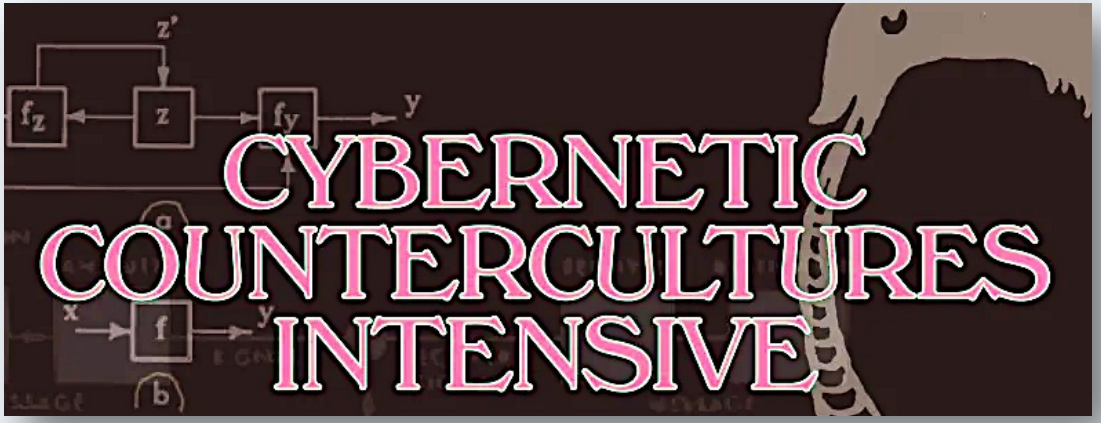
Week 10: Whole Earth Redux



Part One: The Cybernetic Countercultures

((o)) GAIAN SYSTEMS

During this Intensive we've explored three primary topics, three interconnected sets of people, of places, and of ideas. We distinguished an inner group of cybernetic thinkers; we examined a series of key venues, ranging from physical locations such as labs, to media operations and publications, to meetings and conferences; and we encountered a rich store, an embarrassment of systems concepts focused through the recovery of an organic cybernetics.

For tonight's Whole Earth Redux, we'll review and summarize what we've discussed. Part One looks back over the Whole Earth network of individuals and their immediate relationships to each other, then reviews the most important venues, in chronological order: the Biological Computer Lab, the Whole Earth network, and the Lindisfarne Association. Part Two: Cybernetics of Life gathers up the abiding biological and ecological goods conceived, gestated, incubated, and delivered to the world by the Cybernetic Countercultures.

The Cybernetic Countercultures network

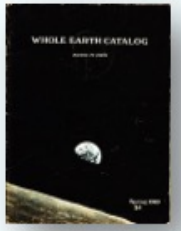
Buckminster Fuller

Norbert Wiener

Warren McCulloch

Humberto Maturana

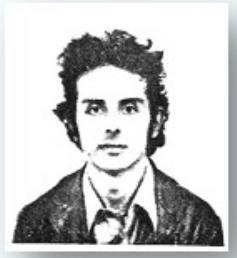
Gregory Bateson



Heinz von Foerster

Stewart Brand

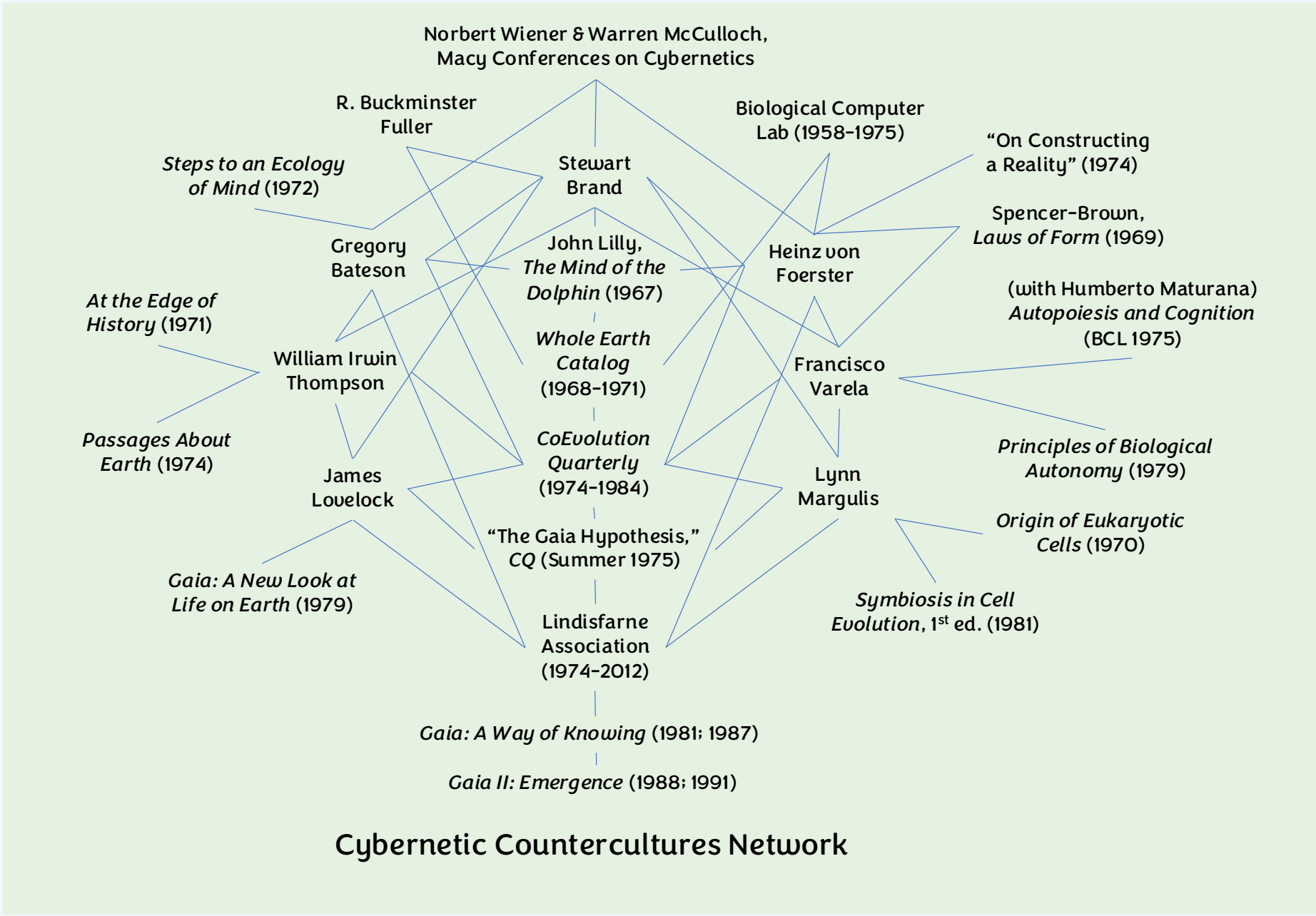
William Irwin Thompson



Francisco Varela

James Lovelock

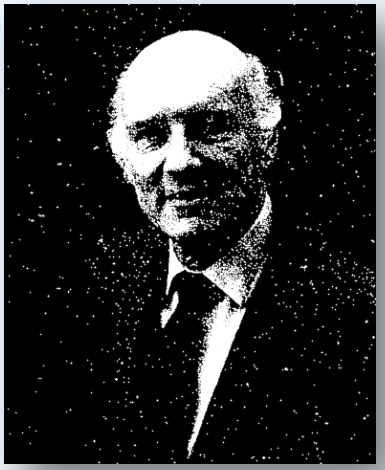
Lynn Margulis

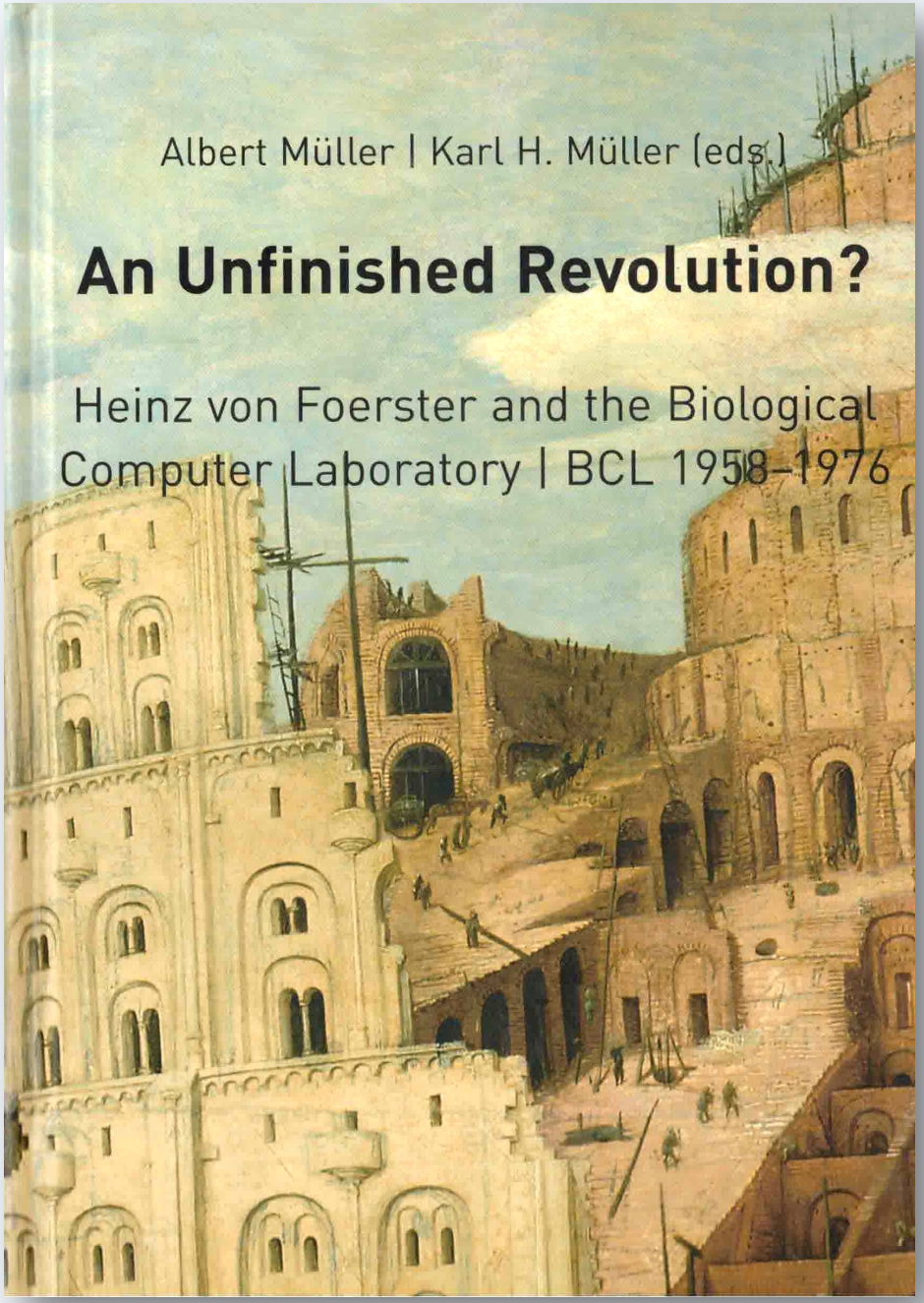


Cybernetic Countercultures Network

Cybernetic Counterculture 1: The Biological Computer Lab

Director of the Biological Computer Lab Heinz von Foerster brought key connections, back to cybernetic origins at the later Macy Conferences on Cybernetics, as well as forward to the neocybernetic developments in the Whole Earth and Lindisfarne milieus.





These pictures from the 1952 Macy Conference on Cybernetics occur without attribution in Stewart Brand's interview with Gregory Bateson and Margaret Mead.

McCulloch Von Foerster

1952, one of the later Macy Conferences on cybernetics. From foreground clockwise: Larry Kubie, Larry Frank, T.C. Schneirla, H.L. Teuber, Walter Pitts, Gerhard von Bonin, Frank Fremont-Smith, Warren McCulloch (beard), W. Grey Walter, Henry Quastler, Heinz Von Foerster, John Bowman.

Source: *CoEvolution Quarterly* 10 (Summer 1976): 34

Bateson

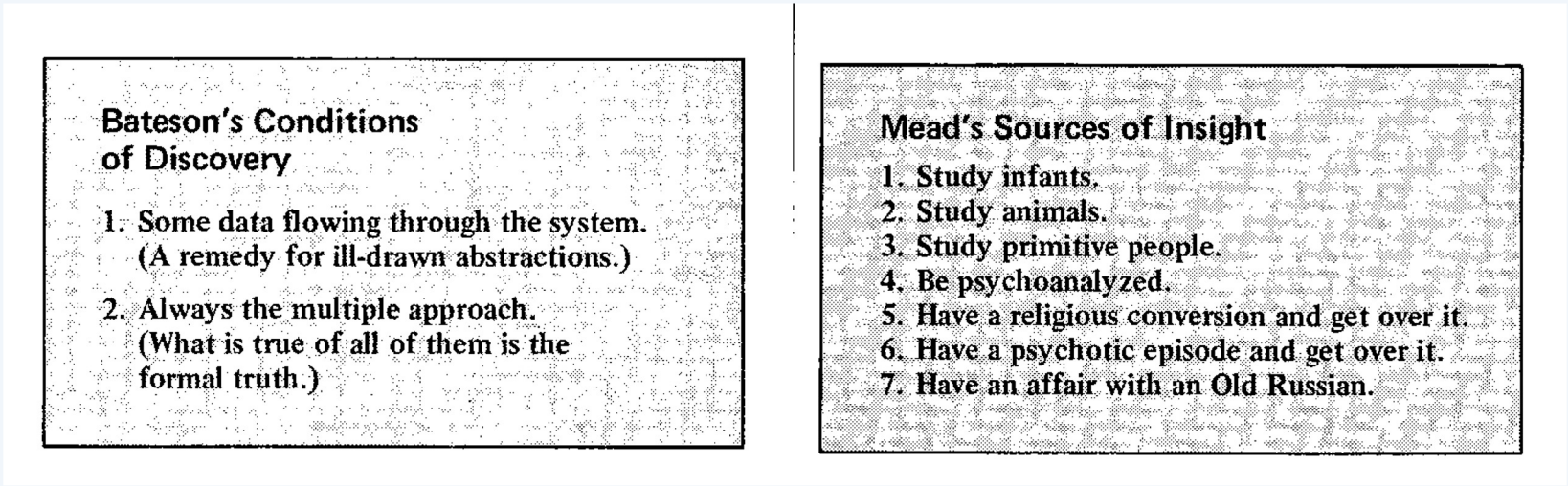
Mead

von Foerster

The rest of the 1952 Macy Conference. From foreground clockwise: Henry Quastler, Heinz Von Foerster, John Bowman, Gregory Bateson, G.E. Hutchinson, unidentified, Henry Brosin, Heinrich Klüver, Janet Freud, Y. Bar-Hillel (speaking), Julian Bigelow, Leonard Savage, V.E. Amassian, Margaret Mead, Y.R. Chao, F.S. Northrup, Don Marquis, Larry Kubie.

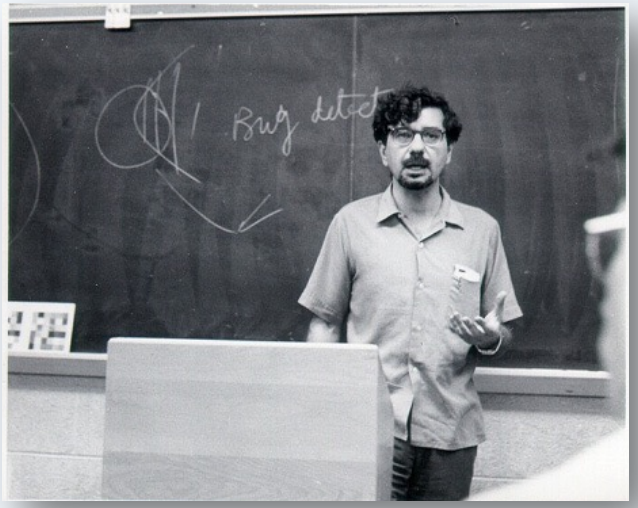
Source: *CoEvolution Quarterly* 10 (Summer 1976): 35

And while we're at it, looking forward to concepts, this set of boxes appears in the continuation of that Bateson-Mead interview. Mead's sources of insight are residually anthropological—Bateson's conditions of discovery are explicitly cybernetic:



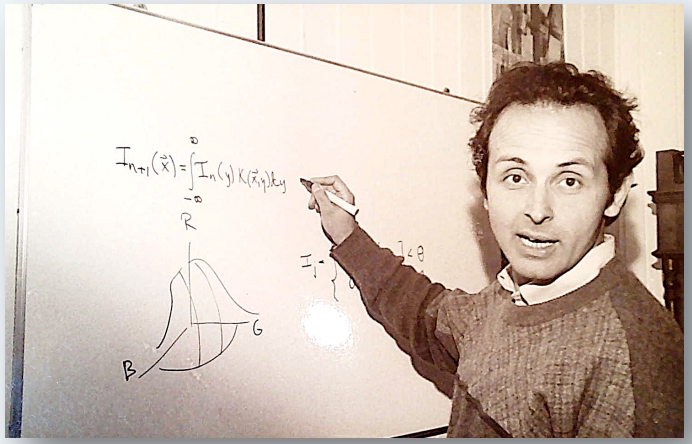
"For God's Sake, Margaret: Conversation with Gregory Bateson and Margaret Mead," *CoEvolution Quarterly* 10 (Summer 1979): 38-39.

Humberto Maturana. The concept of autopoiesis gestated in his lab at the University of Chile a decade after his post-doctoral training at MIT in proximity to Warren McCulloch's research in neurophysiology. Maturana encountered and bonded with von Foerster, another card-carrying member of the McCulloch school of "experimental epistemology," in the early 1960s.



Humberto Maturana in Jerry Lettvin's lab at MIT

Co-authored with Warren McCulloch and Walter Pitts, Maturana and Lettvin's paper of 1959, "What the Frog's Eye Tells the Frog's Brain," is "one of the earliest papers in the realm of neuroethology" (Wikipedia). In this classic early-cybernetic treatment of epistemological constructivism, the better to prosper as a living being, the frog sensorium evolves to construct a reality that foregrounds immediately available nutritious affordances—that is, flies.



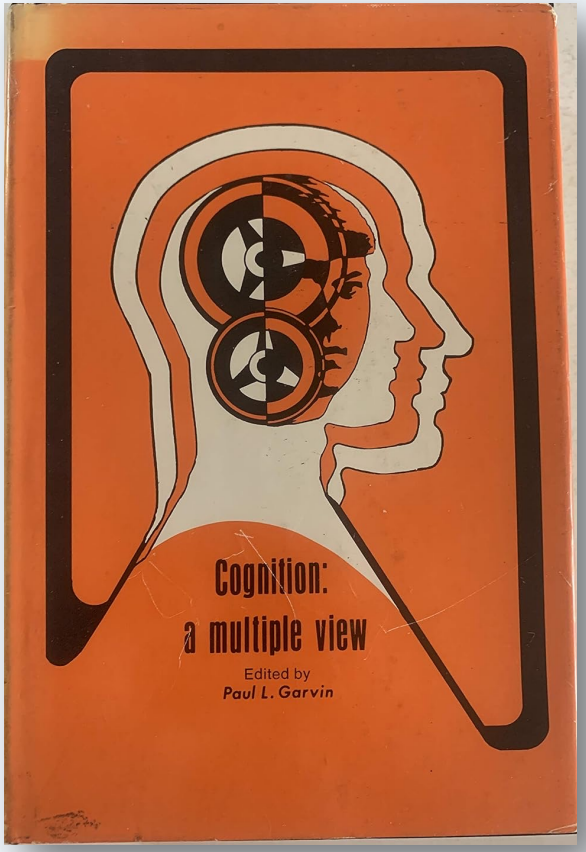
Francisco Varela. After a visit to the BCL soon upon arriving in the States to start grad school at Harvard, Varela applies to the University of Illinois to be a part of the BCL, listing Maturana as his director and von Foerster as a reference. He ends up staying at Harvard.

Insert below a statement of not more than three hundred words concerning your past work in your proposed or allied fields of study, including non-course educational experiences, teaching or other relevant employment, publications, and your plans for graduate study and a professional career.

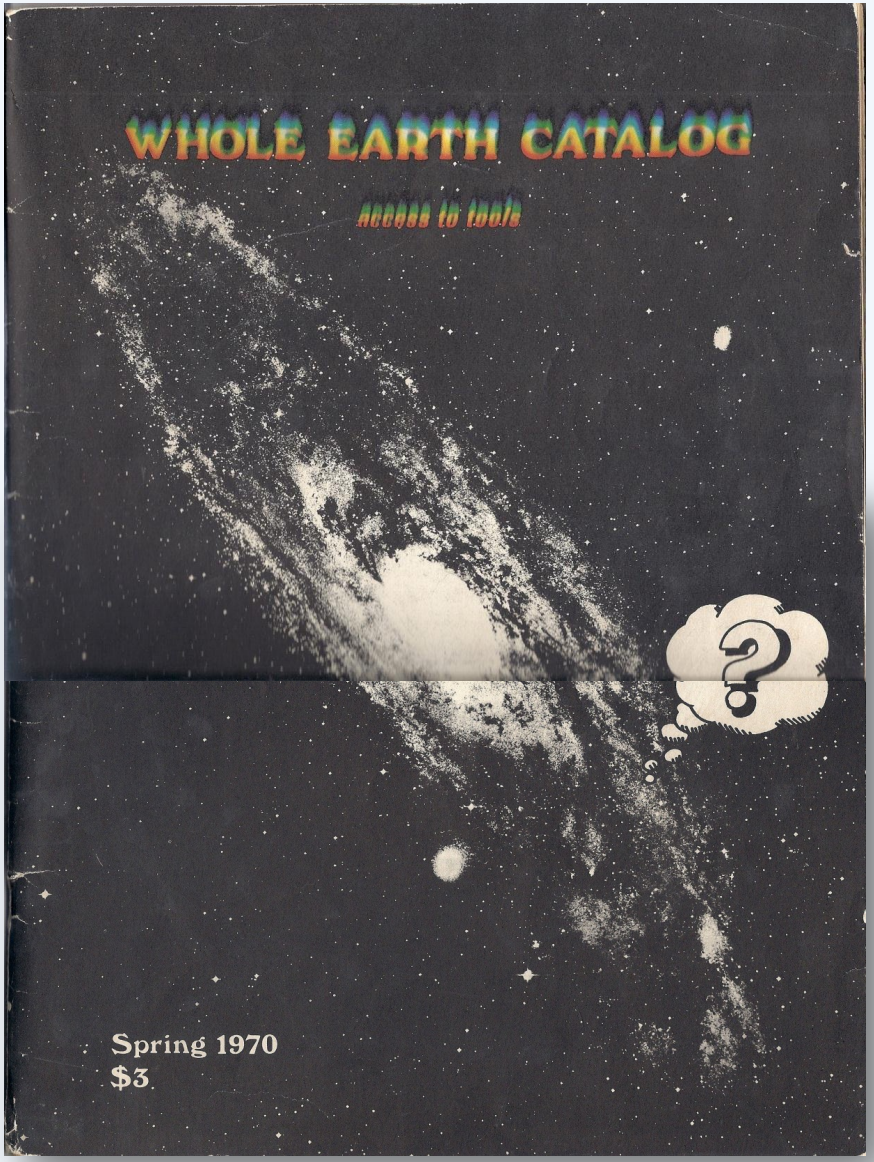
My major professional goal is the understanding of the nervous system, both from the physiological and the theoretical point of view. It is my intention to concentrate in the neuron-to-neuron interaction and to develop a mathematical apparatus to describe these interactions as a first step towards a more broad theoretical (mathematical) frame for the biological sciences. During 1966-67 I worked under the direction of Dr. H.R. Maturana in vision physiology. A final report on this work is ready for publication. A paper entitled, "Interactions between Excitatory and Inhibitory Processes in Single Ganglion Cells" by F.G. Varela and H.R. Maturana has been accepted for publication. I have the intention to join the Faculty of Sciences (Univ. of Chile), for research and teaching sometime after I have received my Ph.D.

At that moment in the late 1960s, **Maturana's biology of cognition helped to drive the formation of an organic cybernetics** discontented with models borrowed from information theory that treated cognition representationally, as if it conformed to flow charts of telephonic apparatuses. **Neocybernetics at the BCL reformulated the operation of cognition, in line with the biological organism itself, as a continuous construction,** and as such, as a kind of open-ended organic computation.

Von Foerster's own cognitive turn toward epistemological constructivism reached full statement and maximum compression in the final remarks of his paper "Thoughts and Notes on Cognition," first published immediately following Maturana's "Neurophysiology of Cognition" (1970) in the volume *Cognition: A Multiple View* (1970).



Meanwhile, as we traced through their correspondence, von Foerster got himself on Stewart Brand's radar by coming to his rescue with a review of *Laws of Form*. The BCL and the *WEC* first converge at this moment, a key relationship forged by cybernetic attraction.



Laws of Form

The laws of form have finally been written! With a "Spencer Brown" transistorized power razor (a Twentieth Century model of Occam's razor). G. Spencer Brown cuts smoothly through two millennia of growth of the most prolific and persistent of semantic weeds, presenting us with his superbly written **Laws of Form**. *This Herculean task which now, in retrospect, is of profound simplicity rests on his discovery of the form of laws. Laws are not descriptions, they are commands, injunctions: "Do!" Thus, the first constructive proposition in this book (page 3) is the injunction: "Draw a distinction!" an exhortation to perform the primordial creative act.*

After this, practically everything else follows smoothly: a rigorous foundation of arithmetic, of algebra, of logic, of a calculus of indications, intentions and desires; a rigorous development of laws of form, may they be of logical relations, of descriptions of the universe by physicists and cosmologists, or of functions of the nervous system which generates descriptions of the universe of which it is itself a part.

*The ancient and primary mystery which still puzzled Ludwig Wittgenstein (***Tractatus Logico-Philosophicus**, *A. J. Ayer (ed), Humanities Press, New York, 1961, 166 pp.), namely that the world we know is constructed in such a way as to be able to see itself, G. Spencer Brown resolves by a most surprising turn of perception. He shows, once and for all, that the appearance of this mystery is unavoidable. But what is unavoidable is, in one sense, no mystery. The fate of all descriptions is " . . . what is revealed will be concealed, but what is concealed will again be revealed."*

At this point, even the most faithful reader may turn suspicious: how can the conception of such a simple injunction as "Draw a distinction!" produce this wealth of insights? It is indeed amazing——but, in fact, it does.

*The clue to all this is Spencer Brown's ingenious choice for the notation of an operator ⌐ which does several things at one time. This mark is a token for drawing a distinction, say, by drawing a circle on a sheet of paper which creates a distinction between points inside and outside of this circle; by its asymmetry (the concave side being its inside) it provides the possibility of indication; finally, it stands for an instruction to cross the boundary of the first distinction by crossing from the state indicated on the inside of the token to the state indicated by the token (A space with no token indicates the unmarked state). Moreover, these operations may operate on each other, generating a primary arithmetic, an opportunity which is denied us by a faulty notation in conventional arithmetic as pointed out by Karl Menger in "Gulliver in the Land without One, Two, Three" (***The Mathematical Gazette**, 53, 24-250; 1959).*

These operations are defined in the two axioms (no other ones are needed) given on pages 1 and 2. They are:

Axiom 1. The law of calling

The value of a call made again is the value of the call.

That is to say, if a name is called and then is called again, the value indicated by the two calls taken together is the value indicated by one of them.

That is to say, for any name, to recall is to call.

(In notation: ⌐⌐ = ⌐ the "form of condensation".)

Axiom 2. The law of crossing

The value of a crossing made again is not the value of the crossing.

That is to say, if it is intended to cross a boundary and then it is intended to cross it again, the value indicated by the two intentions taken together is the value indicated by none of them.

That is to say, for any boundary, to recross is not to cross.

(In notation: ⌐| = the "form of cancellation".)

For instance, take a complex expression

E = ⌐⌐⌐⌐|||

Then, by the two axioms

Sometimes the reading gets rough because of Spencer Brown's remarkable gift for parsimony of expression. But the 30 pages of "Notes" following the 12 Chapters of presentation come to the reader's rescue precisely at that moment when he lost his orientation in the lattice of a complex crystal. Consequently, it is advisable to read them almost in parallel with the text, if one can suppress the urge to keep on reading Notes.

In an introductory note Spencer Brown justifies the mathematical approach he has taken in this book: "Unlike more superficial forms of expertise, mathematics is a way of saying less and less about more and more." If this strategy is pushed to its limit, we shall be able to say nothing about all. This is, of course, the state of ultimate wisdom and provides a nucleus for a calculus of love, where distinctions are suspended and all is one. Spencer Brown has made a major step in this direction, and his book should be in the hands of all young people——no lower age limit required.

[Reviewed by Heinz Von Foerster. Suggested by Steve Baer]

Laws of Form
G. Spencer Brown
1969; 141 pp.
$5.40 postpaid
from:
Blackwell's
Broad Street
Oxford, ENGLAND
or WHOLE EARTH CATALOG

無名天地之始

CONSTRUCTION
Draw a distinction.

CONTENT
Call it the first distinction.
Call the space in which it is drawn the space severed or cloven by the distinction.
Call the parts of the space shaped by the severance or cleft the sides of the distinction or, alternatively, the spaces, states, or contents distinguished by the distinction.

INTENT
Let any mark, token, or sign be taken in any way with or with regard to the distinction as a signal.
Call the use of any signal its intent.

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In all mathematics it becomes apparent, at some stage, that we have for some time been following a rule without being consciously aware of the fact. This might be described as the use of a *covert* convention. A recognizable aspect of the advancement of mathematics consists in the advancement of the consciousness of what we are doing, whereby the covert becomes overt. Mathematics is in this respect psychedelic.

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One of the most beautiful facts emerging from mathematical studies is this very potent relationship between the mathematical process and ordinary language. There seems to be no mathematical idea of any importance or profundity that is not mirrored, with an almost uncanny accuracy, in the common use of words, and this appears especially true when we consider words in their original, and sometimes long forgotten, senses.

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The main difficulty in translating from the written to the verbal form comes from the fact that in mathematical writing we are free to mark the two dimensions of the plane, whereas in speech we can mark only the one dimension of time.

Much that is unnecessary and obstructive in mathematics today appears to be vestigial of this limitation of the spoken word.

•

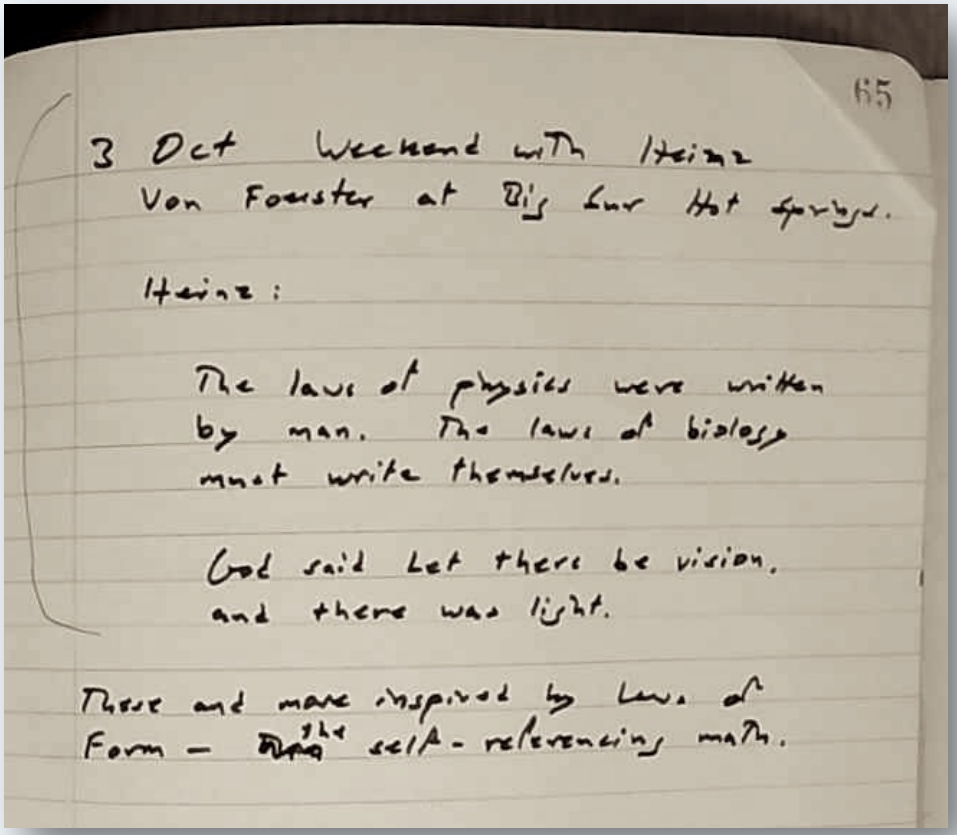
Any evenly subverted equation of the second degree might be called, alternatively, evenly informed. We can see it over a subversion (turning under) of the surface upon which it is written, or alternatively, as an in-formation (formation within) of what it expresses.

Such an expression is thus informed in the sense of having its own form within it, and at the same time informed in the sense of remembering what has happened to it in the past.

We need not suppose that this is exactly how memory happens in an animal, but there are certainly memories, so-called, constructed this way in electronic computers, and engineers have constructed such in-formed memories with magnetic relays for the greater part of the present century.

We may perhaps look upon such memory, in this simplified information, as a precursor of the more complicated and varied forms of memory and information in man and the higher animals. We can also regard other manifestations of the classical forms of physical or biological science in the same spirit.

Stewart Brand's journal records two memorable Heinz von Foerster aphorisms, both of which evoke the ambience of *Laws of Form* to sharpen the distinction between physical "laws" and biological "laws":



65

3 Oct Weekend with Heinz
Von Foerster at Big Sur Hot Springs.

Heinz:

The laws of physics were written by man. The laws of biology must write themselves.

God said Let there be vision, and there was light.

These and more inspired by Laws of Form — the self-referencing math.

—Stewart Brand papers, Stanford University library

3 Oct [1971] Weekend with Heinz Von Foerster at Big Sur Hot Springs.

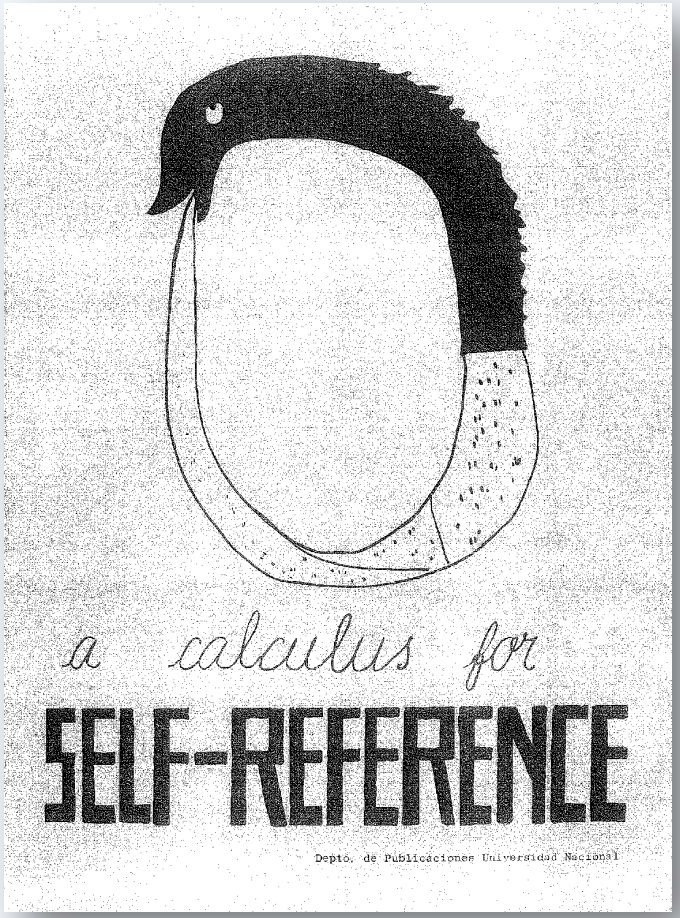
Heinz:

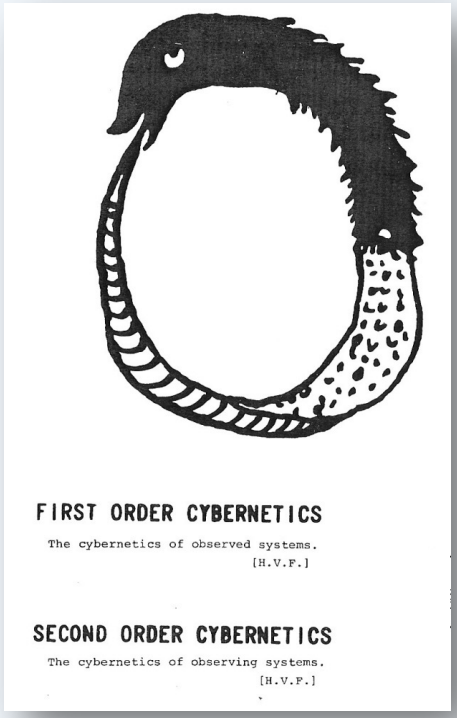
> **The laws of physics were written by man. The laws of biology must write themselves.**
>
> **God said let there be vision, and there was light.**

These and more inspired by Laws of Form—the self-referencing math.

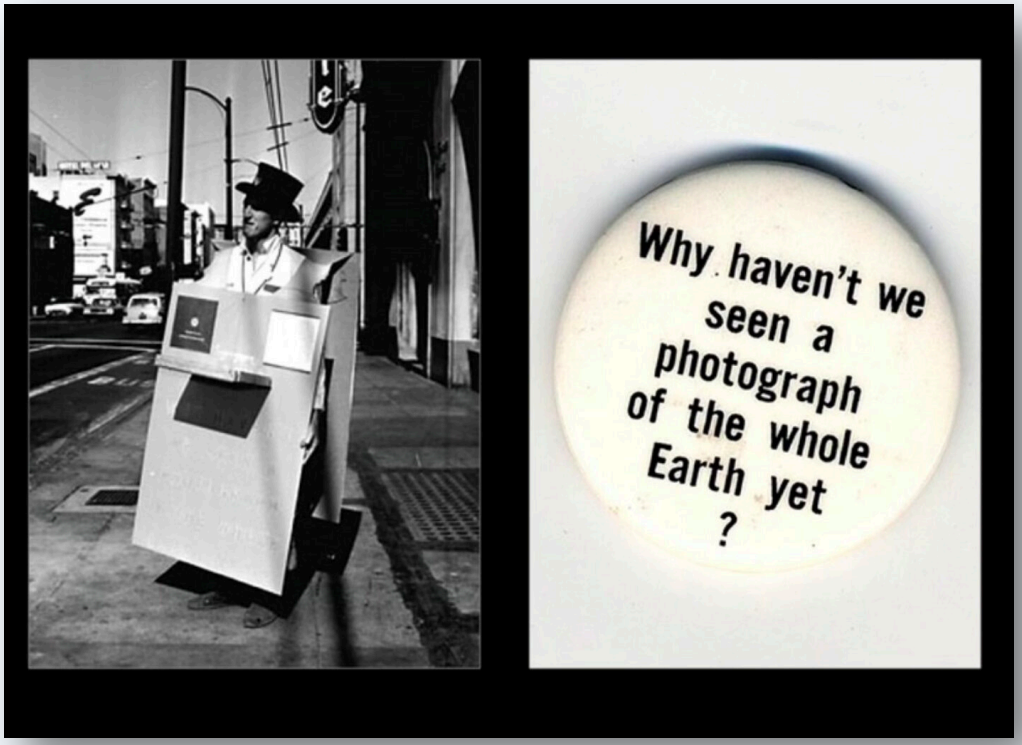
In 1975, in a temporary academic position in Costa Rica, Varela sends von Forester the draft of a new paper suggesting that the addition of a "self-referential operator" to the calculus of distinctions presented in *Laws of Form* could open directly to issues of biological autonomy.

Von Foerster always had one eye on biology, the other on computation. While Varela never worked at the BCL but only visited, his science is perhaps the single greatest production to take shape from the countercultural cybernetics at the BCL.





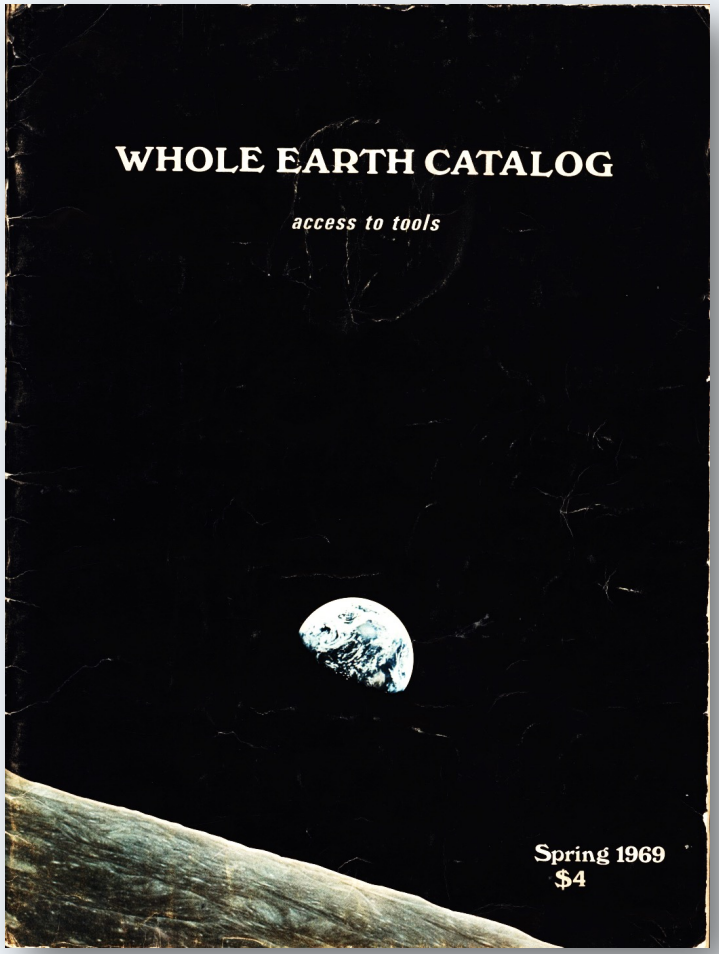
Cybernetic Counterculture 2: The Whole Earth Network

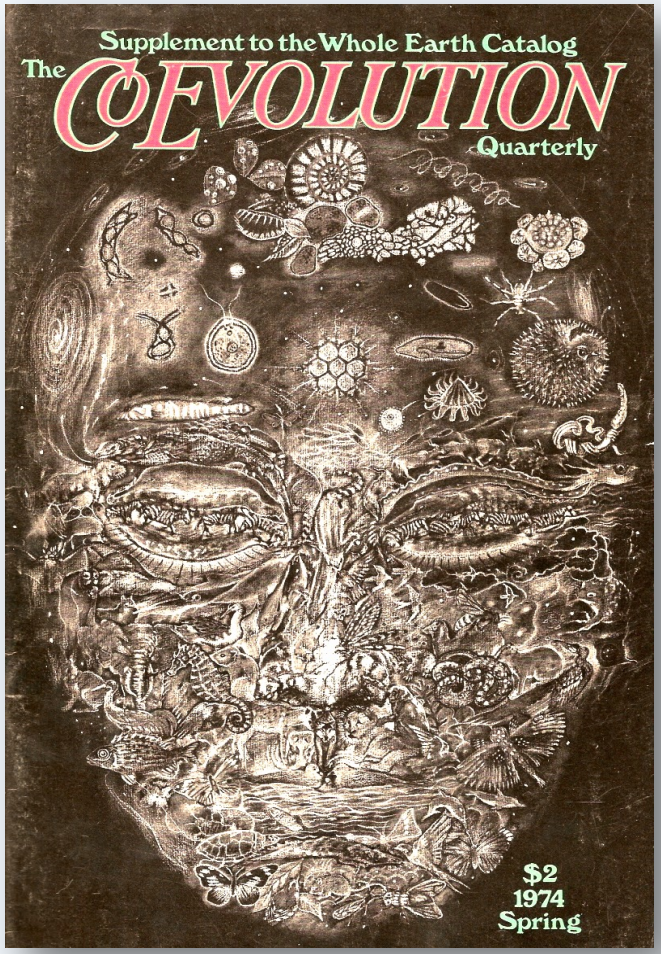


—"The 'Whole Earth' of the Catalog's namesake comes from a 1966 performative project by Stewart Brand in which he campaigned for NASA to release the first satellite image of the entire Earth [as opposed to various partial views] taken from space. When the photo was released in 1967 it was used to create the Catalog's iconic cover design."

Source: https://www.praksisoslo.org/accesstotools (BC] A detailed and informative article with a critical take on Whole Earth hype.)

CoEvolution Quarterly represents the regularization of the supplements to the *Whole Earth Catalog*, as well as their journalistic release from some of the confines of the Catalogs' annotated product reviews.





Some cybernetics from the first *Whole Earth Catalog* (Fall 1968)

The Human Use of Human Beings

Whole Systems 11

Norbert Wiener is one of the founders of an n-dimensional inhabited world whose nature we've yet to learn. He is also one of the all-time nice men.

A proper sequel to his Cybernetics [see p. 32], this book is social, untechnical, ultimate in most of its considerations. Its domain is the whole earth of the mind.

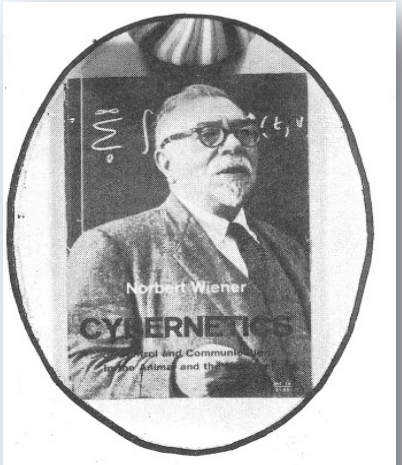
The Human Use of Human Beings
Norbert Wiener
1950, 1954; 288pp

$1.25

from:
Avon Books
250 West 55th Street
New York, N.Y. 10019

or most book stores

It is the thesis of this book that society can only be understood through a study of the messages and the communication facilities which belong to it; and that in the future development of these messages and communication facilities, messages between man and machine and between machine and machine, are destined to play an ever-increasing part.



Cybernetics — or Control and Communication in the Animal and the Machine

Cybernetics

McLuhan's assertion that computers constitute an extension of the human nervous system is an accurate historical statement. The research and speculation that led to computer design arose from investigation of healthy and pathological human response patterns embodied in the topological make-up of the nervous system. Insights here soon expanded into generalizations about communication that permitted the building of analgous electronic devices physically separate from the Central Nervous System. But they're just one artifact of these new understandings about communication. Society, from organism to community to civilization to universe, is the domain of cybernetics. Norbert Wiener has the story, and to some extent, is the story.

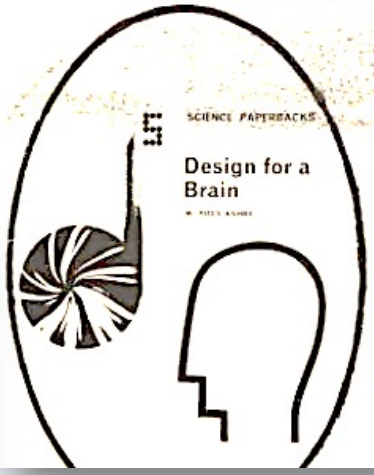
Design for a Brain

This is a reputation review. Ashby's book is found prominent in the bibliography and footnotes of every text we've seen on computers and the mind. It's technical going to read but worth it for the insights of prime work.

Finding an optimum is a much more complex operation than finding a value that is acceptable (according to a given criterion). Thus, suppose a man comes to a foriegn market containing a hundred kinds of fruit that are quite new to him. To find the optimum for his palate he must (1) taste all the hundred, (2) make at least ninety-nine comparisons, and (3) remember the results so that he can finally go back to the optimal form. On the other hand, to find a fruit that is acceptable he need merely try them in succession or at random (taking no trouble to remember the past), stopping only at the first that passes the test. To demand the optimum, then, may be excessive; all that is required in biological systems is that the organism finds a state or a value between given limits.

The development of life on earth must thus not be seen as something remarkable. On the contrary, it was inevitable. It was inevitable in the sense that if a system as large as the surface of the earth, basically polystable, is kept gently simmering dynamically for five thousand million years, then nothing short of a miracle could keep the system away from those states in which the variables are aggregated into intensely self-preserving forms.

This is the learning mechanism. Its peculiarity is that the gene-pattern delegates part of its control over the organism to the environment. Thus, it does not specify in detail how a kitten shall catch a mouse, but provides a learning mechanism and a tendency to play, so that it is the mouse which teaches the kitten the finer points of how to catch mice.



Design for a Brain
W. Ross Ashby
1952, 1960; 286 pp.

$2.85 postpaid

from:
Barnes & Noble, Inc.
105 Fifth Avenue
New York, N.Y. 10003
Economy Bookstore
171 W. Madison
Chicago, Illinois 60602
or
WHOLE EARTH CATALOG

Communication 35

Last Whole Earth Catalog (1971)

Understanding Whole Systems

Buckminster Fuller

The insights of Buckminster Fuller initiated this catalog.

Among his books listed here, **Utopia or Oblivion** *is now probably the most direct introduction. It's a collection of his talks and papers from 1964 to 1967, at a bargain price.* **An Operating Manual for Spaceship Earth** *is his most recent, and succinct, statement.* **Nine Chains to the Moon** *is early, and openly metaphysical.* **The Untitled Epic of Industrialization** *is lyrical and strong.* **Ideas and Integrities** *is his most autobiographical, and perhaps the most self-contained of his books.* **No More Secondhand God** *is the most generalized, leading into the geometry of thought.*

People who beef about Fuller mainly complain about his repetition—the same ideas again and again, it's embarrassing, also illuminating, because the same notions take on different contexts. Fuller's lectures have a raga quality of rich nonlinear endless improvisation full of convergent surprises.

Some are put off by his language, which makes demands on your head like suddenly discovering an extra engine in your car—if you don't let it drive you faster, it'll drag you. Fuller won't wait. He spent two years silent after illusory language got him in trouble, and he returned to human communication with a redesigned instrument.

—SB

Utopia or Oblivion
R. Buckminster Fuller
1969; 366pp.

$1.25 postpaid

from:
Bantam Books
666 Fifth Avenue
New York, New York 10019

or WHOLE EARTH CATALOG

My recommendation for a curriculum of design science:

1. Synergetics
2. General systems theory
3. Theory of games (Von Neumann)
4. Chemistry and physics
5. Topology, projective geometry
6. Cybernetics
7. Communications
8. Meteorology
9. Geology
10. Biology
11. Sciences of energy
12. Political geography
13. Ergonomics
14. Production engineering

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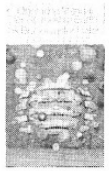
Here on Southern Illinois' campus we are going to set up a great computer program. We are going to introduce the many variables now known to be operative in economics. We will store all the basic data in the machines memory bank; where and how much of each class of the physical resources; where are the people, what are the trendings—all kinds of trendings of world man?

Operating Manual for Spaceship Earth
Buckminster Fuller
1969; 133pp.

$1.25 postpaid

from:
Pocket Books, Inc.
1 W. 39th St.
New York, N.Y. 10018

or WHOLE EARTH CATALOG



To comprehend this total scheme we note that long ago a man went through the woods, as you may have done, and I certainly have, trying to find the shortest way through the woods in a given direction. He found trees fallen across his path. He climbed over those crisscrossed trees and suddenly found himself poised on a tree that was slowly teetering. It happened to be lying across another great tree, and the other end of the tree on which he found himself teetering lay under a third great fallen tree. As he teetered he saw the third big tree lifting. It seemed impossible to him. He went over and tried using his own muscles to lift that great tree. He couldn't budge it. Then he climbed back atop the first smaller tree, purposefully teetering it, and surely enough it again elevated the larger tree. I'm certain that the first man who found such a tree thought that it was a magic tree, and may have dragged it home and erected it as man's first totem. It was probably a long time before he learned that any stout tree would do, and thus extracted the concept of the generalized principle of leverage out of all his earlier successive special-case experiences with such accidental discoveries.

•

To begin our position-fixing aboard our Spaceship Earth we must first acknowledge that the abundance of immediately consumable, obviously desirable or utterly essential resources have been sufficient until now to allow us to carry on despite our ignorance. Being eventually exhaustible and spoilable, they have been adequate only up to this critical moment. This cushion-for-error of humanity's survival and growth up to now was apparently provided just as a bird inside of the egg is provided with liquid nutriment to develop it to a certain point. But then by design the nutriment is exhausted at just the time when the chick is large enough to be able to locomote on its own legs. And so as the chick pecks at the shell seeking more nutriment it inadvertently breaks open the shell.

•

A new, physically uncomprised, metaphysical initiative of unbiased integrity could unify the world. It could and probably will be provided by the utterly impersonal problem solutions of the computers.

•

Heisenberg's principle of 'indeterminism' which recognized the experimental discovery that the act of measuring always alters that which was being measured turns experience into a continuous and never-repeatable evolutionary scenario.

•

The gold supply is so negligible as to make it pure voodoo to attempt to valve the world's economic evolution traffic through the gold-sized needle's 'eye'.

•

Brain deals exclusively with the physical, and mind exclusively with the metaphysical. Wealth is the progressive mastery of matter by mind . . .

•

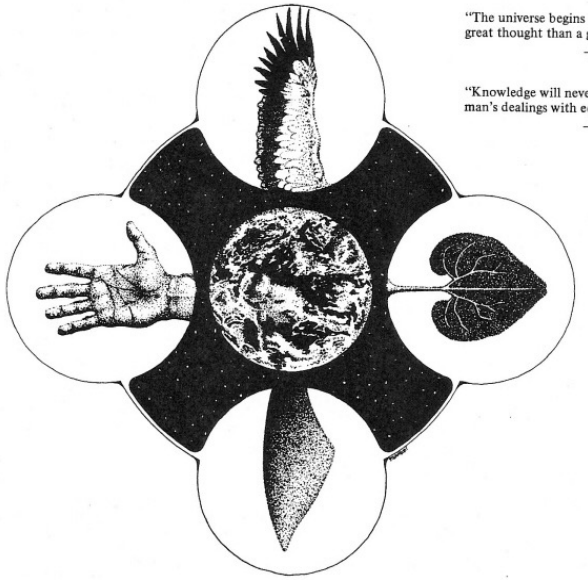
Stepping forth from its initial sanctuary, the young bird must now forage on its own legs and wings to discover the next phase of its regenerative sustenance.

Nine Chains to the Moon
Buckminster Fuller
1938, 1963; 375 pp.

Unavailable until 1972

Whole Earth Epilog (1974)

Understanding Whole Systems



"The universe begins to look more like a great thought than a great machine."
—Sir James Jeans
Astronomer

"Knowledge will never replace respect in man's dealings with ecological systems."
—Roy A. Rappaport
Anthropologist

Section Contents

Steps to an Ecology of Mind
Gregory Bateson
1972; 517pp
$1.95 postpaid
from:
Ballantine Books, Inc.
201 E. 50th St.
New York, NY 10022
or Whole Earth

No organism can afford to be conscious of matters with which it could deal at unconscious levels.

•

Mere purposive rationality unaided by such phenomena as art, religion, dream, and the like, is necessarily pathogenic and destructive of life; its virulence springs specifically from the circumstance that life depends upon interlocking *circuits* of contingency, while consciousness can only see such short arcs as human purpose may direct.

•

The social scene is nowadays characterized by the existence of a large number of self-maximizing entities which, in law, have something like the status of 'persons'— trusts, companies, political parties, unions, commerical and financial agencies, nations, and the like. In biological fact, these entities are precisely *not* persons and are not even aggregates of whole persons. They are aggregates of *parts* of persons.

•

They say that power corrupts; but this, I suspect, is nonsense. What is true is that the *idea of power* corrupts.

•

(My father, the geneticist William Bateson, used to read us passages of the Bible at breakfast— lest we grow up to be *empty-headed* atheists.)

•

In no system which shows mental characteristics can any part have unilateral control over the whole. In other words, *the mental characteristics of the system are immanent, not in some part, but in the system as a whole.*

•

Published in 1973, Stewart Brand's *II Cybernetic Frontiers* marks the moment when the long slow Gregory Bateson surge first breaks upon Whole Earth shores, sending its spray in all directions.

Bateson's *Steps to an Ecology of Mind* first hit land in the *Whole Earth Epilog* of September 1974.

•

Part II. Form and Pattern in Anthropology:
"Style, Grace, and Information in Primitive Art"

Part V. Epistemology and Ecology: "Effects of Conscious Purpose on Human Adaptation"

Part VI. Crisis in the Ecology of Mind:
"Pathologies of Epistemology"

Part III. Form and Pathology in Relationship:
"The Cybernetics of 'Self': A Theory of Alcoholism"

I became convinced that much more of whole systems could be understood than I thought, and that much more existed wholesomely beyond understanding than I thought—that mysticism, mood, ignorance, and paradox could be rigorous, for instance, and that the most potent tool for grasping these essences—these influence nets—is cybernetics. . . . —SB

Stewart Brand, editor,
Whole Earth Epilog
(September 1974).

Steps to an Ecology of Mind

Where the insights of Buckminster Fuller initiated the **Whole Earth Catalog**, *Gregory Bateson's insights lurk behind most of what's going on in this* **Epilog**.

Through him I became convinced that much more of whole systems could be understood than I thought, and that much more existed wholesomely beyond understanding than I thought—— that mysticism, mood, ignorance, and paradox could be rigorous, for instance, and that the most potent tool for grasping these essences—— these influence nets—— is cybernetics.

Bateson is responsible for a number of formal discoveries, most notably the "Double Bind" theory of schizophrenia. As an anthropologist he did pioneer work in New Guinea and (with Margaret Mead) in Bali. He participated in the Macy Foundation meetings that founded the science of cybernetics but kept a healthy distance from computers. He has wandered thornily in and out of various disciplines—— biology, ethnology, linguistics, epistemology, psychotherapy—— and left each of them altered with his passage.

This book chronicles the journey. It is a collection of all his major papers, 1935-1971. In recommending the book I've learned to suggest that it be read backwards. Read the recent broad analyses of mind and ecology at the end of the book and then work back to see where the premises come from.

In my view Bateson's special contribution to cybernetics is in exploring its second, more difficult realm (where the first is feedback, a process influencing itself, what Bateson calls "circuit"; and the second is the meta-realm of hierarchic levels, the domain of context, of paradox and abundant pathology, and of learning.)

Strong medicine.

—SB

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•

The Theology of Alcoholics Anonymous

Some outstanding points of the theology of AA are:

(1) *There is a Power greater than the self.* Cybernetics would go somewhat further and recognize that the "self" as ordinarily understood is only a small part of a much larger

Gregory Bateson

trial-and-error system which does the thinking, acting, and deciding. This system includes all the informational pathways which are relevant at any given moment to any given decision. The "self" is a false reification of an improperly delimited part of this much larger field of interlocking processes.

•

But what about "me"? Suppose I am a blind man, and I use a stick. I go tap, tap, tap. Where do *I* start? Is my mental system bounded at the handle of the stick? Is it bounded by my skin? Does it start halfway up the stick? Does it start at the tip of the stick? But these are nonsense questions. The stick is a pathway along which transforms of difference are being transmitted. The way to delineate the system is to draw the limiting line in such a way that you do not cut any of these pathways in ways which leave things inexplicable. If what you are trying to explain is a given piece of behavior, such as the locomotion of the blind man, then, for this purpose, you will need the street, the stick, the man; the street, the stick, and so on, round and round.

•

If you put God outside and set him vis-a-vis his creation and if you have the idea that you are created in his image, you will logically and naturally see yourself as outside and against the things around you. And as you arrogate all mind to yourself, you will see the world around you as mindless and therefore not entitled to moral or ethical consideration. The environment will seem to be yours to exploit. Your survival unit will be you and your folks or conspecifics against the environment of other social units, other races and the brutes and vegetables.

If this is your estimate of your relation to nature *and you have an advanced technology*, your likelihood of survival will be that of a snowball in hell. You will die either of the toxic by-products of your own hate, or simply, of overpopulation and overgrazing. The raw materials of the world are finite.

•

When you narrow down your epistemology and act on the premise "What interests me is me, or my organization, or my species," you chop off consideration of other loops of the loop structure. You decide that you want to get rid of the by-products of human life and that Lake Erie will be a good place to put them. You forget that the ecomental system called Lake Erie is a part of *your* wider ecomental system—— and that if Lake Erie is driven insane, its insanity is incorporated in the larger system of *your* thought and experience.

•

It is rather unusual to find that any feature of a biological system is at all directly determined by the need which it fulfills. Eating is governed by appetite, habit, and social convention rather than by hunger, and respiration is governed by CO_2 excess rather than by oxygen lack. And so on.

In contrast, the products of human planners and engineers are constructed to meet specified needs in a much more direct manner, and are correspondingly less viable. The multiple causes of eating are likely to ensure the performance of this necessary act under a large variety of circumstances and stresses whereas, if eating were controlled only by hypoglycaemia, any disturbance of the single pathway of control would result in death. Essential biological functions are not controlled by lethal variables, and planners will do well to note this fact.

•

D: What is a cliché, Daddy?
F: A cliché? It's a French word, and I think it was originally a printer's word. When they print a sentence they have to take the separate letters and put them one by one into a sort of grooved stick to spell out the sentence. But for words and sentences which people use often, the printer keeps little sticks of letters ready made up. And these ready-made sentences are called clichés.

•

F: Let's go back to the question which you asked and which I said was too difficult to answer today. We were talking about the printer breaking up his clichés, and you said that he would still keep some sort of order among his letters—— to keep from going mad. And then you asked "What sort of order should we cling to so that when we get into a muddle we do not go mad?" It seems to me that the "rules" of the game is only another name for that sort of order.

D: Yes—— and cheating is what gets us into muddles.

F: In a sense, yes. That's right. Except that the whole point of the game is that we do get into muddles, and do come out on the other side, and if there were no muddles our "game" would be like canasta or chess—— and that is not how we want it to be.

D: Is it *you* that make the rules, Daddy? Is that fair?

F: That, daughter, is a dirty crack. And probably an unfair one. But let me accept it at face value. Yes, it is I who make the rules—— after all, I do not want us to go mad.

D: All right. But, Daddy, do you also change the rules? Sometimes?

F: Hmm, another dirty crack. Yes, daughter, I change them constantly. Not all of them, but some of them.

D: I wish you'd tell me when you're going to change them!

F: Hmm—— yes—— again. I wish I could. But it isn't like that. If it were like chess or canasta, I could tell you the rules, and we could, if we wanted to, stop playing and discuss the rules. And then we could start a new game with the new rules. But what rules would hold us between the two games? While we were discussing the rules?

D: I don't understand.

F: Yes. The point is that the purpose of these conversations is to discover the "rules." It's like life—— a game whose purpose is to discover the rules, which rules are always changing and always undiscoverable.

D: But I don't call that a *game*, Daddy.

F: Perhaps not. I would call it a game, or at any rate "play." But it certainly is not like chess or canasta. It's more like what kittens and puppies do. Perhaps. I don't know.

***

D: Daddy, why do kittens and puppies play?

F: I don't know—— I don't know.

A Third Chameleon-hypothesis

"What color is a chameleon on a mirror?"

I asked the question of Gregory Bateson at a point in our interview when we were lost in contemplation of the function, if any, of consciousness—— self-consciousness. Both of us being biologists, we swerved to follow the elusive chameleon. Gregory asserted that the creature would settle at a middle value in its color range. I insisted that the poor beast trying to disappear in a universe of itself would endlessly cycle through a number of its disguises.

Now hear the hypothesis of Gerald Hall, student of Gregory's at Santa Cruz, author of the following book review, and proponent of G. Spencer Brown's Laws of Form *(which denotes but two basic systems—— ones which remember and ones which oscillate):*

"The chameleon will stay whatever color he was at the moment he entered the mirror domain."

—SB

Stewart Brand, Gregory Bateson, Heinz von Foerster.

The Cybernetic Countercultures produced a set of physiological, biological, and ecological approaches to issues of cognitive and communicational operation. Heinz von Foerster's *CoEvolution Quarterly* review of Brand's treatment of Bateson in *II Cybernetic Frontiers* brings this radical consensus into focus.

Two Cybernetic Frontiers

Stewart Brand, the mover of the Whole Earth (Catalog, Epilog, and now its CoEvolution) succeeded in making two apparently different ends meet. In **II Cybernetic Frontiers** *he puts between the same covers the Taoistic reflections of a sage and the fanatic life of bums. The sage is Gregory Bateson (***Steps to an Ecology of Mind***) who would despise being put into a disciplinary bag; the bums are computer bums whose bag is clearly moonlighting on the large computer networks that grow steadily over the United States and begin to extend their tentacles over the entire globe. Brand visited both, the sage and the bums, sipping tea with the former, munching doughnuts with the latter, talking softly, but mostly listening and watching in his unobtrusive, obtrusive way, being "stranger and friend" to his informants at the cybernetic frontiers. The harvest of Brand's explorations are the two major articles in this book which is (on the first page) dedicated to the Difference and (on the last page) to the Bond – because the difference is the Bond.*

After a Prologue, **II Cybernetic Frontiers** *opens with his conversations with Gregory Bateson: "Both Sides of the Necessary Paradox", followed by an Epilog I which is, in fact, a "synolog" connecting the first piece to the second piece, "Fanatic Life and Symbolic Death Among the Computer Bums", and closes with an Epilog (II).*

Indeed, in these two pieces the difference is complete, hence their inseparable bond. Bateson in his late-sixties, with deep roots woven into the complexity of a rich cultural context; the Bums in their mid-twenties sending out their rootlets in all directions, creating a cultural context for each other; the Bateson-dialogue appeared in **Harper's**, *the Bums-story in* **The Rolling Stone**: *these are the counterpoints of this composition.*

The Bateson-Brand dialogue on the Necessary Paradox inverts itself to expose the paradox of necessity. Necessities are tautological by necessity, hence they say nothing. To say something it is necessary to transcend necessity: this is the logical root of the necessary paradox.

How can this be told to the readers of **Harper's** *". . . such that our reader shall be thereby squeezed up a level of abstraction . . ."? Bateson doubts that it can be done. The difficulty, he knows "It's linear thinking: you've got to find an identifiable cause for an identifiable effect. And the argument cannot spread backward the way cholera spreads forwards. When you get them spreading both ways, then you can begin thinking about circuits – indeed circuits become inevitable." And he knows also Wittgenstein's diagnosis "The belief in causality is the superstition." which he paraphrases: "This is, I think, the insanity of . . . . Twentieth Century Occident." But Brand, one generation younger, knows differently. He knows his Bums and their knowledge of the absurdity of necessity, and gently coaxes Bateson into talking of transcendence: Lao-Tse's Tao (you ask a Taoist – "What do we do?" and he would say: "Follow the Way", and that's all he would say); Zenon's Paradox (each half of the paradox proposes the other); Caen's sensible non-sense (a man without God is like a fish without a bicycle); Bateson's Double Bind (the loving Jewish mother gives her son two ties; he puts one on to please her. She: "I see you didn't like the other one."); McCulloch's Heterarchy of Values (there is no summum bonum: when chosen in pairs, A may be preferred over B; B over C, and C over A); and, of course, Wiener's Cybernetics (in order to act one must see; in order to see one must act).*

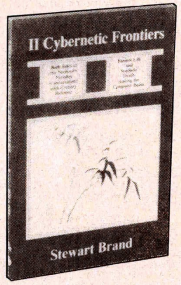
To know more about cybernetics from a man who helped in giving birth to this baby a quarter century ago was one of Brand's motivations to see Bateson in the first place. He recalled Bateson's statement in **Steps to an Ecology of Mind**: *"I think that cybernetics is the biggest bite out of the fruit of the Tree of Knowledge that mankind has taken in the last 2000 years. But most of such bites out of the apple have proved to be rather indigestible – usually for cybernetic reasons."*

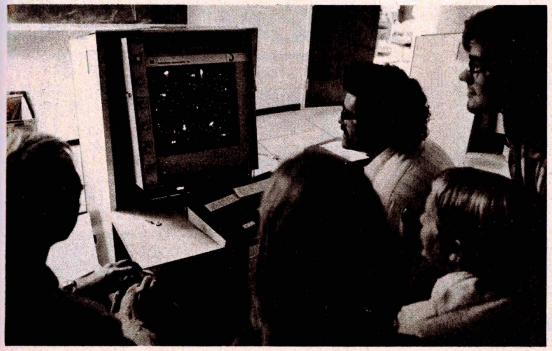
And Bateson explains: "The whole thinking that goes with the words 'input' and 'output' is monstrously bad. It draws a line across the systemic structure. Here there's input and there's output, and it's me against the universe at once, the moment you draw that line. This actually throws away the whole cybernetic background for cybernetics, you know. The engineers have decided it is engineering. All they have to do, you see, is to cut off the circuit so that you have an 'input' on one end and an 'output' on the other, and those two never join up out in the environment. The input-output literature is very large, it's highly skilled engineering and all the rest of it, but it ignores the philosophy of the feedback.

But these were the ill begotten fruits of first-generation cybernetics: the cybernetics of observed systems. With a Bateson, a Brand, the Computer Bums, we have moved into the next generation: the cybernetics of observing systems. This is to be outside of a system to be inside; and inside to be outside. This is to be a Mobius Strip on a Klein Bottle; this is to transcend. This may be meditation, or laughter or play.

– Heinz Von Foerster

II Cybernetic Frontiers
Stewart Brand
1974; 95pp.
$2.00 postpaid
from:
Random House, Inc.
457 Hahn Road
Westminster, MD 21157
or Whole Earth

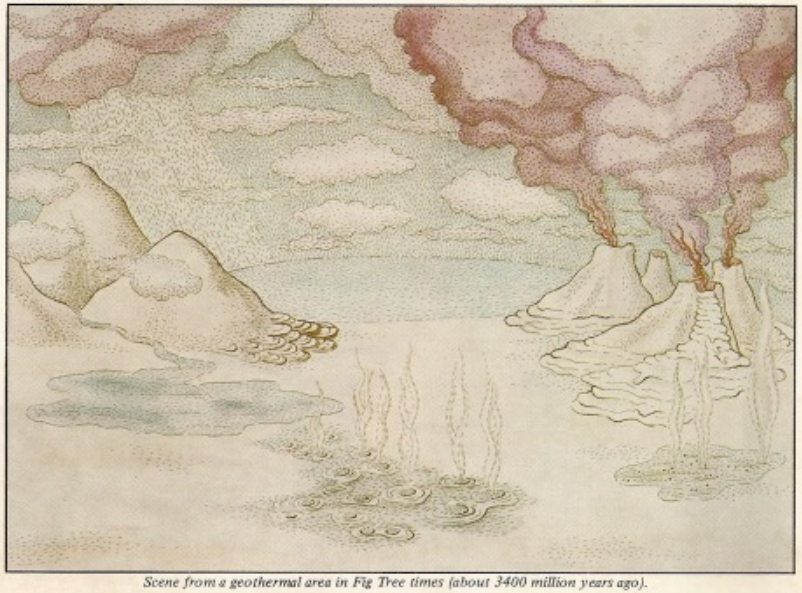




Ralph Gorin, nearest the display tube, warms up Spacewar contestants. Rocket controls are visible on knee of player at left – four buttons: one for thrust, one for torpedoes, one each for turn to the left and to the right.

Heinz von Foerster in *CoEvolution Quarterly* 5 (Summer 1975) reviewing Stewart Brand's article on Gregory Bateson's work as a "cybernetic frontier":

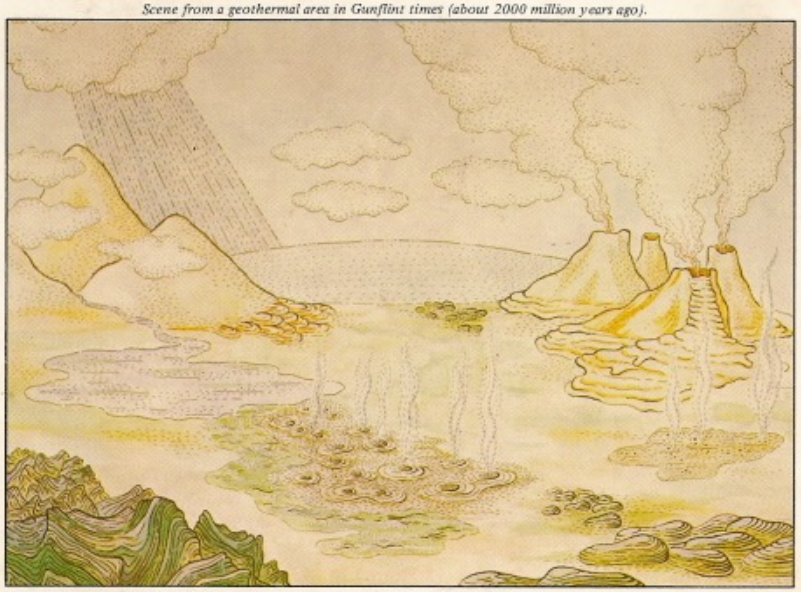
"To know more about cybernetics from a man who helped in giving birth to this baby a quarter century ago was one of Brand's motivations to see Bateson in the first place. He recalled Bateson's statement in *Steps to an Ecology of Mind*: 'I think that cybernetics is the biggest bite out of the fruit of the Tree of Knowledge that mankind has taken in the last 2000 years. But most of such bites out of the apple have proved to be rather indigestible - usually for cybernetic reasons.'" [*Steps* (1972): 476]



Scene from a geothermal area in Fig Tree times (about 3400 million years ago).

The Gaia Hypothesis

Scene from a geothermal area in Gunflint times (about 2000 million years ago).



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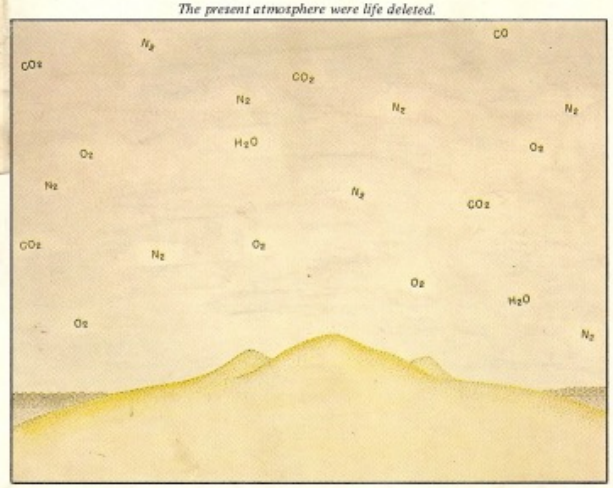
The COEVOLUTION Quarterly

Earth's atmosphere at present.

The Gaia Hypothesis

The present atmosphere were life deleted.



$2 Summer 1975

"We would like to discuss the Earth's atmosphere from a new point of view – that it is an integral, regulated, and necessary part of the biosphere... "This new way of viewing the Earth's atmosphere has been called the "Gaia" hypothesis. The term Gaia is from the Greek for "Mother Earth," and it implies that certain aspects of the Earth's atmosphere —temperature, composition, oxidation reduction state, and acidity—form a homeostatic system, and that these properties are themselves products of evolution."

FIGURE 1. Frontispiece* to Sachs von Lewenheimb, 1664, Oceanus Macro-Microcosmicus. This illustration stresses the analogies between the circulation of the blood and the circulation of water. According to W. Pagel (1), *"The subtitle of the dissertation [which addresses itself to the famous anatomist Thomas Bartholinus] explains that it deals with the analogies between the circular motion of the water from and back to the sea, on the one hand, and that of the blood from and back to the heart, on the other. This motion is "circular," not because it describes the geometrical figure of a circle, but because it reverts to its point of departure. The earth resembles the human body in that, like the latter, it is pervaded by canals and harbours an internal fire. The sea lets water rise by evaporation and return in the form of rain whereby the rivers and subterranean waters are nourished and these finally return the same water to the sea. The latter thereby acts not unlike the heart from which the blood goes out to the organs, starting on its way attenuated by the influx of heat and 'perfected' in the 'workshops' of the organs; finally, after its absorption and assimilation by the organs, its residue is drawn back into the heart in order to be attenuated again – just as the waters are diluted by joining the sea."*

*From the original treatise in the Wellcome Library by courtesy of the trustees.

The Atmosphere as Circulatory System of the Biosphere— The **Gaia** Hypothesis

BY LYNN MARGULIS AND JAMES E. LOVELOCK

We would like to discuss the Earth's atmosphere from a new point of view – that it is an integral, regulated, and necessary part of the biosphere. In 1664 Sachs von Lewenheimb, a champion of William Harvey, used the analogy shown in Figure 1 to illustrate the concept of the circulation of blood. Apparently the idea that water lost to the heavens is eventually returned to Earth was so acceptable in von Lewenheimb's time that Harvey's theory was strengthened by the analogy (1).

Three hundred and ten or so years later, with the circulation of blood a universally accepted fact, we find it expedient to revive von Lewenheimb's analogy – this time to illustrate our concept of the atmosphere as circulatory system of the biosphere. This new way of viewing the Earth's atmosphere has been called the "Gaia" hypothesis (2). The term Gaia is from the Greek for "Mother Earth," and it implies that certain aspects of the Earth's atmosphere – temperature, composition, oxidation reduction state, and acidity –

The Gaia Hypothesis ("Gaia" is pronounced to rhyme with papaya) treats the anomalous Earth atmosphere as an artifact of life and comprehends the planet itself as a single life.

The two old puzzles – 1) How does the bizarre Earth atmosphere maintain itself? and 2) How does fragile Earth life maintain itself? – solve each other. It took two remarkable scientists – Margulis & Lovelock – meeting outside their specialties to discover that convergence.

Lynn Margulis is a microbiologist at Boston University. Her best-known contribution is the symbiotic theory of the origin of complex cells (her book Origin of Eukaryotic Cells *is reviewed on p. 41). Popularization of that theory in* The Lives of a Cell *won Lewis Thomas a National Book Award last month. He even perpetuated Dr. Margulis' misspelling – "Myxotricha paradoxa" (should be Mixotricha, she notes).*

James Lovelock is the envy of every scientist, a successful free-lancer. Working out of a thatched cottage in the Salisbury Plain, England, this biospheric chemist has accumulated some 69 patents – most of them in what he calls "gas pornography" – chromatographic analysis of gases at the parts-per-billion level. The New Scientist *recently wrote of him, "In some ways, Jim Lovelock – begetter of the Gaia hypothesis – is one of the last of the old-style natural philosophers. A scientist who works from his own home because he believes that lack of security encourages creativity, he has invented – among other things – 'a magnificent Pandora's box', the electron capture detector gas chromatograph. Most sensitive of the analytical chemist's tools, it has been responsible for arousing concern about pesticide residues and Freons in the stratosphere, and may yet help to show that, thanks to Gaia, our fears of pollution-extermination are unfounded."*

It is an honor for The CoEvolution Quarterly *to be the first non-specialist American publication to carry the Gaia Hypothesis. Margulis and Lovelock will doubtless take some flak for appearing in suspect company – condom evaluations, poetry, and such – but both seem comfortable that their science is sound enough to withstand the science-plus context. We are grateful to Carl Sagan, who put us in touch with Lynn Margulis, and to* Natural History *editor Alan Ternes, who will publish an expanded version of this article in his magazine in September or October.*

Gaia is an old idea. She is one of the four primary divine beings of the Ancient Greeks – Chaos (Space), Gaia (Earth), Tartarus (the Abyss), and Eros (Love). But Gaia is still a new hypothesis, containing more questions than answers.

It is too early for proofs, conclusions, or morals, beyond the one increasingly obvious, that as long as human activity works against the self-balancing of biosphere and atmosphere there is no Teilhardian noosphere in evidence, just a damned human cartel.

In Gaia we are – all – Tangled Up In Blue.

– SB

Box 428, Sausalito, California 94965

"You look down and see the surface of that globe that you've lived on all this time and you know all those people down there. They are like you, they are you, and somehow you represent them when you are up there —a sensing element, that point out on the end, and that's a humbling feeling. It's a feeling that says you have a responsibility. It's not for yourself. ¶ The eye that doesn't see does not do justice to the body. That's why it's there, that's why you're out there. And somehow you recognize that you're a piece of this total life. You're out on that forefront and you have to bring that back, somehow. And that becomes a rather special responsibility. It tells you something about your relationship with this thing we call life. And so that's a change, that's something new."

"Then looking down to the south and there's the whole peninsula of Florida laid out. And all the hundreds of hours you spent flying across that route, down in that atmosphere, all that is friendly again."

The size of it, the significance of it — it becomes both things, it becomes so small and so fragile, and such a precious little spot in that universe, that you can block it out with your thumb, and you realize that on that small spot, that little blue and white thing is everything that means anything to you. All of history and music and poetry and art and war and death and birth and love, tears, joy, games, all of it is on that little spot out there that you can cover with your thumb.

And you realize that that perspective . . . that you've changed, that there's something new there. That relationship is no longer what it was. And then you look back on the time when you were outside on that EVA and those few moments that you had the time because the camera malfunctioned, that you had the time to think about what was happening. And you recall staring out there at the spectacle that went before your eyes. Because now you're no longer inside something with a window looking out at a picture, but now you're out there and what you've got around your head is a goldfish bowl and there are no limits here. There are no frames, there are no boundaries. You're really out there, over it, floating, going 25,000 mph, ripping through space, a vacuum, and there's not a sound. There's a silence the depth of which you've never experienced before, and that silence contrasts so markedly with the scenery, with what you're seeing, and the speed with which you know you're going. That contrast, the mix of those two things, really comes through.

And you think about what you're experiencing and why. Do you deserve this? This fantastic experience? Have you earned this in some way? Are you separated out to be touched by God to have some special experience here that other men cannot have? You know the answer to that is No. There's nothing that you've done that deserves that, that earned that. It's not a special thing for you. You know very well at that moment, and it comes through to you so powerfully, that you're the sensing element for man.

You look down and see the surface of that globe that you've lived on all this time and you know all those

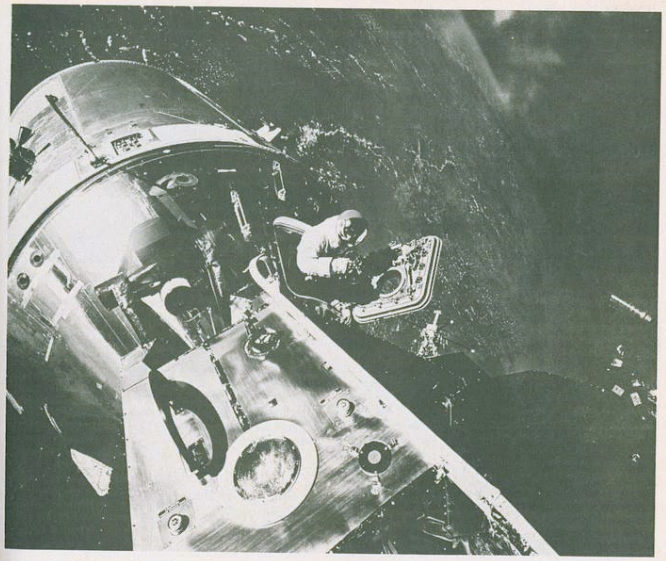


Photo by Russell Schweickart of David Scott standing out of the Apollo 9 Command Vehicle. "There are no frames, there are no boundaries. You're really out there, over it, floating, going 25,000 mph, ripping through space, a vacuum, and there's not a sound."

people down there. They are like you, they are you, and somehow you represent them when you are up there — a sensing element, that point out on the end, and that's a humbling feeling. It's a feeling that says you have a responsibility. It's not for yourself.

The eye that doesn't see does not do justice to the body. That's why it's there, that's why you're out there. And somehow you recognize that you're a piece of this total life. You're out on that forefront and you have to bring that back, somehow. And that becomes a rather special responsibility. It tells you something about your relationship with this thing we call life. And so that's a change, that's something new.

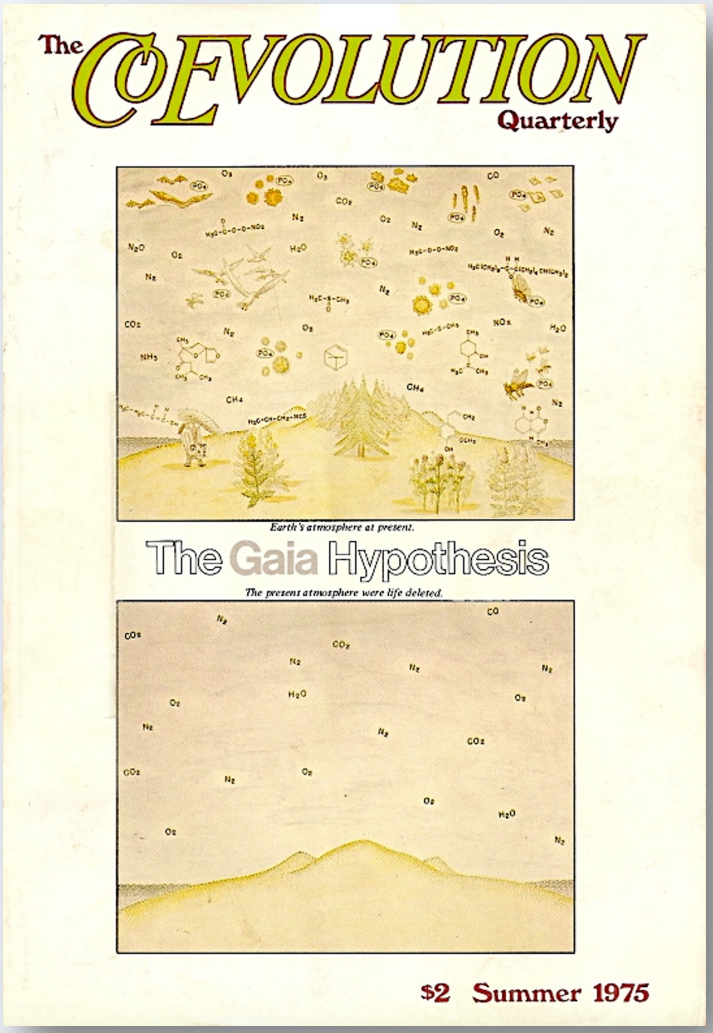
And when you come back, there's a difference in that world now, there's a difference in that relationship between you and that planet, and you and all those other forms of life on that planet, because you've had that kind of experience. It's a difference, and it's so precious. And all through this I've used the word *you* because it's not me, it's not Dave Scott, it's not Dick Gordon, Pete Conrad, John Glenn, it's you, it's us, it's we, it's life. It's had that experience. And it's not just *my* problem to integrate, it's not my challenge to integrate, my joy to integrate — it's yours, it's everybody's.

I guess that's really about all I'd like to say, except that — and I don't even know why, but to me it means a lot — I'd like to close this with a poem by e. e. cummings that has just become a part of me, somehow out of all this, and I'm not really sure how.

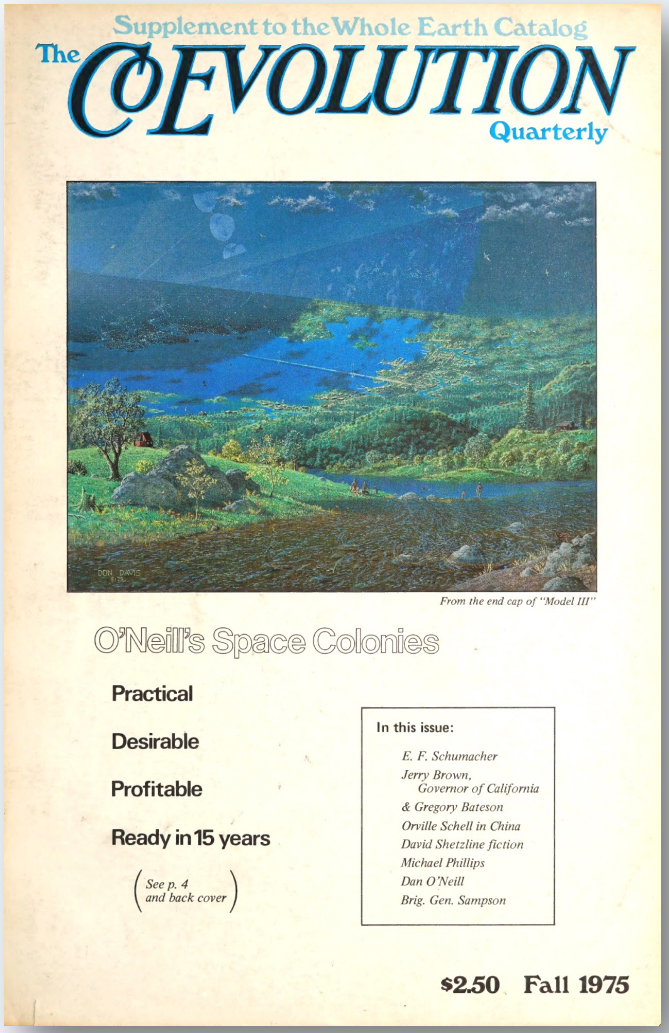
He says, that

> i thank You God for most this amazing
> day: for the leaping greenly spirits of trees
> and a blue true dream of sky; and for everything
> which is natural which is infinite which is yes.

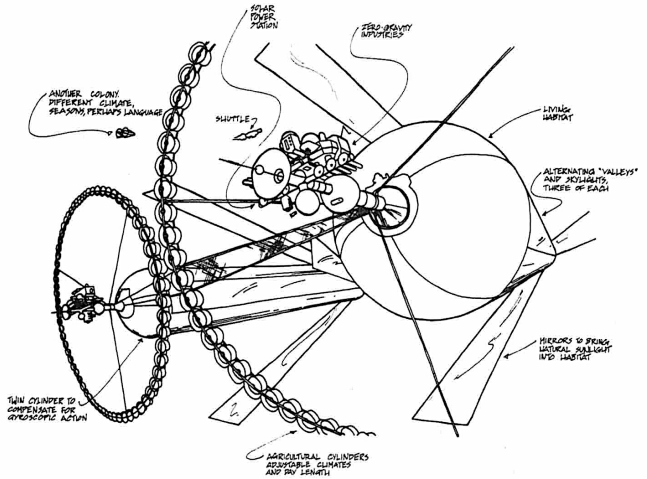
Thank you. ■



CoEvolution Quarterly's exceptional introduction of Margulis and Lovelock's "The Atmosphere as Circulatory System of the Biosphere: The Gaia Hypothesis" in the summer of 1975 was immediately followed by a fall number devoting the first thirty pages to Princeton physicist Gerard K. O'Neill's proposals and designs for geostationary high-orbital space colonies, along with memorable depictions by NASA artists. O'Neill's technological speculations presented seductive images of environmental duplication that translated Gaia's terrestrial implications into idealized visions of closed ecologies supporting sustainable habitats in space.



Space Colonies



Summary

of the 26 pages on Space Colonies in the Fall '75 CQ *to which the following 76 pages of comments respond.*

Gerard O'Neill, 48, is a notable high-energy physicist — he developed the particle storage rings that have become standard on nuclear accelerators. In 1969 he posed a special question to a special seminar of his freshman physics students at Princeton, **"Is the surface of a planet really the right place for an expanding technological civilization?"**

They and he concluded that, no, free space would be better — richer energy domain (sunlight pouring past at ten times the strength of Earth sunlight), fine manufacturing materials available in the Moon and asteroids, many advantages of zero gravity, and lots of room. When they addressed the engineering of building an Earth-like environment, they found that many of the design problems solved each other.

The pinnacle of their vision is the behemoth Space Colony Model III, home of 1,000,000 inhabitants, the result by about 2000 AD of a "bootstrap" sequence of successively larger space manufacturing facilities. The first step, Model I, would cost $100 billion, be ready in 15 years, house 10,000 people, and rapidly start paying for itself by constructing Satellite Solar Power Stations (SSPS) for micro-wave beam-down of energy from low-Earth-orbit — replacing nuclear and fossil fuel use on Earth.

The later colony, Model III, would be 6¼ miles long by 1¼ miles in diameter (across each of the two counter-rotating cylinders). The cylinders would rotate at a rate to provide centrifugal force equivalent to Earth gravity (1 g). Each cylinder would consist of three valleys, interspersed with three enormous windows with huge mirrors to reflect in sunlight. Every inhabitant would have something like five rural acres in this space terrarium. A vessel that big would have blue sky and weather.

98% of the material of the colonies would come from the Moon, taking advantage of the high metal, glass, and oxygen content of lunar "soil." Hydrogen, nitrogen, and other essentials for life would have to be hauled up from Earth. With 1/20 of Earth's gravity on the Moon, and no atmosphere, it would be possible to propel lunar material off the Moon by means of a "mass-driver" — magnetically controlled buckets flinging Moon chunks toward the colony site. The entire construction of Model I would leave a mined hole only 7 yards by 200 yards by 200 yards. O'Neill claims that the whole Space Colony project can be done with present technology.

The site, usually called "L-5," is one of the two stable gravitational points in the Earth-Moon system. The Lagrangian libration points, L-4 and L-5, precede and follow the Moon in Orbit around the Earth (see diagram). They are Sargasso Seas of space, where things accumulate.

As the bootstrap process continues, O'Neill foresees each colony manufacturing more colonies, and each of them making themselves as attractive as possible to draw colonists from Earth. Travel and communications between colonies would be very easy, but O'Neill expects that they would become increasingly diverse, comprising different Earth groups, different ideas, and setting forth on different missions to the asteroids, other planets, and even out of the solar system entirely.

This year, 1975-76, the Space Colonies are beginning to be a public issue. O'Neill has testified before a House Committee and a Senate Committee. NASA (National Aeronautics and Space Administration) has done studies on the scheme and increased their interest. One Presidential runner, Morris Udall, has already expressed interest. Since O'Neill's original article in Physics Today *in 1974, there have been major articles in* The New Scientist, Science, The New York Times Magazine, Saturday Review, Harpers, The Smithsonian, *and others.*

Everything that has appeared in print has been favorable. Till now.

—SB

BC] It is ironic that the only substantial remains of O'Neill's grandiose project—other than the pages of *CoEvolution Quarterly* and other contemporary publications—are works of graphic and literary art: NASA's illustrations of his designs for inhabitable spheres and cylinders, and William Gibson's descriptions of off-world "islands" in his Sprawl trilogy.

▪

Archipelago

The islands. Torus, spindle, cluster. Human DNA spreading out from gravity's steep well like an oilslick.

Call up a graphics display that grossly simplifies the exchange of data in the L-5 archipelago. One segment clicks in as red solid, a massive rectangle dominating your screen.

Freeside. . . .

—William Gibson, *Neuromancer* (1984)

▪

The **Lagrangian points** (also Lagrange point, L-point, or libration point), are the five positions in an orbital configuration where a small object affected only by gravity can theoretically be stationary relative to two larger objects (such as a satellite with respect to the Earth and Moon). The Lagrange points mark positions where the combined gravitational pull of the two large masses provides precisely the centripetal force required to rotate with them. They are analogous to geostationary orbits in that they allow an object to be in a "fixed" position in space rather than an orbit in which its relative position changes continuously. (*Wikipedia*)

In the midst of Gaia's roll-out and the Space Colony debates, the *CoEvolution Quarterly* for Summer 1976 published a long interview led by Stewart Brand in conversation Gregory Bateson and Margaret Mead about their attendance at the fabled Macy Conferences on Cybernetics.

For God's Sake, Margaret

CONVERSATION WITH GREGORY BATESON AND MARGARET MEAD

Stewart Brand: I need a little background, if it's all right, on how this whole Macy thing got rolling, why, and when, and what the sequence was.

Gregory Bateson: There was this Macy meeting in what, '42?[1]

SB: Who started it, and what was it about?

Bateson: This was a meeting called "Cerebral Inhibition," which in fact was a meeting on hypnosis.* "Cerebral inhibition" was a respectable word for hypnosis. Most of what was said about "feedback" was said over lunch.

Mead: Well, I know that's what you always tell people, but I didn't sit at the same place at lunch, and I heard what was said at that conference. But at that conference, which is the one where Milton Erickson hypnotized that Yale psychologist, it was at the end of that conference that you really had the design of what needed to be done. And then you were caught up in war work and went overseas and there was that long period.

I think that you actually have to go back to that earlier meeting that was held in the basement of the old Psycho-Analytic building on the West Side the day of Pearl Harbor.

*The twenty participants included representatives of anthropology, psychobiology, physiology, psychiatry, neurology, psychology, medicine, anatomy, and electronics. Among those present were Gregory Bateson, Lawrence K. Frank, Frank Fremont-Smith, Lawrence Kubie, Warren McCulloch, Margaret Mead, Arthur Rosenblueth.

Bateson: They didn't on-go from year to year, those early ones. Larry Frank was chairman I bet.

Mead: No, Larry never was chairman, you know. He always sat on the sidelines and made somebody else be chairman. Kubie was a very important person at that point.

Bateson: Yes. Kubie was an important bridge because Kubie had respectable-ized Milton. There's a whole series of papers which are jointly Kubie and Erickson. Now, in fact, they were Erickson's papers.

Mead: And Kubie didn't know what was in them. That's the truth.

Bateson: But Kubie did get right the energy problem. He was the first person that really took Freud's "energy" and said, "Look, look, look, it makes no sense." There is a very good paper by Kubie on the errors of Freudian energy theory. *[Goes to find the reference.]* Huh. Kubie, "Fallacious Use of Quantitative Concepts in Dynamic Psychology."

Mead: Now when was that?

Bateson: That was . . . guess.

Mead: No, I don't guess that one.

Bateson: Published in '47. **Psychoanalytic Quarterly**. For which I suspect he very nearly got read out of the church. He never said it again.

Margaret Mead and Gregory Bateson were married in 1936. They had met and fallen in love in 1932 while both were doing anthropological fieldwork on the Sepik River in New Guinea (Margaret was at the time with her second husband, Reo Fortune). In New Guinea Gregory's unusual sense of theory met Margaret's improved field methodology and sparked much of the quality in Gregory's opus on the latmul tribe, **Naven**.

Newly-wed in Bali, they spent two collaborative years in the most intense and productive fieldwork of their lives, developing, among other things, a still unmatched photographic analysis of the culture.

Their daughter Mary Catherine, Margaret's only child, was born in 1939 in the United States. Gregory and Margaret worked together on the result of their Bali fieldwork, **Balinese Character – A Photographic Analysis**, *and then were separated increasingly by World War II and their own diverging interests.*

After the war they both were involved in starting the somewhat famous Macy Conferences (1947-53) that invented cybernetics. This interview begins with their joint recollection of that critical period.

Margaret Mead is one of the world's most remarkable women. She got a full mixture of praise and notoriety (notorious in that day because women weren't supposed to talk about sex) with her first book, **Coming of Age in Samoa** *(1928). Since then there have been ten other books and numerous honors and positions, including President of the American Anthropological Association (1960), and of Scientists' Institute on Public Information, and (this year) the American Association for the Advancement of Science, and a Curator of the American Museum of Natural History, which continues as her headquarters. In public affairs she seems to have taken over the Eleanor Roosevelt niche.*

After Bali and the Macy Conferences Gregory Bateson went on to work with schizophrenics, alcoholics, artists, dolphins, students, and a steadily more general set of understandings of what they have in common. He co-authored a book, **Communication: The Social Matrix of Psychiatry** *(1951-68, Norton), with Jurgen Ruesch, and edited* **Perceval's Narrative – A Patient's Account of his Psychosis, 1830-1832** *(1961, Stanford). Mary Catherine, his and Margaret's daughter, wrote a book about one of Gregory's conferences,* **Our Own Metaphor** *(1972, Knopf). His collected papers appear in* **Steps to an Ecology of Mind** *(1972, Ballantine), a book that wowed me out of my shoes. If Gregory lives long enough he will get his Nobel for the Double Bind Theory of Schizophrenia.*

Margaret is now 75, Gregory 72. They meet seldom though always affectionately. Gregory has a son John, 23, by his second wife, and a daughter Nora, 9, by Lois Bateson his present wife.

This meeting with Margaret took place at Gregory's home near Santa Cruz, California, in March of this year.

–SB

Gregory, Margaret, and a microphone at the Bateson home near Santa Cruz this spring.

Mead: It was very hard to read Kubie out of the church because he had once been a neurologist, and that was the thing that they were all scared of. Now, where is the Rosenblueth, Wiener and Bigelow paper? The first great paper on cybernetics.**

Bateson: Rosenblueth, Wiener and Bigelow. "Behavior, Purpose and Teleology," **Philosophy of Science**, 1943.[2]

Mead: That's it, you see.

Bateson: It could just have been published at the time of the Cerebral Inhibition conference.

Mead: It was just coming out or just had come out.

SB: What was the experiment that that paper recorded?

Bateson: It didn't record an experiment, it reported on the formal character of seeking mechanisms, essentially. Self-corrective mechanisms such as missiles. The missile measures the angle between its direction and the target it's seeking, and uses that measure to correct itself.

Mead: But using some very simple physiological experiments that Rosenblueth had been doing at the University of Mexico.

SB: Do you recall what they were saying that you overheard that got you excited?

Bateson: It was a solution to the problem of purpose. From Aristotle on, the final cause has always been the mystery. This came out then. We didn't realize then (at least I didn't realize it, though McCulloch might have) that the whole of logic would have to be reconstructed for recursiveness. When I came in from overseas in '45 I went within the first two or three days to Frank Fremont-Smith, and said, "Let's have a Macy Conference on that stuff."

Mead: You and Warren McCulloch had an exchange of letters when you were in Ceylon.

Bateson: We did?

**I am told a paper by W. Ross Ashby predated this by a year but we didn't know it. —Mead

Mead: Yes. You told me enough about it in some way. I talked to Fremont-Smith. McCulloch had talked to Fremont-Smith.

Bateson: Fremont-Smith told me, "Yes, we've just arranged to have one, McCulloch is the chairman, go talk to McCulloch."

Mead: And McCulloch had a grand design in his mind. He got people into that conference, who he then kept from talking.

Bateson: Yes, he had a design on how the shape of the conversation would run over five years – what had to be said before what else could be said.

Mead: He wouldn't let Ralph Gerard talk. He said, "You can talk next year." He was very autocratic.

Bateson: Yes, but an awfully good chairman in many ways. It's very rare to have a chairman who knows what it's about at all.

SB: What was his grand design?

Bateson: Who knows?

Mead: Well, I think more or less what happened was.

Bateson: How did the first meeting differ from the second meeting?

Mead: There wasn't even any usable terminology. At first we called the thing "feedback," and the models that we were presented with at that point were the guided missile, target-seeking. Now there had been another even that's worth considering here. That is that Wiener had written an article in the **Atlantic**, or **Harper's**, refusing to give the war department data on guided missiles. Remember that?

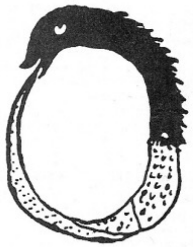
Bateson: Oh yes.

Mead: He'd worked on them all through the war, and of course they had the material if they had hunted for it, but they made the mistake of asking him for some, and at that point he said that he would not give it to them, the war was over, and this was data that could only be used for war-like purposes. He would not give it to them.

[more ➔]

Stewart Brand, "For God's Sake, Margaret: Conversation with Gregory Bateson and Margaret Mead," *CoEvolution Quarterly* 10 (Summer 1976), 32-44.

On Observing Natural Systems



FRANCISCO VARELA IN CONVERSATION WITH DONNA JOHNSON

Donna Johnson: Many people, almost as a matter of principle, of knowing what they're doing, make an effort to think "holistically," in terms of whole systems. But many of us often face a confusion stemming from our knowledge that "you can't consider a rabbit without considering his forest." We don't quite know how to go about considering the rabbit without fading into the forest, the local ecology, the planet, etc., and quickly into Everything. We know too that "the whole is more than the sum of its parts," but please Francisco what is a whole?

Francisco Varela: Well, yes, wholes, or whole systems, are arranged like Chinese boxes. One whole contains another whole and every whole is contained in another whole. There's a recursion principle there. But that does not mean that you cannot stop your unwinding at some point and consider a system.

And I have come to the conviction that the key to understanding the holism of such systems, the whole-ness of systems, is to understand that they are organized, their parts are organized, in a circular form. That is, every part interacts with every other part. That gives us a total self-referential system.

Four laws of ecology: "(1) everything is connected to everything else; (2) everything must go somewhere; (3) nature knows best; and (4) there is no such thing as a free lunch."

Barry Commoner in *The Closing Circle*, A. Knopf, New York, 1971, p. 18.

And of course the analysis of the parts does not account for the emergent properties when these parts are put together.

There has not been a lot of clear, disciplined thinking about wholes. We have a hell of a lot of technology, and ideas, and mathematics, about control of systems, that is, how to design them and how to get them to do whatever you want them to do. That is one step toward talking about systems in general regardless of their specific parts, that is, a proper system theory. But there hasn't been a lot of thinking, as a matter of fact very little thinking, on emerging properties of whole systems, natural systems.

Johnson: So how do you identify the circle that defines your system?

Varela: By the boundaries you put into the system. You say, this is the system I'm going to consider, this dog, or this society. To be sure, there are many ways of splitting up the world into different wholes, but once the criteria for separating one system from the other are given, you have a stable description.

So if you're interested in ecology, a certain kind of ecology, you split up the world in a certain way. If you're interested in economy, you split up the world in a different way. But given a criteria of distinction, you always come up with systems that have some sort of closure of their organization. And if you're a biologist, that's pretty clear, right? In the subject matter of the biologists, every one of the interactions in any organism interacts with every other interaction in a very closed fashion, a closed network of interactions.

Francisco Varela is a mathematician and neurologist whose special interest is the logic of self-reference. This sounds abstruse, but I share the opinion of Ludwig Wittgenstein, Gregory Bateson, G. Spencer Brown, Heinz von Foerster and others that failure to understand self-reference is the poison in the brain of most Western misbehavior, public and personal.

In his recent landmark paper, "A Calculus of Self-Reference" and in this interview, Francisco is helping build what Von Foerster calls "a cybernetics of observing-systems," which is the rest of the story after "the cybernetics of observed-systems" — feedback, goal-seeking, and such.

After several years with Von Foerster's Biological Computer Laboratory at the University of Illinois in Urbana, Varela is now teaching and doing research at the University of Colorado, Denver. Donna Johnson, 28, is an intellectual nomad who goes around making people's ideas clearer.

—SB

CoEvolution Quarterly 10 (Summer 1976)

MIND/BODY DUALISM CONFERENCE

POSITION PAPERS

Organized by Gregory Bateson and myself, a conference addressing the pathology of Cartesian mind/body dualism was held at the Wheelwright Center in Marin County, California, July 27th to 30th, 1976. Participants were Gregory Bateson, Francisco Varela, Heinz Von Foerster, Richard Baker-roshi, Ramon Margalef, Gordon Pask, Alan Kay, Terry Winograd, Mary Catherine Bateson, Steve Baer, Stewart Brand, Robert Edgar, and Carol Proudfoot. Below is Gregory's invitational paper, followed by three of the position papers. Portions of the proceedings and some more of the position papers will appear in later CQs.

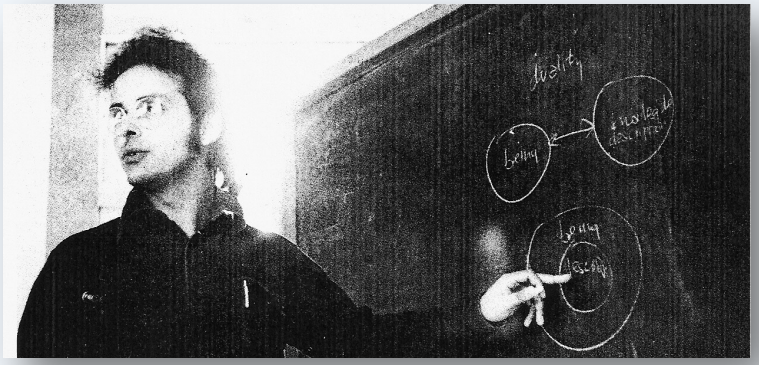
—SB

Invitational Paper *by Gregory Bateson*

1. The human species, perhaps since the evolution of language, has attached strange importance to "spiritual," "mental," "moral," and even "supernatural" aspects or components of life and death.

proposes the same dualism, and I hope that the conference members will be able to agree at the start that the old compromises between "supernatural" religion and "materialist" science are artifacts of a false division and by-products of the meeting between unsophisticated theology and equally unsophisticated science.

CoEvolution Quarterly 11 (Fall 1976)



CoEvolution Quarterly 11 (Fall 1976): 62-67.

—On this occasion Varela brings a complex philosophical statement that deconstructs the oppositional dualism of dialectical thinking through a method he calls "Star cybernetics." (Note. Thompson will call it a theory of "non-dualism," but since there is no collapsing of observed distinctions, I think that "meta-dualism" might be a preferable label.) In his introductory note, Brand strikingly observes, "Of all the mind/body position papers I think his has the most remarkable content." Here we will just examine the top layer of Varela's discourse. He promptly places his approach in alignment with Bateson's "series of convergences":

> "Star is (can be taken to be) a compact expression to signify a broad paradigm encompassing that series of convergences rightly demanded by Bateson:
>
> cybernetics ←→ epistemology ←→ evolution ←→ ethics ←→ cognition ←→ ecology"

NOT ONE, NOT TWO

Position Paper for the Mind-Body Conference

BY FRANCISCO J. VARELA

This paper has two parts. In the "Notes on Dialectics" I develop some ideas that apply to dualities quite generally. In the "Epilog," I have stated my ideas on the Mind-Body Problem from the perspective taken in the notes.

Briefly stated, my feeling is that if there is going to be a change in our perception of the Mind-Body relation, there has to be a change in the context in which the problem is seen to arise. This implies, at least, a change

(i) in the logic used to understand that dialectics and wholes are;
(ii) in the scientific ideas about what mind is, (moving away from the brain-secretion image, towards an understanding of mind as conversational domain); and
(iii) in the cultural conceptions about mind, (which restrict the kind of experience that are socially and individually accessible).

Points (i) and (ii) are treated in the following Notes. In the Epilog, (iii) is considered separately.

1. NOTES ON DIALECTICS

0. The Star

0.1 One possible way of access to the central concern of our gathering is to consider duality and dialectics as a broad philosophical idea. Accordingly I would like to see us discussing trinities.

By trinity I mean the contemplation of the ways in which pairs (poles, extremes, modes, sides) are related and yet remain distinct.

0.2 The metaphorical "trinity" can then be replaced with some statement which contains a built-in injunction (heuristic, recipe, guidance) that can tell us how to go from duality to trinity.

*"trinity" = "the it/the process leading to it" (the Star * statement).*

0.2.1 The slash "/" in Star *, and hereinafter, is to be read as: "consider both sides of /", i.e:

"consider both the it and the process leading to it."

An active supporter of Allende in Chile, cybernetician Francisco Varela now works out of the Medical Center of the University of Colorado in Denver. Of all the mind/body position papers I think his has the most remarkable content. He appeared last issue in **The CQ** *,with an interview called "Observing Natural Systems."*

—SB

Thus the slash is to be taken as a compact indication of a way of transiting to and fro both sides of it.

0.3 In the sections that follow I would like to show

(i) that the Star * is effective, i.e. it is a way to proceed from disjoint pairs to their unity in a metalevel, and;
(ii) that one can map (project, reformulate) in Star a number of dualities, the Mind-Body included, and;
(iii) that Star is (can be taken to be) a compact expression to signify a broad paradigm encompassing that series of convergencies rightly demanded by Bateson

cybernetics ↔ epistemology ↔ evolution ↔ ethics ↔ cognition ↔ ecology

1. Star Cybernetics

1.1 The first aspect (i) of Star that I want to consider is the cybernetics contained in it. Let us transcribe Star into the more convenient form of

** = "network/trees constituting the network."*

1.2 This is pictured in Fig. 1. On one side (by convention the left) we see a network or mesh of interactions. These are left unspecified: the nodes could be anything at all (molecules, species, concepts, . . .), and their interconnecting arrows could be any processes whatsoever (computations, rearrangements, transformations, . . .).

1.2.1 It is assumed that any node could be seen (at another time, by somebody else) as another network, or that the initial net could be seen as a node in a larger net. That is: there are no initial or final "elements"; everywhere we look, everything has the same meshy appearance.

1.3 On the right side of Fig. 1 there is a tree of root *a* in which I have, step by step, drawn the nodes to which *a* connects, the nodes to which those nodes connect in turn, and so on. Had I continued to do this, I would have come back, after a while, to write *a* again. Thus the process could go on forever (whence the ". . .").

1.3.1 The stages of this procedure are conveniently tracked by 1,2,3, . . ., to indicate the successive depth of the tree.

1.4 The way to go from left to right in Fig. 1 is: chop (prune, truncate) at *a*. That is: take *a* as if it were an initial element, and proceed as if the time at which this is done is zero time. Please note that the act of chopping demands somebody who does it, and sometime to do it.

1.5 The way to go from right to left is more tricky, hence usually disregarded. If we go down the tree we would

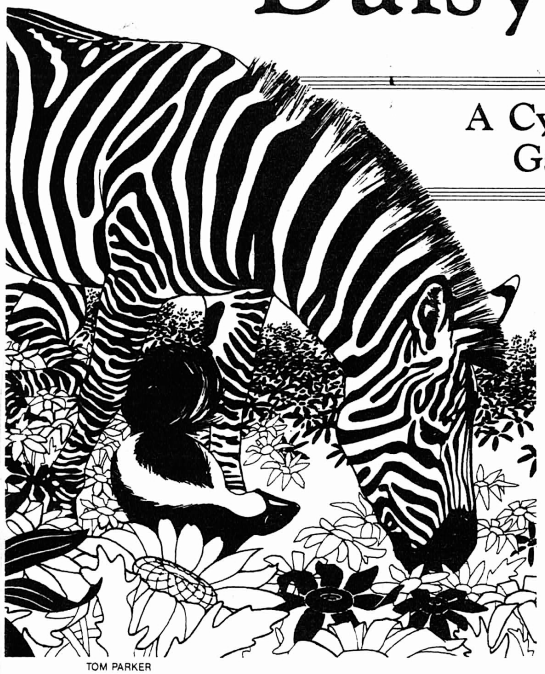
BC] "Cybernetics for Lovelock is set at control systems engineering and, notwithstanding occasional perturbations, stays at that steady conceptual state. His invention of the Daisyworld simulation brings out his ties to computational platforms for cybernetic model building. Daisyworld—a computer model of homeostatic self-regulation in the coupled interaction between an idealized biota and its virtual environment—is the culmination of Lovelock's heuristic exploration of Gaian parameters through cybernetic models" (*Gaian Systems* 132).

"Since cybernetics was kidnapped by computer science a couple decades back **[!!]**, there have been few working applied cyberneticians loose in the world. Lovelock, holder of innumerable patents in gas chromatography and related fields, visiting professor in the Department of Cybernetics at Reading University, is one. May he and Gaia inspire more." (SB)

Daisy World

A Cybernetic Proof of the Gaia Hypothesis

by James E. Lovelock



TOM PARKER

IT IS NOW JUST OVER TEN YEARS since Lynn Margulis and I published our first paper on the Gaia Hypothesis.[1] You may be wondering what has happened in the meanwhile.

You will have noted that the idea does not yet seem to have set big science on fire. This is not too surprising, for many famous scientists in the past, including such names as Redfield, Hutchinson, and Sillen, touched on the idea without managing to convince their colleagues. One of the extraordinary things about science is that whilst it swallows the intricacies of relativity and of genetics, it has never been comfortable with whole systems; witness the unpopularity of cybernetics. How

In his book **Gaia: A New Look at Life on Earth (NWEC** *p. 7) British scientist Lovelock defines the Gaia Hypothesis so:*

"It postulates that the physical and chemical condition of the surface of the Earth, of the atmosphere, and of the oceans has been and is actively made fit and comfortable by the presence of life itself. This is in contrast to the conventional wisdom which held that life adapted to the planetary conditions as it and they evolved their separate ways."

As Lovelock notes, there is a peculiar silence going on. Lovelock is widely respected, his book got warm reviews in **Scientific American**, **Science**, *and such places, and the Gaia Hypothesis is well known and well regarded. But it is not being challenged — or even discussed — in the scientific literature. In a computer teleconference I'm in I raised the subject, and British anthropologist Mary Douglas had this to say:*

"Why should people who are really worried about nonrenewable resources and irreversible damage to the environment take so little notice of a well thought out, optimistic message? . . . . You might start by generalizing the problem, and ask why pessimistic theories are more readily credited than optimistic ones in this part of the century . . . . What are the funding agencies looking for? Trouble-shooting research. There is this problem here, or that problem there. The competitive research tenders have to show that they can see the urgent problems and that their project might solve one of them . . . . That is why no one has had time to look at Gaia's hopeful scenario."

Since cybernetics was kidnapped by computer science a couple decades back, there have been few working applied cyberneticians loose in the world. Lovelock, holder of innumerable patents in gas chromatography and related fields, visiting professor in the Department of Cybernetics at Reading University, is one. May he and Gaia inspire more.

"Daisy World" is so simple a proof you could run it on your, um, personal computer. Jim did.

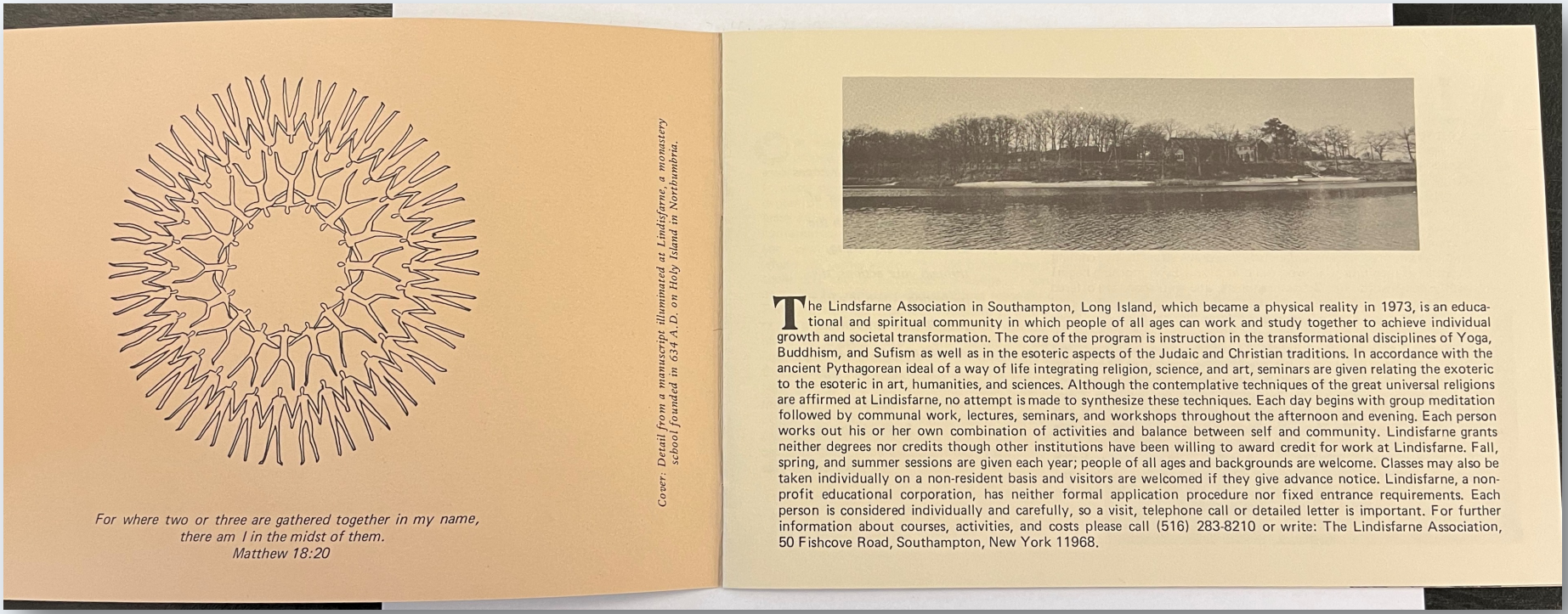
This article is rewritten from a recent collection of papers, **Biomineralization and Biological Metal Accumulation** *(1982, $69.50 postpaid from Kluwer Boston, 160 Old Derby Street, Hingham, MA 02043).* —*Stewart Brand*

"One of the extraordinary things about science is that whilst it swallows the intricacies of relativity and of genetics, it has never been comfortable with whole systems; witness the unpopularity of cybernetics. How many universities, I wonder, have departments of cybernetics?"

CoEvolution Quarterly (Summer 1983)

Cybernetic Counterculture 3: Lindisfarne

1974 brochure for Lindisfarne's original incarnation as an intentional community on Long Island, NY



For where two or three are gathered together in my name,
there am I in the midst of them.
Matthew 18:20

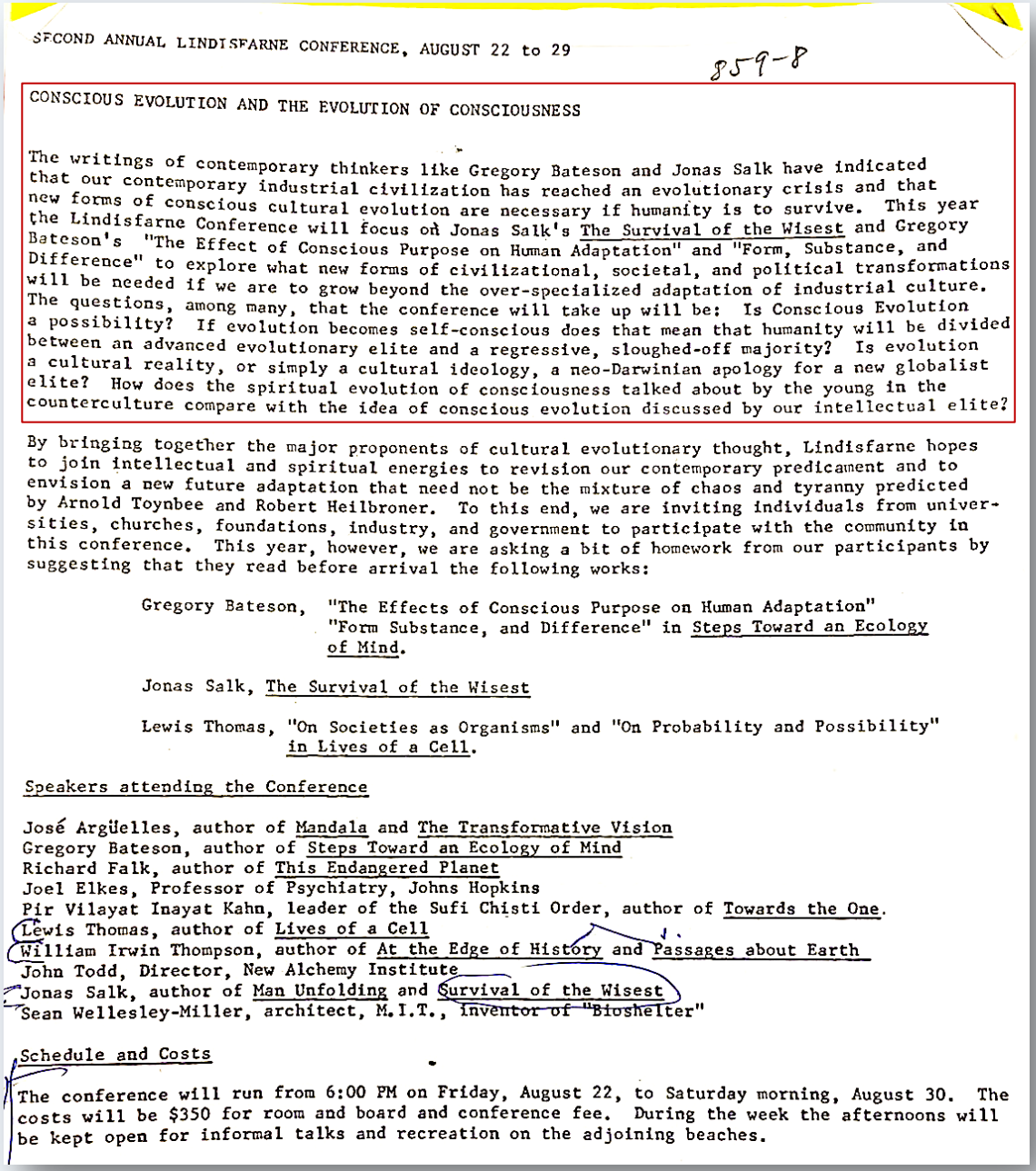
Cover: Detail from a manuscript illuminated at Lindisfarne, a monastery school founded in 634 A.D. on Holy Island in Northumbria.

The Lindsfarne Association in Southampton, Long Island, which became a physical reality in 1973, is an educational and spiritual community in which people of all ages can work and study together to achieve individual growth and societal transformation. The core of the program is instruction in the transformational disciplines of Yoga, Buddhism, and Sufism as well as in the esoteric aspects of the Judaic and Christian traditions. In accordance with the ancient Pythagorean ideal of a way of life integrating religion, science, and art, seminars are given relating the exoteric to the esoteric in art, humanities, and sciences. Although the contemplative techniques of the great universal religions are affirmed at Lindisfarne, no attempt is made to synthesize these techniques. Each day begins with group meditation followed by communal work, lectures, seminars, and workshops throughout the afternoon and evening. Each person works out his or her own combination of activities and balance between self and community. Lindisfarne grants neither degrees nor credits though other institutions have been willing to award credit for work at Lindisfarne. Fall, spring, and summer sessions are given each year; people of all ages and backgrounds are welcome. Classes may also be taken individually on a non-resident basis and visitors are welcomed if they give advance notice. Lindisfarne, a non-profit educational corporation, has neither formal application procedure nor fixed entrance requirements. Each person is considered individually and carefully, so a visit, telephone call or detailed letter is important. For further information about courses, activities, and costs please call (516) 283-8210 or write: The Lindisfarne Association, 50 Fishcove Road, Southampton, New York 11968.

—Gregory Bateson papers, University of California/Santa Cruz

CONSCIOUS EVOLUTION AND THE EVOLUTION OF CONSCIOUSNESS

The writings of contemporary thinkers like Gregory Bateson and Jonas Salk have indicated that our contemporary industrial civilization has reached an evolutionary crisis and that new forms of conscious cultural evolution are necessary if humanity is to survive. This year the Lindisfarne Conference will focus on Jonas Salk's *The Survival of the Wisest* and Gregory Bateson's "The Effect of Conscious Purpose on Human Adaptation" and "Form, Substance, and Difference" to explore what new forms of civilizational societal and political transformations will be needed if we are to grow beyond the over-specialized adaptation of industrial culture. The questions, among many, that the conference will take up will be: Is Conscious Evolution a possibility? If evolution becomes self-conscious does that mean that humanity will be divided between an advanced evolutionary elite and a regressive sloughed-off majority? Is evolution a cultural reality, or simply a cultural ideology, a neo-Darwinian apology for a new globalist elite? **How does the spiritual evolution of consciousness talked about by the young in the counterculture compare with the idea of conscious evolution discussed by our intellectual elite?**



SECOND ANNUAL LINDISFARNE CONFERENCE, AUGUST 22 to 29

859-8

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By bringing together the major proponents of cultural evolutionary thought, Lindisfarne hopes to join intellectual and spiritual energies to revision our contemporary predicament and to envision a new future adaptation that need not be the mixture of chaos and tyranny predicted by Arnold Toynbee and Robert Heilbroner. To this end, we are inviting individuals from universities, churches, foundations, industry, and government to participate with the community in this conference. This year, however, we are asking a bit of homework from our participants by suggesting that they read before arrival the following works:

Gregory Bateson, "The Effects of Conscious Purpose on Human Adaptation"
"Form Substance, and Difference" in Steps Toward an Ecology of Mind.

Jonas Salk, The Survival of the Wisest

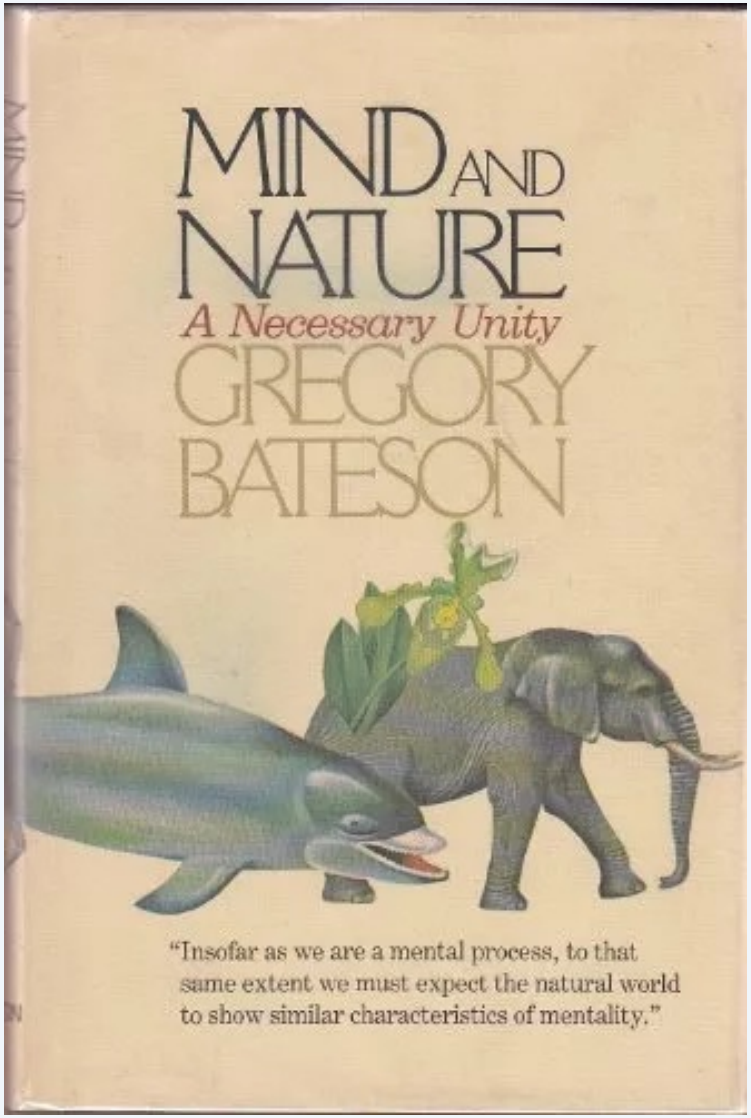
Lewis Thomas, "On Societies as Organisms" and "On Probability and Possibility" in Lives of a Cell.

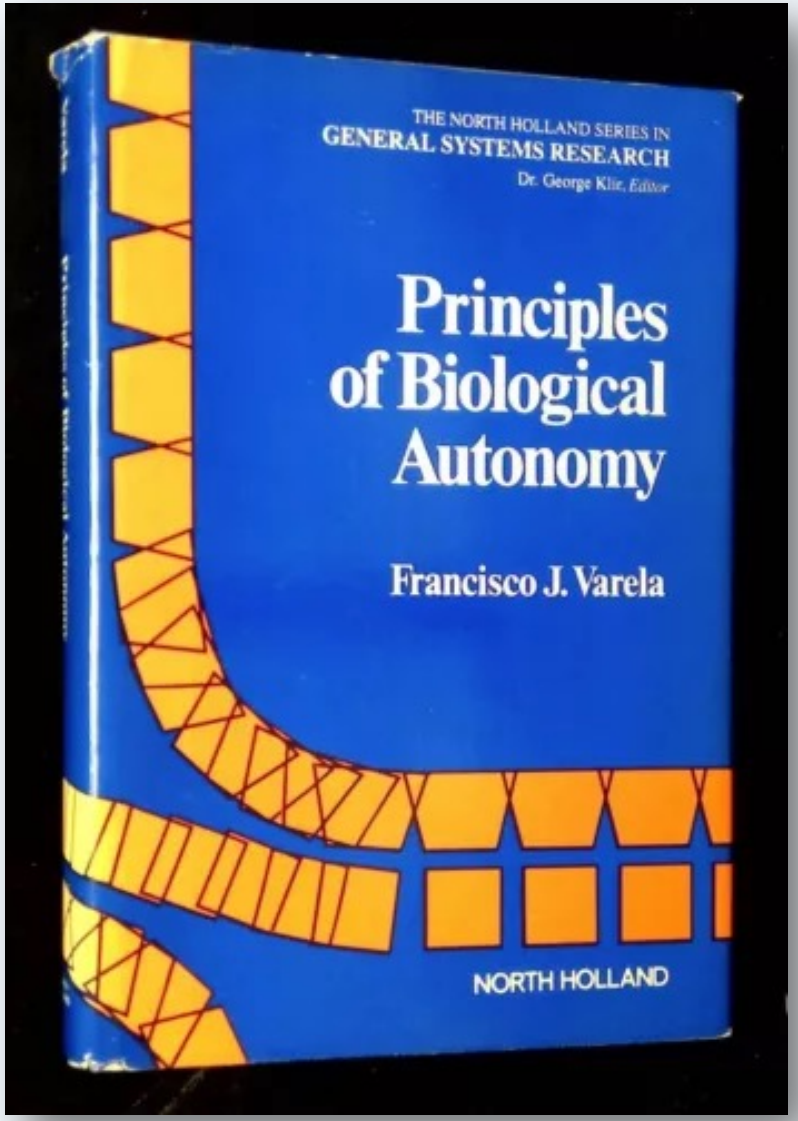
Speakers attending the Conference

José Argüelles, author of Mandala and The Transformative Vision
Gregory Bateson, author of Steps Toward an Ecology of Mind
Richard Falk, author of This Endangered Planet
Joel Elkes, Professor of Psychiatry, Johns Hopkins
Pir Vilayat Inayat Kahn, leader of the Sufi Chisti Order, author of Towards the One.
Lewis Thomas, author of Lives of a Cell
William Irwin Thompson, author of At the Edge of History and Passages about Earth
John Todd, Director, New Alchemy Institute
Jonas Salk, author of Man Unfolding and Survival of the Wisest
Sean Wellesley-Miller, architect, M.I.T., inventor of "Bioshelter"

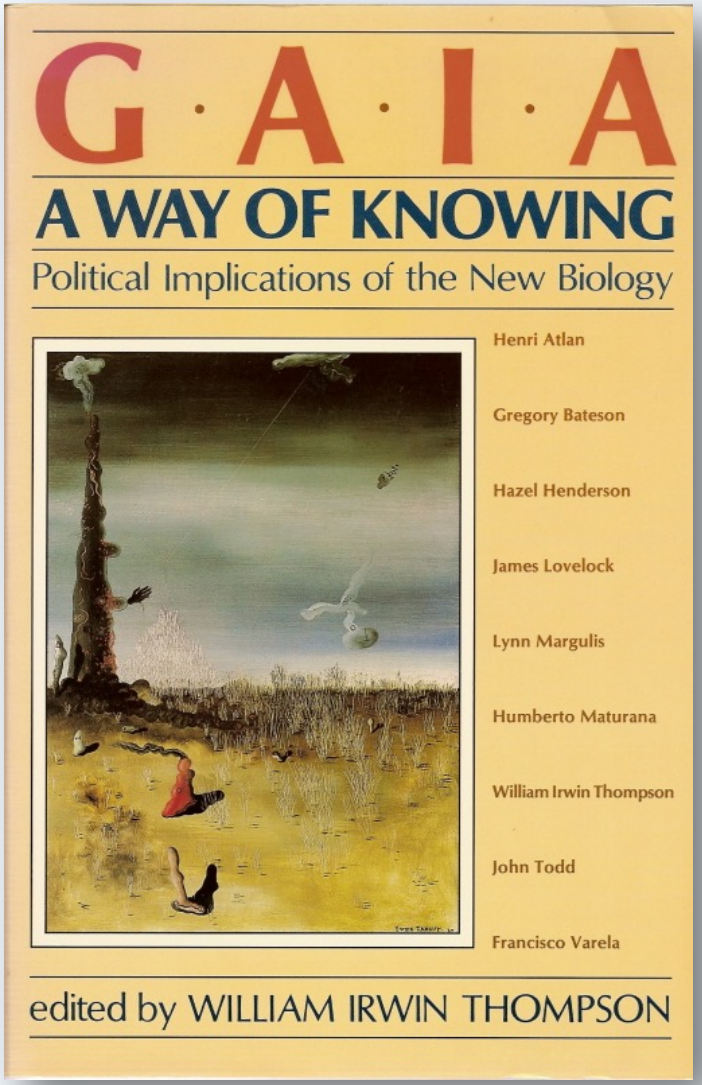
Schedule and Costs

The conference will run from 6:00 PM on Friday, August 22, to Saturday morning, August 30. The costs will be $350 for room and board and conference fee. During the week the afternoons will be kept open for informal talks and recreation on the adjoining beaches.





Completed in residence at Lindisfarne



CONTENTS

Gaia: A Way of Knowing (conference in 1981; published in 1987)

—In the concluding remarks of his "five-minute speech" at the Whole Earth Jamboree in 1978, Thompson observed the Blakean productivity of *dissensus*—"the cohabitation of incompatible systems by which and through which the forces of mutual rejection serve to integrate the apparently autonomous unities in a meta-domain that is invisible to them but still constituted by their reactive energies"— in his riff on World making in "Gaia and the Politics of Life," the concluding article in *Gaia 1: A Way of Knowing.*

What was true of Industrialization is true of Planetization. A nostalgic and false consciousness tried to camouflage the structure with a romantic content. All the artifacts and cultures of the world were miniaturized in Stewart Brand's *Whole Earth Catalog*, and although people grooved on wood stoves and fantasies of self-sufficiency, the catalog itself was absorbing everything into its giant collage. All culture was now being absorbed and miniaturized as the preparation for stuffing it into one of Stewart's beloved space colonies.

Just as the Victorians had once grooved on rose-decorated sewing machines, so people now grooved on wood stoves, windmills, and solar collectors, but the folksy nostalgia merely camouflaged the technological collectivization. When the *CoEvolution Quarterly* later openly came out in favor of Herman Kahn and O'Neill's space colonies, it showed the true skull and bones under the costume: all nature was to be turned into a potted plant in a tin can, and all culture was to be trashed into a television-sensibility collage.

But the *Whole Earth Catalog* and the *CoEvolution Quarterly* do not express the full dimensions of Planetization. In what Sri Aurobindo would call "the descent of the supra-mental," there is a new level of human consciousness which is now surrounding, absorbing, and miniaturizing the old civilized and technological consciousness. As the Supramental surrounds the old mental level, the mind becomes an artifact, and intellection becomes a mind-dance. *Ratio* becomes *logos* once again and the central icon of the econometric state, the dollar sign $ falls on its side and the bars that cross it melt and turn it into a sign for infinity.