of course, the dialectic here is human resourcefulness. In other words, given one's access to the limited resources available, what can one do to design one's life, should one proactively choose to do so? The answer to this question requires some consideration of the place of designing and planning in inquiry.

DESIGNING AND PLANNING

Design and plan, and designing and planning are often used synonymously. For example, the architect as designer produces the architectural plans. The organizational consultant may temporarily be employed by a corporation to assist and guide a strategic planning process that helps bring about the delimited redesign of the organization. The points made earlier, in regard to the constructs change, development, and evolution, apply also to the constructs design and plan. Denotations of design and plan are shown in Table III. There are connotative subtleties, such as, design is more laden with meanings associated space, and plan with meanings associated with time. This distinction has been enhanced in their formal application in research methodology.

The formalization of these two constructs in research methodology reveals their important difference. I refer specifically to the formulation of any inquiry in spacetime. At the heart of every human science research method is the research design and the research plan (Collen, 1995). It is the combined representation of both the design and plan that gives a method its pragmatic appeal. They are complementary reciprocal constructs, like the two sides of

Table III
Denotations of Design and Plan*

Design

(1) a plan or scheme conceived in the mind and intended for subsequent execution; the preliminary conception of an idea that is to be carried into effect by action; a project.
(2) in a weaker sense, purpose, aim, intention.
(3) the thing aimed at; the end in view; the final purpose.
(4) contrivance in accord with a preconceived plan; adaptation of means to ends; prearranged purpose.
(5) a plan in art; a preliminary picture or sketch for a work of art; the plan of a building or any part of it, or the outline of a piece of decorative work, after which the actual structure or texture is to be completed; a delineation; pattern.
(6) the combination of details or architectural features which go to make up a picture, statue, building, etc.

Plan

(1) a drawing, sketch, or diagram of any object, made by projection upon a flat surface; a drawing or diagram showing the relative positions of the parts of a building or of a floor of a building as projected on a horizontal plane; a map of a comparatively small district or region, as a town, etc., drawn on a relatively large scale and with considerable detail; a diagram, table, or program, indicating the relations of some sets of objects, or the times, places, etc. of some intended proceedings.
(2) a design according to which things or parts of a thing are, or are to be, arranged; a scheme of arrangement.
(3) a formulated or organized method according to which something is to be done; a scheme of action, project, design; the way it is proposed to carry out some proceeding; method, a way of proceeding.

* from *The Compact Oxford English Dictionary* 1989, Second edition. New York: Oxford University Press, pp. 418 and 1356.

a coin. It does confuse matters to be limited to the horizontal plane to communicate both constructs. However, recent innovations in computer and imaging technology have largely surmounted this limitation.

The researcher of every scientific inquiry must eventually be able to specify its design and plan. The research design is a conceptual pattern, a *spatial* configuration of the elements of the method that shows the resources required to propose and conduct the inquiry. The research plan is a conceptual pattern also, but it is a *temporal* configuration of the elements of the method. The plan serves to direct the orderly collection and processing of data, observations, and information sources, that is, the step by step sequence to

consume and utilize the resources specified in the design. A clearly articulated design and plan are expected in order to establish and maintain the consistency, logic, validity, and coherence of inquiry. More globally, the term to indicate this hallmark of scientific inquiry is method validity (Collen, 1995).

RESEARCH METHODS

There is a family of valid scientific research methods applicable to the study of human beings which utilize some form of the key constructs and parameters previously described. It would behoove the inquirer/researcher alias designer to become familiar with them in order to formulate, design, plan, collect, process, and report inquiry.

When sufficient clarity regarding rules and procedures for inquiry become available to systematize, communicate, and apprentice, we have a form of disciplined inquiry, acknowledged often with the label "method." One such list of established and valid methods of this methodology family pertinent to the design of a life might be: autobiographical, biographical, constant comparative, case study, ethnographic, hermeneutical, historical, life history, life story, phenomenological, psychobiographical, and psychohistorical methods. This list is incomplete; it is illustrative and exemplary only. See also Denzin and Lincoln (1994) and Gall et al. (1996).

More to a focus on systems methodology, the contribution by Banathy (1987) is particularly noteworthy in connection with the constructs under discussion. He proposed the Evolutionary Guidance Systems (EGS)—a specialized form of human activity system (Checkland, 1981), in which its members work together over time toward some agreed upon end. The special features of this group involve decisions on the key vital dimensions that under gird human activity over the course of their inquiry. Banathy recommended 8 key dimensions that provide the core emphases of the EGS. We infer from his presentation that these dimensions comprise a value base for healthy change, development, and evolution of the EGS (Collen et al., 1990). This approach is a research method or methodology, depending on its definition and the complexity of

the inquiry. It has profound possibilities for application to the design of a life, whether (1) the individual instrumentally conceives one's EGS in relation to those who sustain one's lifestyle and/or idealized future, (2) the members comprising a family operate as a collective to design actively their life together, and (3) the organization (business, church, corporation, school, etc.) implements organizational design inquiry through member teams representing the various constituent interests within the organization.

DESIGN OF A LIFE

The constructs discussed briefly in this paper comprise in part the methodological means to take a more proactive and disciplined stance toward incorporating design inquiry activities into one's daily life. While purposes, goals, and visions of lifestyle *draw*, one's underlying interests, motivations, perceptions, and values *drive* the inquiry. Decisions and decision making processes are embedded in this personal pull and push dynamic, and they can be intentionally configured in spacetime, hence the relevance of research design and research plan. Thus, one can integrate and construct for oneself the critical components of a more familiar method that provides for the orderly guidance and movement toward life fulfillment, as defined by the inquirer/researcher alias designer.

The linguistic designation "design of a life" connotes the conceptual focus for the convergence of human science research methodology constructs. It may be a methodological approach to disciplined inquiry, threading together the methodology family noted in the previous section of this paper. The conduct of such inquiry produces a tapestry, or text, that the researcher tries to communicate—albeit inadequately—in oral, written, or electronic form (type of ethnography, psychobiography, history, etc.).

SUMMARY AND CONCLUSIONS

This paper is a modest exploration of the idea that self-sustainability is importantly related to sustainability of the world system.

At one level, I focused more on the pragmatics of a person's actions in the world of increasing multitudes of human beings. At another level, my moving focus was an intellectual journey into the potentiality for the formulation of a personal ethics in a rapidly changing, and oftentimes complicated and confusing world system. Most human beings appear to desire and seek a viable future for themselves and their loved ones. This existential struggle is a preoccupation at the individual level and the impetus for weaving a rationale placing the human being at the center of disciplined inquiry. At a third and more comprehensive level, my focus was the mounting impact of human activity on the biosphere as well as the whole of humanity itself. We live in a polluted world. The planetary mantle is now blanketed with the artificial electronic envelops generated by several communication media. Human betterment is a double-sided sword. Ironically, while the accepted means of betterment have brought sustenance for larger portions of humanity in this century, betterment comes at tremendous cost to ever larger portions of humanity and the biosphere.

On balance, we have yet to institute means to sustain our species *in situ* with our natural environment, but have chosen to redesign our context to suit the personal interests and beliefs of those who manage to control temporarily available human and natural resources to serve their interests.

The goal of my inquiry was to discuss design of a life in the evolving world system. The point of reference taken is the individual human being—the centrality of the person in the world system—a vantage point I believe that we all share existentially and from which we perceive all things and pass judgment. To reach out and grasp the world system from the place of one's person represents a difficult and ambitious challenge for inquiry. As one becomes more aware of one's predicament in the world, that is, where one is situated in an evolving world system, one comes to realize the importance of design in one's life to cope and comprehend the complexity. Further, it is a necessity to take a more proactive role, a survival strategy if you will, if one is to better one's place, one's life, and the lives of others interdependent with oneself. Designing one's life we all do, but rarely do we give the central emphasis that it probably now merits. The emergent position of

inquirer/researcher alias designer in the world is inevitable as one's decisions and actions bear proactively on designing one's life and the lives of others. Sustainability therefore becomes intimately tied to design. A proactive ongoing role in designerly activities becomes a way of living that shapes one's future and creates the various options for possible futures for self and others.

To the extent that one's designerly activity must impact on others in an increasingly interdependent world, sensitivity to the consequences of one's actions requires an emphasis on the ethical dimension in design. Design of a life is not only an emergent statement of life style; it is also the design of a personal ethics that must be recognized as such, especially when deliberately adopted by or imposed upon others. And thus in closing, I return to Churchman (1982).

In his chapter on the "Design of a Life," he provides us with his more contemporary definition of what I surmise Aristotle (1953) did in his time when he articulated the "good life." Churchman writes, "I'm interested in the design of a life, by which I mean the design of an aesthetic conversation. One response to those who want to know 'what can I do about it,' is to say 'design your life as an aesthetic conversation." (Churchman, 1982, p. 56) He describes the aesthetic as a quality in living, a radiance and liveliness with others. The choice of the term conversation brings into the foreground the emphasis on human community—the social interconnectedness and interdependence of one with others throughout the life span. Given his presentation leading up to this culminating point on "what can I do about it," I infer that the myriad of decisions one makes throughout one's life leads one to the aesthetic, which, if I understand Churchman, embodies implicitly the responsible and the ethical—a pursuit in life conceptually not too distinct from Aristotle's idea that the culmination of the virtuous life ought be senior years of contemplative happiness. Perhaps it is fair to update and restate that the aesthetic ought to lie at the core of the ethical life—the designerly life—the life of the inquirer/researcher alias designer. For those who gain the luxury to make decisions beyond the lower levels, sustaining their lower levels in their pursuit of higher needs, designing one's life as an *aesthetic conversation* is life fulfillment in an evolving world system.

References

Aristotle, 1953, *Ethics*. (The Nicomachean Ethics. J. Thomson, trans.), Harmondsworth, Middlesex, England: Penguin.

Baltes, P., Reese, H., and Nesselroade, J. 1977, *Life-Span Developmental Psychology: Introduction to Research Methods*. Monterey, California: Brooks/Cole.

Banathy, B. 1987, "The Design of Evolutionary Guidiance Systems." Presented at the meeting of the International Society for General Systems Research, Budapest.

Buckley, W. 1968, *Modern Systems Theory for the Behavioral Scientist: a Sourcebook*. Chicago: Aldine.

Bertalanffy von, L. 1968, *General Systems Theory: Foundations, Development, Applications*. New York: George Braziller.

Checkland, P. 1981, *Systems Thinking, Systems Practice*. New York: John Wiley.

Churchman, C. 1982, *Thought and Wisdom*. Seaside, California: Intersystems.

Collen, A. 1994a/1995, *Human Science Research: a Systemic Approach to Inquiry Methods, Models, and Systems*. Walnut Creek, California: HSR Seminars.

Collen, A. 1994b, "To Focus on Small Human Activity Systems, Designing-planning, Local-to-global Issues, and the Future: a Human-centered Cybernetic systemic Ecology." In *Cybernetics and Systems Research '94*, (R. Trappl, ed.) 1, World Scientific Publishers, Singapore, pp. 437–442.

Collen, A. and Minati, G. 1993, "Logical Openness and the Ethics of Globality," Presented at the Fifth Annual Research Conference of the International Systems Institute, Pacific Grove, California.

Collen, A., Wailand, C., Bach, J., and Reeves, W. 1990, "Evolutionary Guidance Systems for the Systems Design of a Just Society for Future Generations." In *Proceedings of the Thirty Fourth Annual Meeting of the International Society of the Systems Sciences*, (B. H. Banathy and B. A. Banathy, eds.) Vol. 1, International Society for the Systems Sciences, Pomona, California, pp. 401–403.

Denzin, N. and Lincoln, Y. (eds.) 1994, *Handbook of Qualitative Research*. Thousand Oaks, California: Sage.

Gall, M., Borg, W., and Gall, J. 1996, *Educational Research*. Sixth edition, White Plains, New York: Longman.

Gasparski, W., Mlicki, M., and Banathy, B. (eds.) 1996, *Social Agency: Dilemmas and Education Praxiology*. New Brunswick, New Jersey: Transaction Publishers.

Gleick, J. 1987, *Chaos: Making a New Science*. New York: Viking Penguin.

Gore, A. 1992, *Earth in the Balance: Ecology and the Human Spirit*. New York: Houghton Mifflin.

Harman, W. 1988, *Global Mind Change: The Promise of the Last Years of the Twentieth Century*. Indianapolis, Indiana: Knowledge Systems.

Maslow, A. 1962, *Toward a Psychology of Being*. Princeton, New Jersey: D. van Nostrand.

Jantsch, E. 1980, *The Self-Organizing Universe: Scientific and Human Implications of the Emerging Paradigm of Evolution*. New York: Pergamon.

Prigogine, I. and Stengers, I. 1984, *Order Out of Chaos: Man's New Dialogue with Nature*. New York: Bantam.

Radner, D. and Radner, M. 1982, *Science and Unreason*. Belmont, California: Wadsworth.