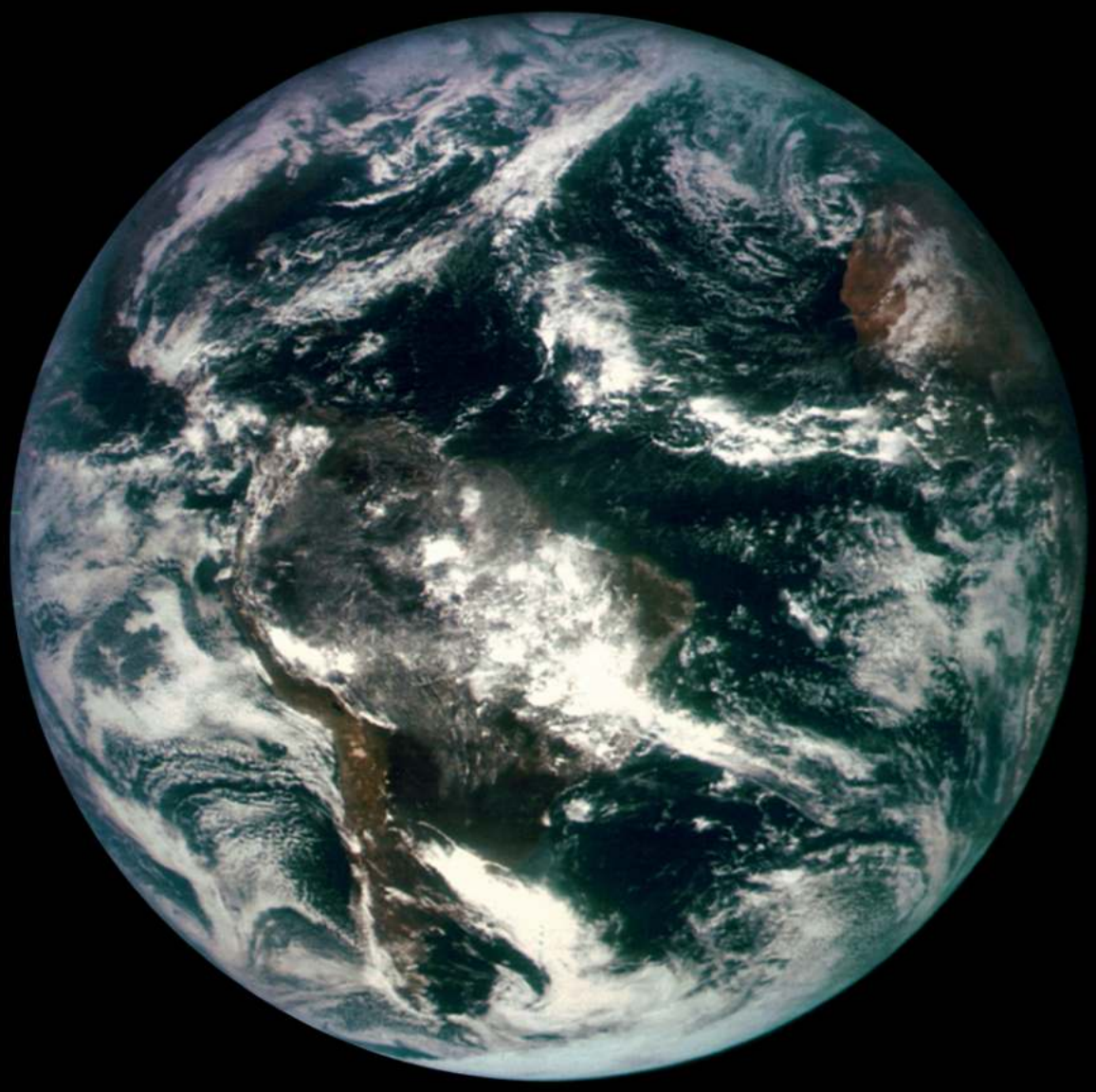
WHOLE EARTH CATALOG

access to tools



Fall 1968

$5

GREENWICH
ENTERTAINMENT
&
STRIPE
PRESS

Present

WE ARE AS GODS

A FILM ABOUT STEWART BRAND

In Theaters September 2
On Amazon and Apple TV September 6

A Film By **DAVID ALVARADO & JASON SUSSBERG**

94 min | USA | 4k cinema Dolby 5.1

[National and Regional PR Contact] **ADAM SEGAL** adam@the2050group.com

www.weareasgods.film

WE ARE AS GODS

FILM LOGLINE

"We are as gods and might as well get good at it," Stewart Brand wrote in 1968. A Zelig-like pioneer of LSD, modern environmentalism, cyberspace and futurism now urges people to use their god-like powers to fight extinction by reviving lost species, but his former allies in the environmental movement vow to stand in his way.

FILM SYNOPSIS

WE ARE AS GODS offers a deep dive into the many sides of Stewart Brand— the Zelig-like creator of The Whole Earth Catalog, an influential member of Ken Kesey's "The Merry Pranksters," and an early activist in the modern environmental movement. Brand, in his guise as cyber-utopian, coined the phrase "personal computer" and influenced many in Silicon Valley, including Steve Jobs, who have gone on to shape our modern world. Now in his 80s, Brand looks to leave a legacy for the long-term future with his efforts to rewild ecosystems by resurrecting extinct species. But his former allies believe he's gone too far.

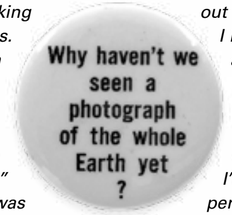
STEWART BRAND

Stewart has been at the center of some of the most influential movements of the last century: he was a Merry Prankster organizing acid tests with Ken Kesey; his LSD trip inspired the photograph that helped catalyze the modern environmental movement; he organized the first Hackers Conference; and he created the revolutionary do-it-yourself publication The Whole Earth Catalog, which Steve Jobs famously called "Google in paperback form, 35 years before Google existed." He has a showman's uncanny ability to be at the center of cultural and technological shifts. Today, he is channeling his considerable energy into one of his most ambitious projects yet: a new form of wildlife conservation using biotechnology called de-extinction.

AND MIGHT AS WELL GET GOOD AT IT.

THE WHOLE EARTH BUTTON

I'm sitting around March of 1966, and it's kind of a tedious afternoon in my apartment in North Beach. Maybe I'll just go up on the roof see what LSD does for the afternoon. So I'm looking out at San Francisco with my LSD-enhanced, fisheye lens. I imagined that the buildings that are parallel downtown are not quite parallel. They're actually slightly diverged because they're on the curved surface of the Earth. "How far up would I have to go up," I'm inquiring with this LSD mind, "before the curve of the Earth closes on itself, and the Earth is a circle?" I'm only three stories up and 100 micrograms up, but I was persuading myself that if we had an image of the Earth from space, it would change everything.



Now, at this point in '66, there's been no photograph of the Earth as a whole. What I conjured in my mind was, "I've got to get people demanding this photograph and demanding of themselves that whenever the photograph happens, it'll be an important thing to take seriously." So I conjured a button that would say,

"Why haven't we seen a photograph of the Whole Earth yet?"

That little paranoid edge in there, like maybe it had already been taken, and they're keeping it from us. Probably it had not been taken. Soviet Union might have, but they kept everything secret. The US was pretty transparent.

I sent copies of the button to all of the senators and congressmen and their secretaries. I sent them to various officials that I could find addresses of at NASA. I sent them to senior officials in the Soviet Union.

I started selling them. I had a sandwich board with a little shelf in front of it. People would come up and ask, "What's this about?"

"Well, we haven't seen a photograph of the Earth yet from space. I think it'll make a difference."

"What do you mean it will make a difference?"

"Well, what do you see when you look in the mirror?" I would ask. "This is the big mirror. We haven't really looked in it yet. So whatever it is when you first discover about yourself in the mirror, humanity may discover something about itself, looking in the big mirror."

They go, "Oh." And they'd buy a button.

— Stewart Brand

DIRECTOR'S STATEMENT

We grew up in the world that Stewart inspired through the pages of the ***Whole Earth Catalog:*** the do-it-yourself ethic that animated the Catalog, birthed a world where two lower-middle class filmmakers could create their own lives, making documentaries about some of the most fascinating and relevant personalities in science, health and technology. As Stewart wrote in the opening epigram of the Catalog, "We are as gods, and might as well get good at it." We're using filmmaking to tell gripping, character-driven narratives, aspiring to nudge (if not change) the world for the better.

We both discovered Stewart in college: David through the community ***THE EDGE,*** where Stewart was written about and participated in ***EDGE*** events, and Jason stumbled across a ragged copy of the ***Last Whole Earth Catalog,*** in a used bookstore. To a 20-year-old, it looked like an artifact from the '60s, but it felt strangely futuristic. What resonates for both of us is that Stewart embraces a technological worldview that works harmoniously with the preservation of natural systems and the environment. Paraphrasing Brian Eno, Stewart believes that technology is not ruining the environment, it's the way we can save it!

After reading Stewart's book ***The Clock of the Long Now,*** we became philosophically engaged in concepts of deep time and humankind's obligation to maintaining civilization. Stewart makes a refreshing ethical and optimistic case for being a responsible futurist. Around 2012, we started casually thinking about making a film on Stewart…then came the big de-extinction announcement. Our idea of making a film on Stewart took on a new urgency. Stewart and his merry geneticists started to wonder if biotech could be applied to conservation, and even bring back extinct species. The idea is right in our wheelhouse of profiling extraordinary people at the leading, bleeding edge of science. We contacted an editor at TIME magazine who commissioned a piece about de-extinction. We convinced Stewart to talk to us for a video in 2013, dipping our toes into the waters before diving headlong into a feature documentary in the fall of 2017.

The documentaries that we make are developed, funded, and produced outside of Hollywood. Our first film, ***The Immortalists,*** is a micro-budget indie film and ***Bill Nye: Science Guy*** was funded almost entirely by Kickstarter. We knew that we wanted to produce this film in a similar fashion, in order to have directorial freedom. We met Everett Katigbak at Stripe Press who was developing film and video alongside the press's current offering of printed matter. We partnered with Stripe, who shares Stewart's ideas on long-term thinking, concern about climate change, and belief in technology for solving complex societal issues.

We originally planned to have the film's World Premiere at SXSW in 2020, but the pandemic de facto cancelled our release. Stewart's life is timeless, so waiting a year made his arguments for long-term thinking that much more compelling. If we are to survive as a long-lived global civilization by avoiding nuclear winters, asteroids, mass extinctions, climate change, and pandemics, we need to think and behave long-term.

The idea of doing a feature film on Stewart's remarkable life, and controversial de-extinction project, seemed so cinematic, fascinating, and urgent: we're losing (and have lost) keystone species causing impoverished ecosystems; and humans are to blame. But, if we act as good gods, rather than blundering, unaware gods, we can be part of the solution.

DAVID ALVARADO

Director & Cinematographer

David is a latino director and cinematographer focusing on science, health, technology and nature. Structure Films is a New York and San Francisco based production company David co-founded along with Jason Sussberg. David's personal interests in this career are aimed at building a better world with artistic, emotional storytelling about science. He also has a personal focus on career sustainability for documentary filmmakers.

JASON SUSSBERG

Director & Sound

Jason is a San Francisco-based filmmaker focusing on the art and humanity in the sciences. He started his career working in sports television as a producer/editor for the San Francisco Giants and Golden State Warriors (unfortunately, years before they were World Champions). After receiving his M.F.A. at Stanford University, he and filmmaking partner David Alvarado founded Structure Films, a science storytelling production company.

ABOUT STRIPE PRESS

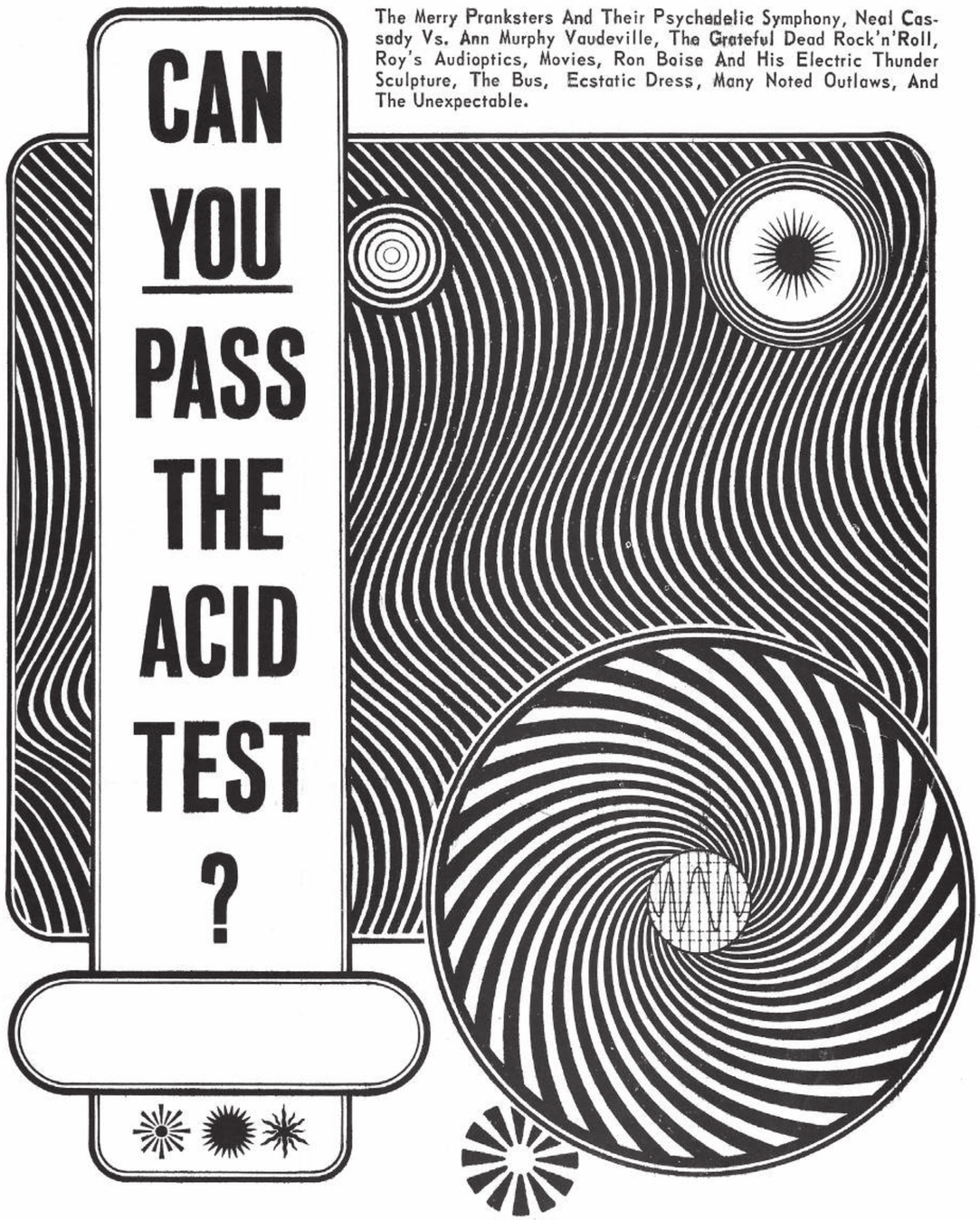
Stripe Press publishes books about economic and technological advancement to promote ideas for progress. *WE ARE AS GODS* is the first feature documentary release from Stripe Press, helmed by filmmaker and Executive Producer, Everett Katigbak.

visit **press.stripe.com**

Edited by Annukka Lilja & Ben Sozanski / Sound Design By Peter Albrechtsen, MPSE
Re-Record Mixing by Pete Horner / Animation by Chase Massingill & Adrian Winter
Original Music by Brian Eno / Cinematography By David Alvarado
Executive Producer Everett Katigbak / Executive Producer Henry S. Rosenthal
Executive Producer Gerry Ohrstrom / Executive Producer Matt Winkler
Executive Producers Lauren Driscoll & John Driscoll
Co-Executive Producers Laurie Benenson, Bill Benenson & William Eigen
Produced by David Alvarado, Kate McLean, Jamie Meltzer & Jason Sussberg
Featuring Stewart Brand / Directed by David Alvarado & Jason Sussberg

Presented by
Greenwich Entertainment & Stripe Press
A Structure Films Production
In Association with Complex Corporation
& The Redford Center

Stripe Press / STRUCTURE FILMS



FUNCTION

The WHOLE EARTH CATALOG functions as an evaluation and access device. With it, the user should know better what is worth getting and where and how to do the getting.

An item is listed in the CATALOG if it is deemed:

1) *Useful as a tool,*
2) *Relevant to independent education,*
3) *High quality or low cost,*
4) *Not already common knowledge,*
5) *Easily available by mail.*

This information is continually revised according to the experience and suggestions of CATALOG users and staff.

PURPOSE

We are as gods and might as well get good at it. So far, remotely done power and glory—as via government, big business, formal education, church—has succeeded to the point where gross defects obscure actual gains. In response to this dilemma and to these gains a realm of intimate, personal power is developing—power of the individual to conduct his own education, find his own inspiration, shape his own environment, and share his adventure with whoever is interested. Tools that aid this process are sought and promoted by the WHOLE EARTH CATALOG.

Understanding Whole Systems

Buckminster Fuller
Cosmic View
Full Earth
Earth Photographs
The World From Above
Surface Anatomy
Geology Illustrated
Sensitive Chaos
A Year From Monday
General Systems Yearbook
Synthesis of Form
On Growth and Form
Tantra Art
Psychological Reflections
The Human Use of Human Beings
The Ghost in the Machine
The Year 2000
The Futurist

Shelter and Land Use

The Dymaxion World of Buckminster Fuller
Space Structures
Tensile Structures, Volume One
Dome Cookbook
Good News
Architectural Design
The Japanese House
Audel Guides
Alaskan Mill
Village Technology
The Indian Tipi
Tipis
Aladdin Kerosene Lamps
Man's Role in Changing the Face of the Earth
Two Mushroom Books
Organic Gardening
ABC and XYZ of Bee Culture
Universal Mill

Industry and Craft

The Way Things Work
Introduction to Engineering Design
The Measure of Man
Thomas Register of American Manufacturers
New Scientist
Scientific American
Industrial Design
Product Engineering
Clearinghouse
Science and Civilization in China, Volume IV, Part 2
Silvo Catalog
Brookstone Tools
Jensen Tools
Miners Catalog
Blasters' Handbook
Direct Use of the Sun's Energy
Structure, Form and Movement
Van Waters & Rogers
Bookmaking
Zone System Manual
A Sculptor's Manual
Creative Glass Blowing
Buckskin
Cut Beads
Melrose Yarns

Communications

Human Biocomputer
The Mind of the Dolphin
Information
9100A Computer
Cybernetics
Eye and Brain
Design for a Brain
Education Automation
Intelligent Life in the Universe
The McGraw-Hill Encyclopedia of Space
Lafayette and Allied Catalogs
Heathkit
Modern Business Forms
American Cinematographer
American Cinematographer Manual
The Technique of Documentary Film Production
The Technique of Television Production
Auto Repair Manual
Books
Subject Guide to Books in Print
Art Prints

Community

The Modern Utopian
The Realist
Green Revolution
Kibbutz: Venture in Utopia
Dune
Groups Under Stress
The Merck Manual
Land for Sale
Consumer Reports
Government Publications
The Armchair Shopper's Guide
How to Get 20% to 90% off on Everything You Buy

Nomadics

Innovator
The Retreater's Bibliography
The Book of Survival
The Survival Book
Survival Arts of the Primitive Paiutes
Camping and Woodcraft
Light Weight Camping Equipment and How to Make It
Backpacking
L.L. Bean
Recreational Equipment
Gerry Outdoor Equipment
Kaibab Boots
Hot Springs
The Explorers Trademart Log
National Geographic
Sierra Club
The Narrow Road to the Deep North
Trout Fishing in America

Learning

Toward a Theory of Instruction
The Black Box
THIS Magazine is about Schools
Cuisenaire Rods
ITA
LIFE Science Library
Kaiser Aluminum News
700 Science Experiments for Everybody
Edmund Scientific
WFF 'N PROOF
Dr. Nim
We Built Our Own Computers
American Boys Handy Book
Pioneer Posters
Sense Relaxation
Zen Flesh, Zen Bones
Meditation Cushions and Mats
Self Hypnotism
Psycho-cybernetics
A Yaqui Way of Knowledge
Fundamentals of Yoga
The Act of Creation
The I Ching

CATALOG procedure

Ordering from the CATALOG

The CATALOG functions primarily as a pointer rather than a seller and prefers to be absent from most of the transactions it encourages.

Address orders to the supplier given with the item unless you know of a better one [if you do, let us know]; if the price is not listed postpaid find out the postage or express cost from the supplier's location to yours [consult post office or express agency for rates]; add state tax if transaction is within your state; and send check or money order with your order.

If the supplier gives you poor service, let us know. That information can be added to his review.

Blank order envelopes are provided at the back of the CATALOG for your convenience and so that suppliers have some idea of the CATALOG's effect on their business — if strong enough it may result in price or service advantages to CATALOG users. Don't use the envelopes if you don't want to.

With some indicated items, books mostly, the CATALOG also will ship. There is no price difference with the service; the CATALOG gets the markup instead of the other guy, is all. For west coast orders it may mean faster service.

Generally, the closer the supplier is to you, the quicker and cheaper the shipping will be. If the item you're getting is at all delicate [Don Buchla tells us], or if you are in a hurry, air express is the best deal. REA mangles..

Anything overseas, do by air.

Subscribing to the CATALOG

$8.00 per year. This includes Fall and Spring issues of the CATALOG and four Supplements. Subscription forms are on page 63. Memorize your zip code.

Suggesting

The validity of the information in the CATALOG is only as good as the transmitted experience of users. For any item, we have to

- *Learn about it.*
- *Get thorough information on it, and*
- *Stay current with its changes and with the improvements of its competitors.*

FROM YOUR EXPERIENCE
HOW WOULD YOU ALTER

per catalog	*THIS CATALOG*
per category	*THESE ITEMS*
per item	*THIS REVIEW*

Reviewing

The CATALOG pays its reviewers $10 an item for: getting familiar with the item, its usefulness, and its competition; evaluating the item; selecting samples of graphics or text (with page references) for the review; and writing a 200 – 300 word review.

Both reviewers and first suggestors of items are credited in the CATALOG.

We invite reviews that improve on present reviews or accompany suggestions for new items. On acceptance for publication reviewers will be paid $10 per accepted review. Unused reviews will not be returned. Polish of submitted material is irrelevant unless it is meant to be camera-ready.

New items that have had some favorable comment, and that we want reviews for, will be listed in the Supplement.

Corresponding

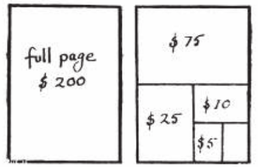
If the content of the WHOLE EARTH CATALOG is mostly products, the content of the Difficult But Possible Supplement is mostly processes.

Commentary from CATALOG users that is of general interest — and not a specific review — will be in the Supplement. Critical comments, new design processes, no-cash techniques, news of specific enterprises, useful fantasies, design student work, time and trouble shortcuts, new uses for common or exotic materials, other realms for the CATALOG to consider, etc., etc., — all welcome. The Supplement could wind up being more useful than the CATALOG.

Advertising

Suppliers, manufacturers, creators of listed items are eligible to advertise in the CATALOG. They may advertise only an item listed or their own catalog. All ads are placed at the back of the book. There are no ads in the Supplement.

Rates:



Selling

The CATALOG and Supplement are available for resale at 50% discount — minimum order 5. Single copy list price of the CATALOG is $5; the Supplement, $2.

Donating

Portola Institute, Inc. is a tax-exempt, non-profit corporation. Donations to Portola or the CATALOG may be deducted.

Retaining subscriptions to the CATALOG are $25 for one year ($17 tax deductible). Sustaining subscriptions are $100+ per year ($92+ tax deductible). Names of retaining and sustaining subscribers will be given in the CATALOG.

CATALOG policy with suppliers and users

The CATALOG is under no obligation to suppliers. Users are under no obligation to the CATALOG.

Suppliers (manufacturers, creators, etc.) may not buy their way into the CATALOG. Free Samples or other blandishments are cheerfully accepted by CATALOG researchers; response not predictable. No payment for listing is asked or accepted. We owe accurate information exchange to suppliers, but not favors.

Our obligation is to CATALOG users and to ourselves to be good tools for one another.

This Issue *of the CATALOG, the first, is heavy on books because they are easy to start with (low cost, simple to get and evaluate). As more CATALOG users report in and we develop better facilities to try stuff out, later issues should contain more information on materials.*

This issue of the CATALOG was prepared by:

Stewart Brand
Sandra Tcherepnin
Joe Bonner

with	
Jane Burton	*Steve Baer*
James Fadiman	*Steve Durkee*
Richard Raymond	*Ralph Metzner*
Larry McCombs	*Gurney Norman*
	Robert Albrecht

We are grateful to Ortega Park Teachers Laboratory for temporary use of their mountain idyll for production space.

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CATALOG	*November*
Supplement	*January*
Supplement	*March*
CATALOG	*May*
Supplement	*July*
Supplement	*September*

Preparation of the CATALOG was done on an IBM Selectric Composer and a Polaroid MP-3 camera with instant half-tone system. Nowel Publications, Menlo Park, printed the contents, and East Wind Printers, San Francisco, printed the cover.

Subscription rate: one year — $8. Application to mail at second class postage rates is pending at Menlo Park, California.

Buckminster Fuller

The insights of Buckminster Fuller are what initiated this catalog.

Of the four books reviewed here, Nine Chains to the Moon is his earliest and most openly metaphysical, Ideas and Integrities his most personal, No More Secondhand God the most recent, World Design Science Decade the most programmatic.

People who beef about Fuller mainly complain about his repetition — the same ideas again and again, it's embarassing. It is embarassing, also illuminating, because the same notions take on different uses when re-approached from different angles or with 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 illuson language got him in trouble, and he returned to human communication with a redesigned instrument.

With that, empirical curiosity, and New England perseverance Fuller has forged one of the most original personalities and functional intellects of the age.

I see God in
the instruments and the mechanisms that
work
reliably,
more reliably than the limited sensory departments of
the human mechanism.

And God says
observe the paradox
of man's creative potentials
and his destructive tactics.
He could have his new world
through sufficient love
for "all's fair"
in love as well as in war
which means you can
junk as much rubbish,
skip as many stupid agreements
by love,
spontaneous unselfishness radiant.

The revolution has come—
set on fire from the top.
Let it burn swiftly.
Neither the branches, trunk, nor roots will be endangered.
Only last year's leaves and
the parasite-bearded moss and orchids
will not be there
when the next spring brings fresh growth
and free standing flowers.

Here is God's purpose—
for God, to me, it seems,
is a verb
not a noun,
proper or improper;
is the articulation
not the art, objective or subjective;
is loving,
not the abstraction "love" commanded or entreated;
is knowledge dynamic,
not legislative code,
not proclamation law.
not academic dogma, not ecclesiastic canon.
Yes, God is a verb,
the most active,
connoting the vast harmonic
reordering of the universe
from unleashed chaos of energy.
And there is born unheralded
a great natural peace,
not out of exclusive
pseudo-static security
but out of including, refining, dynamic balancing.
Naught is lost.
Only the false and nonexistent are dispelled.

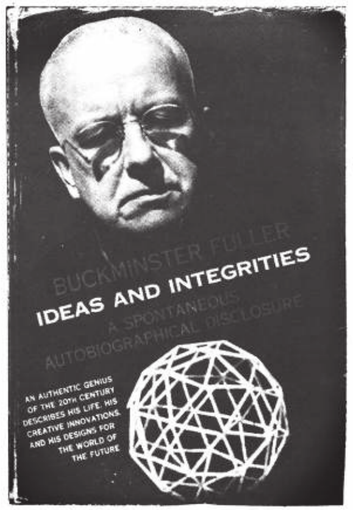
And I've thought through to tomorrow
which is also today.
The telephone rings
and you say to me
Hello Buckling this is Christopher; or
Daddy it's Allegra; or
Mr. Fuller this is the Telephone Company Business Office;
and I say you are inaccurate.
Because I knew you were going to call
and furthermore I recognize
that it is God who is "speaking."

And you say
aren't you being fantastic?
And knowing you I say no.

All organized religions of the past
were inherently developed
as beliefs and credits
in "second hand" information.

Therefore it will be an entirely new era
when man finds himself confronted
with direct experience
with an obviously a priori
intellectually anticipatory competence
that has interordered
all that he is discovering.

[No More Secondhand God]



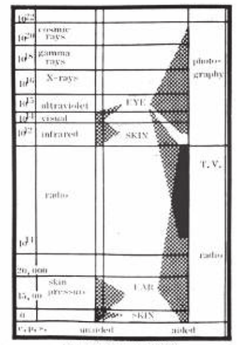
Ideas and Integrities
Buckminster Fuller
1963; 318 pp.

$10.00 postpaid

from:
Prentice-Hall, Inc.
Englewood Cliffs
New Jersey 07631
or
WHOLE EARTH CATALOG

Standing by the lake on a jump-or-think basis, the very first spontaneous question coming to mind was, "If you put aside everything you've ever been asked to believe and have recourse only to your own experiences do you have any conviction arising from those experiences which either discards or must assume an a priori greater intellect than the intellect of mankind?" The answer was swift and positive. Experience had clearly demonstrated an a priori anticipatory and only intellectually apprehendable orderliness of interactive principles operating in the universe into which we are born. These principles are discovered but are never invented by man. I said to myself, "I have faith in the integrity of the anticipatory intellectual wisdom which we may call 'God.'" My next question was, "Do I know best or does God know best whether I may be of any value to the integrity of universe?" The answer was, "You don't know and no man knows, but the faith you have just established out of experience imposes recognition of the a priori wisdom of the fact of your being." Apparently addressing myself, I said, "You do not have the right to eliminate yourself, you do not belong to you. You belong to the universe. The significance of you will forever remain obscure to you, but you may as sume that you are fulfilling your significance if you apply yourself to converting all your experience to highest advantage of others. You and all men are here for the sake of other men."

[Ideas and Integrities]



RELATIONSHIP OF MAN TO ELECTROMAGNETIC SPECTRUM

WDSD Document 1

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

$2.45 postpaid

No More Secondhand God
Buckminster Fuller
1963; 163 pp.

$2.25 postpaid

both from:
Southern Illinois University Press
600 West Grand
Carbondale, Illinois 62903
or
WHOLE EARTH CATALOG

Thinking is a putting-aside, rather than a putting-in discipline, e.g., putting aside the tall grasses in order to isolate the trail into informative viewability. Thinking is FM—frequency modulation—for it results in tuning-out of irrelevancies as a result of definitive resolution of the exclusively tuned-in or accepted feed-back messages' pattern differentiatability.

["Omnidirectional Halo" No More Secondhand God]

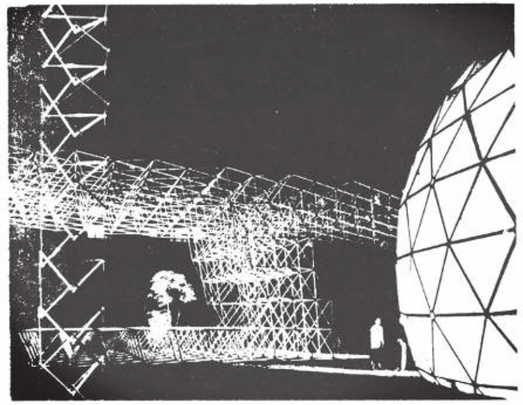
Common to all such "human" mechanisms—and without which they are imbecile contraptions—is their guidance by a phantom captain.

This phantom captain has neither weight nor sensorial tangibility, as has often been scientifically proven by careful weighing operations at the moment of abandonment of the ship by the phantom captain, i.e., at the instant of "death." He may be likened to the variant of polarity dominance in our bipolar electric world which, when balanced and unit, vanishes as abstract unity I or O. With the phantom captain's departure, the mechanism becomes inoperative and very quickly disintegrates into basic chemical elements.

This captain has not only an infinite self-identity characteristic but, also, an infinite understanding. He has furthermore, infinite sympathy with all captains of mechanisms similar to his. . . . .

An illuminating rationalization indicated that captains —being phantom, abstract, infinite, and bound to other captains by a bond of understanding as proven by their recognition of eachother's signals and the meaning thereof by reference to a common direction (toward "perfect")—are not only all related, but are one and the same captain. Mathematically, since charactistics of unity exist, they cannot be non-identical.

[Nine Chains to the Moon]



World society has throughout its millions of years on earth made its judgements upon visible, tangible, sensorially demonstrable criteria. We may safely say that the world is keeping its eye on the unimportant visible 1 percent of the historical transformation while missing the significance of the 99 percent of overall, unseen changes. Forms are inherently visible and forms no longer can "follow functions" because the significant functions are invisible. . . . .

There are very few men today who are disciplined to comprehend the totally integrating significance of the 99 percent invisible activity which is coalescing to reshape our future. There are approximately no warnings being given to society regarding the great changes ahead. There is only the ominous general apprehension that man may be about to annihilate himself. To the few who are disciplined to deal with the invisibly integrating trends it is increasingly readable in the trends that man is about to become almost 100 percent successful as an occupant of universe.

Our Air Force Redomes were installed in the arctic mostly by eskimos and others who had never seen them before. The mass production technology made assembly possible at an average rate of 14 hours each. One of these radomes was loaned by the U.S. Air Force to the Museum of Modern Art in New York City for an exhibition of my work in 1959-1960. It took regular building trades skilled labor one month to assemble the dome in New York City.

WDSD Document 2

I define 'synergy' as follows: Synergy is the unique behavior of whole systems, unpredicted by behavior fo their respective subsystems' events.

[Ideas and Integrities]

selfishness (self-preoccupation pursued until self loses its way and self-generates fear and spontaneous random surging, i.e. panic, the plural of which is mob outburst in unpremeditated wave synchronization of the individually random components)

[No More Secondhand God]

To start off with it is demonstrated in the array of events which we have touched on that we don't have to " earn a living" anymore. The "living" has all been earned for us forever. Industrialization's wealth is cumulative in contradistinction to the inherently terminal, discontinuous, temporary wealth of the craft eras of civilization such as the Bronze Age or Stone Age. If we only understood how that cumulative industrial wealth has come about, we could stop playing obsolete games, but that is a task that cannot be accomplished by political and social reforms. Man is so deeply conditioned in his reflexes by his milleniums of slave functioning that he has too many inferiority complexes to yield to political reformation. The obsolete games will be abandoned only when realistic, happier and more interesting games come along to displace the obsolete games.

[WDSD Document 3]

Tension and Compression are complementary functions of structure. Therefore as functions they only co-exist. When pulling a tensional rope its girth contracts in compression. When we load a column in compression its girth tends to expand in tension. When we investigate tension and compression, we find that compression members, as you all know as architects, have very limited lengths in relation to their cross sections. They get too long and too slender and will readily break. Tension members, when you pull them, tend to pull, approximately, (almost but never entirely), straight instead of trying to curve more and more as do too thin compressionally loaded columns. The contraction of the tension members in their girth, when tensionally loaded, brings its atoms closer together which makes it even stronger. There is no limit ratio of cross section to length in tensional members of structural systems. There is a fundamental limit ratio in compression. Therefore when nature has very large tasks to do, such as cohering the solar system or the universe she arranges her structural systems both in the microcosm and macrocosm in the following manner. Nature has compression operating in little remotely positioned islands, as high energy concentrations, such as the earth and other planets, in the macrocosm; or as islanded electrons, or protons or other atomic nuclear components in the microcosm while cohering the whole universal system, both macro and micro, of mutually remote, compressional, and oft non-simultaneous, islands by comprehensive tension; – compression islands in a non-simultaneous universe of tension. The Universe is a tensegrity.

[WDSD Document 2]

I was born cross-eyed. Not until I was four years old was it discovered that this was caused by my being abnormally farsighted. My vision was thereafter fully corrected with lenses. Until four I could see only large patterns, houses, trees, outlines of people with blurred coloring. While I saw two dark areas on human faces, I did not see a human eye or a teardrop or a human hair until I was four. Despite my new ability to apprehand details, my childhood's spontaneous dependence only upon big pattern clues has persisted. . . . . .

I am convinced that neither I nor any other human, past or present, was or is a genius. I am convinced that what I have every physically normal child also has at birth. We could, of course, hypothesize that all babies are born geniuses and get swiftly de-geniused. Unfavorable circumstances, shortsightedness, frayed nervous systems, and ignorantly articulated love and fear of elders tend to shut off many of the child's brain capability valves. I was lucky in avoiding too many disconnects.

There is luck in everything. My luck is that I was born cross-eyed, was ejected so frequently from the establishment that I was finally forced either to perish or to employ some of those faculties with which we are all endowed—the use of which circumstances had previously so frustrated as to have to put them in the deep freezer, whence only hellishly hot situations could provide enough heat to melt them back into usability.

[WDSD Document 5]

In the 1920's with but little open country highway mileage in operation, automobile accidents were concentrated and frequently occurred within our urban and suburban presence. Witnessing a number of accidents, I observed that warning signs later grew up along the roads leading to danger points and that more traffic and motorcycle police were put on duty. The authorities tried to cure the malady by reforming the motorists. A relatively few special individual drivers with much experience, steady temperament, good coordination and natural tendency to anticipate and understand the psychology of others emerged as "good" and approximately accident-free drivers. Many others were accident prone.

In lieu of the after-the-fact curative reform, trending to highly specialized individual offender case histories, my philosophy urged the anticipatory avoidance of the accident potentials through invention of generalized highway dividers, grade separaters, clover leafing and adequately banked curves and automatic traffic control stop-lighting systems. I saw no reason why the problem shouldn't be solved by preventative design rather than attempted reforms. My resolve: Reshape environment; don't try to reshape man.

[WDSD Document 1]

The Honeywell edition of Fuller's world map (more brightly colored than previous editions) is available for

$4.00 postpaid

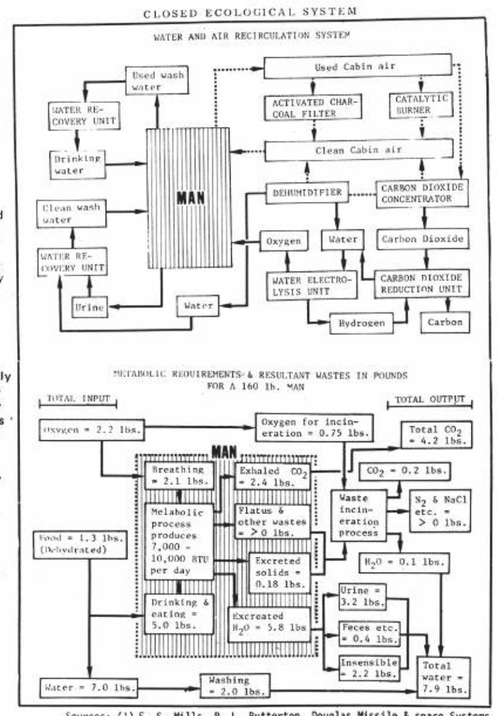
from:
P.O. Box 909
Carbondale, Illinois 62901

However,
man unconcernedly sorting mail on an express train
with unuttered faith that
the engineer is competent ,
that the switchmen are not asleep,
that the track walkers are doing their job,
that the technologists
who designed the train and the rails
knew their stuff,
that the thousands of others
whom he may never know by face or name
are collecting tariffs,
paying for repairs,
and so handling assets
that he will be paid a week from today
and again the week after that,
and that all the time
his family is safe and in well being
without his personal protection
constitutes a whole new era of evolution—
the first really 'new'
since the beginning of the spoken word.
In fact, out of the understanding
innate in the spoken word
was Industrialization wrought
after milleniums
of seemingly whitherless spade work.

[The Unfinished Epic of Industrialization]

The Unfinished Epic of Industrialization
Buckminster Fuller 1963; 227 pp

$3.50 from World Resources Inventory
Box 909, Carbondale, Illinois 62901



Sources: (1) E. S. Mills, R. L. Butterton, Douglas Missile & space Systems Development Interplanetary Mission Life Support System, 1965.
(2) NASA: ASD Report TR 61-363.

WDSD Document 6

Concept Twelve – SELF DISCIPLINES

Working assumptions, cautions, encouragements, and restraints of intuitive formulations and spontaneous actions. My own rule: "Do not mind if I am not understood as long as I am not misunderstood."

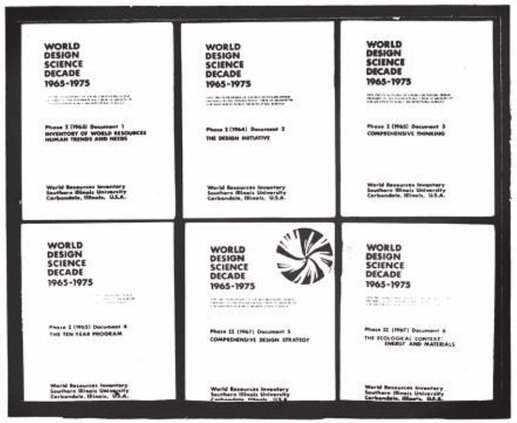
Personal Self Disciplining. In 1927 I gave up forever the general economic dictum of society, i.e. that every individual who wants to survive must earn a living . I substituted, therefore, the finding made in concept one, i.e. the individual's antientropic responsibility in universe. I bought for the tasks that needed to be done that no one else was doing or attempting to do, which if done would physically and economically advantage society and eliminate pain.

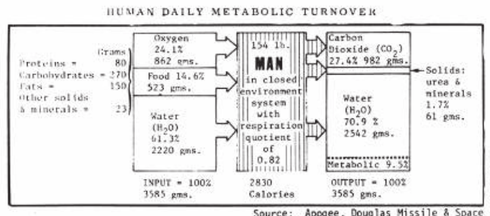
As a consequence, it was necessary for me to discipline my faculties to develop technical and scientific capability to invent the physical innovations and their service industry logistics.

My Recommendations 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

[WDSD Document 5]





Source: Apogee, Douglas Missile & Space Publication No. 4, 1961. p. 8.

The *World Design Science Decade* documents contain some that is in the other books and much that isn't. The 6 volume set costs **$10.50** postpaid to students (formal and informal); **$30.00** postpaid to others.
This is a very good deal.

Order from:
World Resources Inventory Office
P.O. Box 909
Carbondale, Illinois 62901
or WHOLE EARTH CATALOG
Size: 35 x 20 inches

We find that original question asking is a consequence of interferences, whether in the computer or the human brain. We find then that original questions are second derivative events in the computer life.

[WDSD Document 2]

The will of history reads "for everybody or for nobody," and since we balk at "for nobody" it has to be "for everybody". And that's the way it is going, lickety-split and the world around.

[WDSD Document 3]

Cosmic View

"The Universe in 40 Jumps" is the subtitle of the book. It delivers.

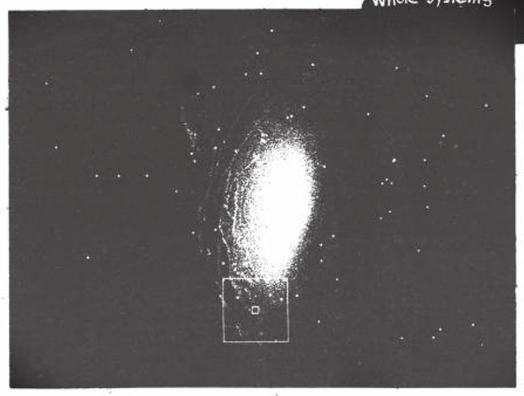
The man who conceived and rendered it, a Dutch schoolmaster named Kees Boeke, gave years of work to perfecting the information in his pictures. The result is one of the simplest, most thorough, inescapable mind blows ever printed. Your mind and you advance in and out through the universe, changing scale by a factor of ten. It very quickly becomes hard to breath, and you realize how magnitude-bound we've been.

I'm amazed this book isn't more commonly available. It's the best seller of The Whole Earth Truck Store. People get it for their friends.

Cosmic View
Kees Boeke
1957; 48 pp.

$3.75 postpaid

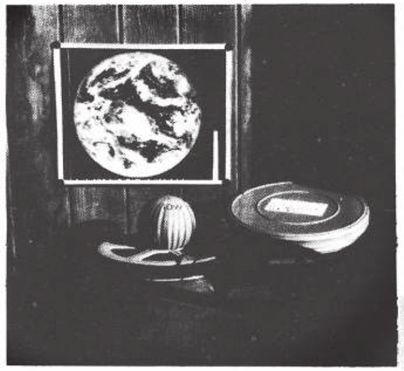
from:
The John Day Company
62 West 45th Street
New York, N.Y.
or
WHOLE EARTH CATALOG



Full Earth

In November 1967 an ATS satellite whose funds phenomenally had not been cut made a home movie. It was a time lapse film of the Earth rotating, shot from 23,000 miles above South America. (This is synchronous distance. The satellite orbits at the same speed the Earth turns, so it remains apparently stationary over one point of the equator.) Color photographs of the Earth were transmitted by TV every ½ hour to make up a 24 hour sequence. The shots were lap dissolved together to make the movie. You see darkness, then a crescent of dawn, then advancing daylight and immense weather patterns whorling and creeping on the spherical surface, then the full round mandala Earth of noon, then gibbous afternoon, crescent twilight, and darkness again.

A 16mm 400-foot silent color print of the film includes several forms of the 24-hour cycle and close-up cropping of specific sectors as their weather develops through the day.



The film (NR 68 - 713) costs

$48.94 plus shipping

from:
Byron Motion Pictures
65 K Street NE
Washington, D.C. 20002

An 8 x 10 color print of the full earth (68-HC-74) costs

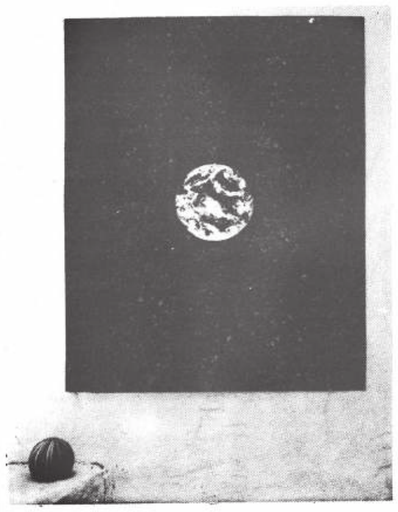
$5.64 postpaid

from:
Creative Arts Studio, Inc.
814 H Street, NW
Washington, D.C. 20001

Color Posters (22 x 27) of the full earth photographs may be ordered from the WHOLE EARTH CATALOG for

$2.00 postpaid.

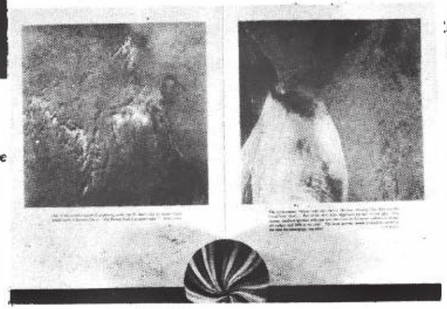
The posters are available for resale (minimum order 5) at 50% discount.



Earth Photographs

NASA SP. 129 is a hell of a book. Two hundred forty-three full page color photograpns of our planet from the Gemini flights of 1965. If it were a Sierra Club book, and it could be, it would cost $25. It costs $7.

There are numerous discoveries in the book. One is that this beautiful place is scarcely inhabited at all.



Earth Photographs from Gemini III, IV, and V.
NASA
1967; 266 pp.

$7.00 postpaid

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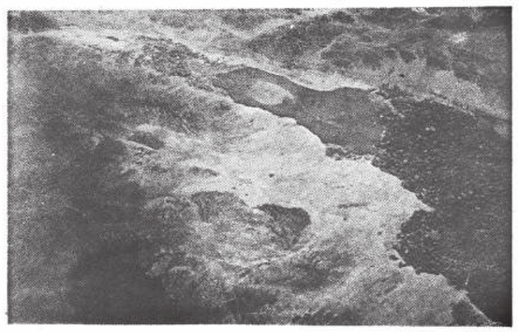
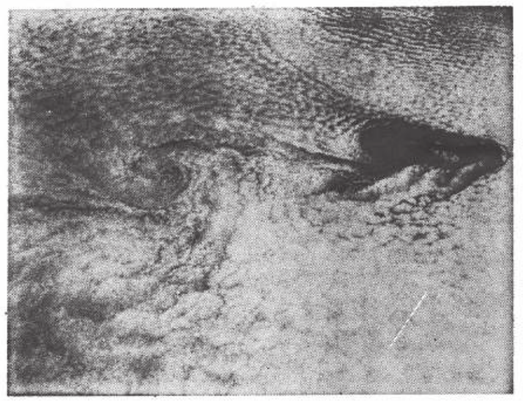
Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402
or
WHOLE EARTH CATALOG



A second photograph of California's Imperial Valley giving a clear view of the Salton Sea. No agreement exists concerning the cause of the gyre seen in the center of the sea.
8-63-43748



The World From Above

Close-up glamor shots of the Earth. Mystery shots (What is that ? What's our altitude above it, 10 feet or 10,000 ?) (Fold out captions tell all.) Good traffic flow pattern shots: surface anatomy of civilization. Not a bad compendium; it'll do until they reprint E.A. Gutkind's Our World From the Air.

The World From Above

Hanns Reich
1966; 88 pictures

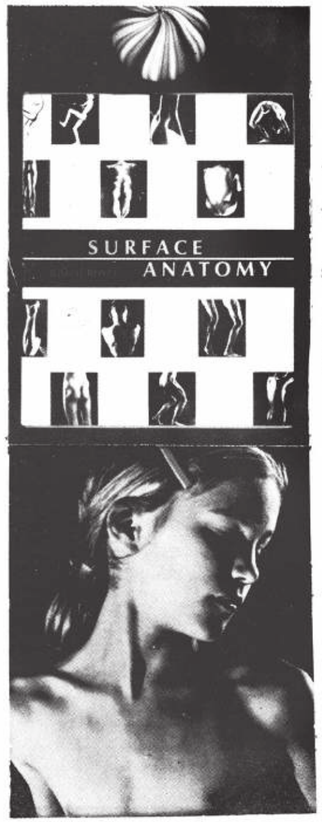
$7.50 postpaid

from:
Hill and Wang, Inc.
141 Fifth Avenue
New York, N.Y. 10010
or
WHOLE EARTH CATALOG

Surface Anatomy

This book is included as a companion piece to the Earth picture books. The whole lovely system of the human creature, seen from without, surface by surface, is here. One of its main revelations is how cliché ridden our usual views of ourselves are — we are still not good with mirrors (satellites were up 10 years before we got a full view of the Earth). Posing friends and neighbors, with a simple light set-up and a 35mm camera, Joseph Royce has shot the most beautiful human album I know.

It also teaches anatomy.



Surface Anatomy

Joseph Royce
1965; 124 photographs
and some diagrams

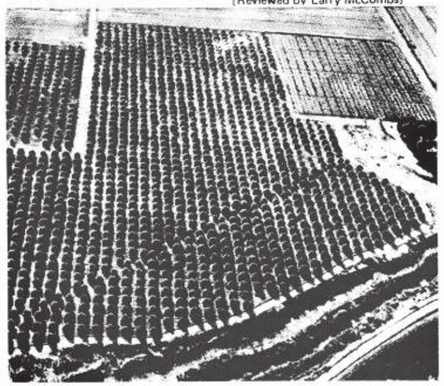
$12.50 postpaid

from:
F.A. Davis Company
1914 Cherry Street
Philadelphia, Pa 19103
or
WHOLE EARTH CATALOG

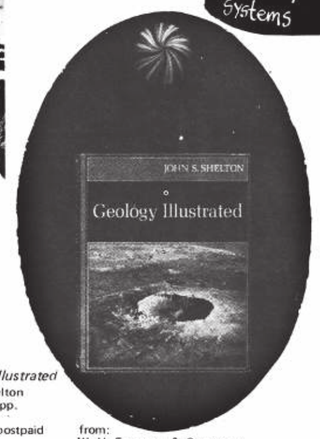
Geology Illustrated

A artist of aerial photography, Shelton uses some 400 of his finest photos to illuminate a discussion of the whole-earth system. Not a traditional textbook, but a fascinating exploration of the problems posed by asking "How did that come about?" Worth buying for the photos and book design alone, but you'll probably find yourself becoming interested in geology regardless of your original intentions.

[Reviewed by Larry McCombs]



As a means of communicating geological concepts, the pictures are fully as important as the words that accompany them. On most pages the photographs represent the facts, the words supply the interpretation. Many of the illustrations will, therefore, repay a little of the kind of attention that would be accorded the real feature in the field. In keeping with this, almost no identifying marks have been placed on the photographs and very few on the drawings. The text (which almost invariably concerns an illustration on the same or a facing page) serves as an expanded legend for the picture; if, while reading it, it is necessary to look more than once to identify some feature with certainty, this is no more than Nature asks of those who contemplate her unlabelled cliffs and hills.



Geology Illustrated
John S. Shelton
1966; 434 pp.

$10.00 postpaid

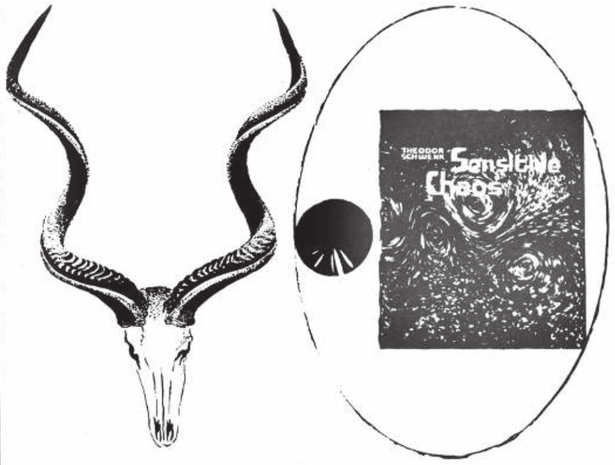
from:
W. H. Freeman & Company
660 Market Street
San Francisco, Ca 94104
or
WHOLE EARTH CATALOG

Sensitive Chaos

Schwenk directs an instute in the Black Forest devoted to the study of the movements of water and air. Within the last few centuries, he says we have "lost touch with the spiritual nature of water." As a result, we have attempted to control the fluids in ways contrary to their nature, and the results are evident in the problems of pollution, damage to the ecosystem, and even drying up of natural water sources. Schwenk attempts attempts to penetrate beyond the mere observable phenomena to an ability to "read" the true spiritual nature of flowing substances.

I found the book to be a peculiarly fascinating mixture of overgeneralization, simplification, undifferentiated fact and theory, and shrewd observation and insight. If you regard analogy as the weakest form of argument, this book is definitely not for you. On the other hand, Schwenk's juxtaposition of similar forms in different flowing media may spark some exciting bisociations, if you are open to them. The section of 88 pages of black and white photos at the back of the book could stand alone as a beautiful art collection.

[Reviewed by Larry McCombs]



Here too the form of the vortex seems to hover invisibly over the growth processes, even before the horns are actually there, for they proceed along this spiral path with mathematical exactitude in their annual growth. It is significant that the axes of the two spiralling horns meet either in the nose or the eyes or in their immediate vicinity, a fact which stresses the strong connection of the horns with sense perception and with the animal's sense of its surroundings. Furthermore, in structure, the horn, like the water vortex, is finely laminated, layer upon layer.

Sensitive Chaos
Theodor Schwenk
1965; 144 pp. 88 plates

$12.00 [Air postpaid]

from:
Rudolf Steiner Press
35 Park Road
London NW 1
England

or

$8.70 [postpaid]

from:
WHOLE EARTH CATALOG

A Year From Monday

The question is: Is my thought changing? It is and it isn't. One evening after dinner I was telling friends that I was now concerned with improving the world. One of them said: I thought you always were. I then explained that I believe—and am acting upon—Marshall McLuhan's statement that we have through electronic technology produced an extension of our brains to the world formerly outside of us. To me that means that the disciplines, gradual and sudden (principally Oriental), formerly practiced by individuals to pacify their minds, bringing them into accord with ultimate reality, must now be practiced socially—that is, not just inside our heads, but outside of them, in the world, where our central nervous system now is.

This has brought it about that the work and thought of Buckminster Fuller is of prime importance to me. He more than any other to my knowledge sees the world situation—all of it—clearly and has fully reasoned projects for turning our attention away from "killingry" toward "livingry." . . . . . .

Coming back to the notion that my thought is changing. Say it isn't. One thing, however, that keeps it moving is that I'm continually finding new teachers with whom I study. I had studied with Richard Buhlig, Henry Cowell, Arnold Schoenberg, Daisetz Suzuki, Guy Nearing. Now I'm studying with N.O. Brown, Marshall McLuhan, Buckminster Fuller, Marcel Duchamp. In connection with my current studies with Duchamp, it turns out I'm a poor chessplayer. My mind seems in some respect lacking, so that I make obviously stupid moves. I do not for a moment doubt that this lack of intelligence affects my music and thinking generally. However, I have a redeeming quality: I was gifted with a sunny disposition.

Everything we come across is to the point. **Living underground because there was no money. Arizona land and air permitted making mounds, covering them with cement, excavating to produce rooms, providing these with skylights. For anyone approaching, the community was invisible. Cacti, desert plants: the land seemed undisturbed.** Quantity (abundance) changes what's vice, what's virtue. Selfishness is out; carelessness is in. (Waste's consciousness. "They think 'world'. . . Theirs will be the most powerful and constructive revolution in all history."]

LIV. More we leave the land, the more productive it becomes. **Technique for changing society: education followed by unemployment. Article by Avner Hovne on automation (Impact of Science on Society 15:1, Unesco publication). Continuity values giving way to flexibility values. Automation alters what's done and where we do it.** You could always tell when she was about to go out of her mind. She would begin to speak the truth. April '64: fifty-five global

A Year From Monday

John Cage
1967; 167pp.
$7.92 postpaid

from:
Wesleyan University Press
Middletown, Conn. 06457
or
WHOLE EARTH CATALOG

to wait. XXXVI. Weather feels good. Isn't. More rain is needed. Water. He played two games, winning one, losing the other. He was continually himself, totally involved in each game, unmoved by the outcome of either. What's the nature of his teaching? For one thing: devotion (practice gives evidence of it). For another: not just playing half the game but playing all of it (having a view that includes that of the opponent). Suddenly a clam rose to

General Systems Yearbook

General systems theory was introduced by biologist Ludwig von Bertalanffy some years back(one application has been systems analysis, which has recomprehended and redesigned much of business, technology, education, etc.). The General Systems Yearbook is edited by Bertalanffy and Anatol Rapoport

By definition General Systems is a mixed bag. Kinds of systems covered in the Yearbook include Biological, Social, Psychological, Games, Linguistic, Political, Cybernetic and Meteorological. Throughout is the search for common dynamics that transcend them all. It's technical, mathematical business, heavy reading, and maybe trivial, maybe wishful; but every here and there is a gleam of something that might be a window into broad mindscapes.

The current volume of the Yearbook (1967) is Volume XII. Titles of articles, working back as far as we have space, are:

The price of the Yearbook is
$10.00 for recent volumes,
$7.50 for earlier ones.
Consolidated contents booklet available free.

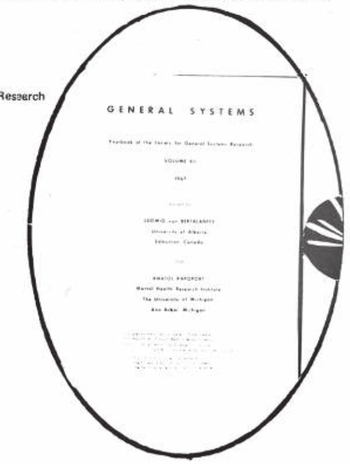
from:
Society for General Systems Research
Box 228
Bedford, Mass. 01730

VOLUME IX (1964)

Sociometry and the Physical Sciences
Prediction in Physics and the Social Sciences
The Concept of Entropy in Landscape Evolution
Geomorphology and General Systems Theory
An Approach to the Conceptual Analysis of Scientific Crises
A Survey of General Systems Theory
The Set Theory of Mechanism and Homeostasis
Constraint Analysis of Many-Dimensional Relations
The Domain of Adaptive Systems: A Rudimentary Taxonomy
Language Description of Concepts
Some Simple Models of Arms Races
The Problem of Systemic Organizations in Theoretical Biology
The Conceptual Formulation and Mathematical Solution of Practical Problems in Population Input-Output Dynamics
The Use of Mathematics and Computers to Determine Optimal Strategies for a Given Insect Pest Control Problem

VOLUME X (1965)

The Logic of Systems: An Introduction to a Formal Theory of Structure
The General System as a Methodological Tool
Systems Theory from an Operations Research Point of View
Similar Problems in Meteorology and Psychology
The Architecture of Complexity
On the Emergence of Patterns of Order
On the Stability of Brain-Like Structures
Some Considerations on the Notion of Invariant Field in Linguistics
Toward a Unifying Theory of Cognition
Contributions to Stochastic Learning Theory
Aspiration Levels and Utility Theory
Concession-Making in Experimental Conditions
Wheat on Kilimanjaro: The Perception of Choice Within Game and Learning Model Frameworks
Models of Southern Kwakiutl Social Organization
A Field Theory of Social Action with Application to Conflict



VOLUME XI (1966)

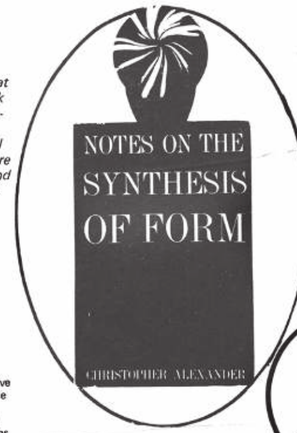
Mathematical Aspects of General Systems Theory
Toward a Theory of Parts and Wholes: An Algebraic Approach
Meteorology and the Social Sciences: Further Comparisons
Methodological Problems of System Research
Metaorganization of Information
The Insect Corneal Nipple Array
The Wholeness of Living Systems and Some Basic Biological Problems
On the Origin of Order in Behavior
A Cognitive Approach to the Analysis of Cultures and Cultural Evolution
The University Community System—Self Regulated Bearer of Meaning
A Condensation in Warpeace Space
On Some General Categories of Linguistics
The Theory of Meta-Games
The Mathematics of Metc-Games
Benevolence in Game Theory
A Taxonomy of 2 x 2 Games
An Analysis of Duopoly Bargaining
Two Motivations for Defection in Prisoner's Dilemma Games
Empirical Approaches to Game Theory and Bargaining: a Bibliography

VOLUME XII (1967)

The Evolution of the Human Brain: Some Notes Toward a Synthesis Between Neural Structure and the Evolution of Complex Behavior
Organismic Sets: Outline of a General Theory of Biological and Social Organisms
The Orderliness of Biological Systems
Colony Development of a Polymorphic Hydroid as a Problem in Pattern Formation
A Geometric Model with Some Properties of Biological Systems
The Regulation of Political Systems
Types of Asymmetry in Social and Political Systems
A Quantitative Approach to the Dynamics of Perception
Some Psychological Aspects of Psychometry
A Further Extension of General Systems Theory for Psychiatry
A Dynamic Model of the Conflict Between Criminals and Society
Some Comparisons Between Traffic Deaths and Suicide
Crime Rate vs. Population Density in United States Cities: A Model
Simulation of Socio-Economic Systems
An Empirical Test of Five Assumptions in an Inter-Nation Simulation, About National Political Systems

Synthesis of Form

Christopher Alexander is a design person that other design people refer to a lot. This book deals with the nature of current design problems that are expanding clear beyond any individual's ability to know and correlate all the factors. The methodology presented here is one of analysis of a problem for misfits and synthesis of form (via computer-translatable nets and hierarchies) for minimum misfits.



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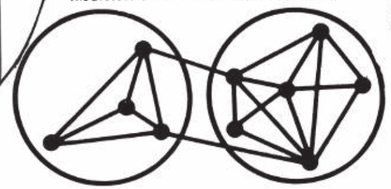
3. The Source of Good Fit 28
4. The Unselfconscious Process 46
5. The Selfconscious Process 55

But if we think of the requirements from a negative point of view, as potential misfits, there is a simple way of picking a finite set. This is because it is through misfit that the problem originally brings itself to our attention. We take just those relations between form and context which obtrude most strongly, which demand attention most clearly, which seem most likely to go wrong. We cannot do better than this. If there were some intrinsic way of reducing the list of requirements to a few, this would mean in essence that we were in possession of a field description of the context: if this were so, the problem of creating fit would become trivial, and no longer problem of design. We cannot have a unitary or field description of a context and still have a design problem worth attention.

Notes on the Synthesis of Form
Christopher Alexander
1964; 216 pp.
$6.75 postpaid
from:
Harvard University Press
79 Garden Street
Cambridge, Mass 02138
or
WHOLE EARTH CATALOG

Indeed, not only is the man who lives in the form the one who made it, but there is a special closeness of contact between man and form which leads to constant rearrangement of unsatisfactory detail, constant improvement. The man, already responsible for the original shaping of the form, is also alive to its demands while he inhabits it. And anything which needs to be changed is changed at once.

A subsystem, roughly speaking, is one of the obvious components of the system, like the parts shown with a circle round them. If we try to adjust a set of variables which does not constitute a subsystem, the repercussions of the adjustment affect others outside the set. because the set is not sufficiently independent. The procedure of the unselfconcious system is so



organized that adjustment can take place in each one of these subsystems independently. This is the reason for its success. In the selfconscious situation, on the other hand, the designer is faced with all the variables simultaneously

The greatest clue to the inner structure of any dynamic process lies in its reaction to change.

The Mousgoum cannot afford, as we do, to regard maintenance as a nuisance which is best forgotten until it is time to call the local plumber. It is in the same hands as the building operation itself, and its exigencies are as likely to shape the form as those of the initial construction.

The selfconscious individual's grasp of problems is constantly misled. His concepts and categories, besides being arbitrary and unsuitable, are self-perpetuating. Under the influence of concepts, he not only does things from a biased point of view, but sees them biasedly as well. The concepts control his perception of of fit and misfit—until in the end he sees nothing but deviations from his conceptual dogmas, and loses not only the urge but even the mental opportunity to frame his problems more appropriately.

The solution of a design problem is really only another effort to find a unified description. The search for realization through constructive diagrams is an effort to understand the required form so fully that there is no longer a rift between its functional specification and the shape it takes.

Two misfits are seen to interact only because, in some sense at least, they deal with the same kind of physical consideration. . . . . .
It is such a physical center of implication, if I may call it that, which the designer finds it easy to grasp. Because it refers to a distinguishable physical property or entity, it can be expressed diagrammatically, and provides a possible non-verbal point of entry into the problem.

On Growth and Form

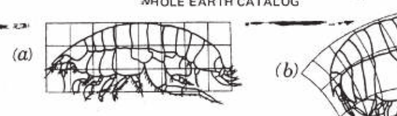


Fig. 143. (*a*) *Harpinia plumosa* Kr.; (*b*) *Stegocephalus inflatus* Kr.: (*c*) *Hyperia galba*.

A paradigm classic. Everyone dealing with growth or form in any manner can use the book. We've seen worn copies on the shelves of artists, inventors, engineers, computer systems designers, biologists. Would one of you do a thorough review of D'Arcy Thompson's venerable book for the CATALOG?

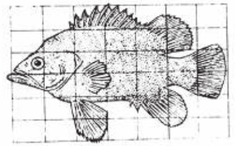


Fig. 150. *Polyprion.*

On Growth and Form
D'Arcy Wentworth Thompson
Two volume edition
1917, 1952
$27.50 postpaid

Abridged paper edition
1917, 1961; 346 pp.
$2.45 postpaid

Both from:
Cambridge University Press
510 North Avenue
New Rochelle, N.Y. 10801
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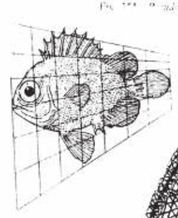
WHOLE EARTH CATALOG

When Plateau made the wire framework of a regular tetrahedron and dipped it in soap-solution, he obtained in an instant a beautifully symmetrical system of six films, meeting three by three in four edges and these four edges running from the corners of the figure to its centre of symmetry. Here they meet, two by two, at the Maraldi angle; and the films meet three by three, to form the re-entrant solid angle which we have called a 'Maraldi pyramid' in our account of the architecture of the honeycomb.
The very same configuration is easily recognized in the minute siliceous skeleton of Callimitra. There are two discrepancies, neither of which need raise any difficulty. The figure is not rectilinear but a spherical tetrahedron, such as might be formed by the boundary edges of a tetrahedral cluster of four co-equal bubbles; and just as Plateau extended his experiment by blowing a small bubble in the centre of his tetrahedral system, so we have a central bubble also here.
This bubble may be of any size; but its situation (if it be present at all) is always the same, and its shape is always such as to give the Maraldi angles at its own four corners. The tension of its own walls, and those of the films by which it is supported or slung, all balance one another. Hence the bubble appears in plane projection as a curvilinear equilateral triangle; and we have only got to convert this plane diagram into the corresponding solid to obtain the spherical tetrahedron we have been seeking to explain (Fig. 63).



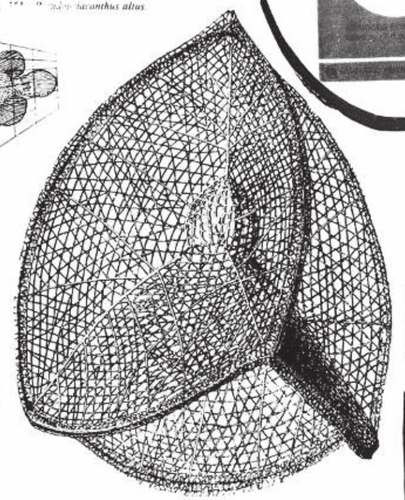


Fig. 67. A Nassellarian skeleton, *Callimitra agnesae* Hkl. (0.1 mm. diameter)

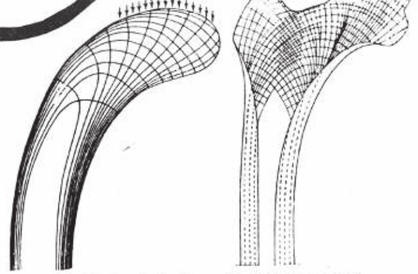


Fig. 101. Crane-head and femur. After Culmann and J. Wolff.

The geometry of the little inner tetrahedron is not less simple and elegant. Its six edges and four faces are all equal. The films attaching it to the outer skeleton are all planes. Its faces are spherical,

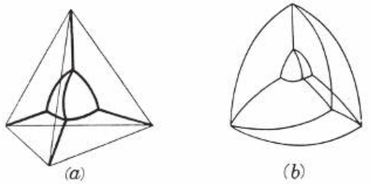


Fig. 63. Diagrammatic construction of *Callimitra*. (*a*) A bubble suspended within a tetrahedral cage; (*b*) another bubble within a skeleton of the former bubble.

and each has its centre in the opposite corner. The edges are circular arcs, with cosine $\frac{1}{3}$; each is in a plane perpendicular to the chord of the arc opposite, and each has its centre in the middle of that chord. Along each edge the two intersecting spheres meet each other at an angle of 120°.[1]

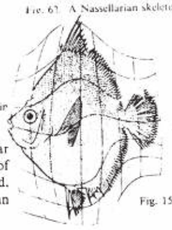
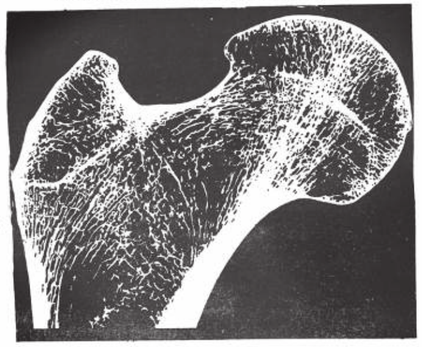
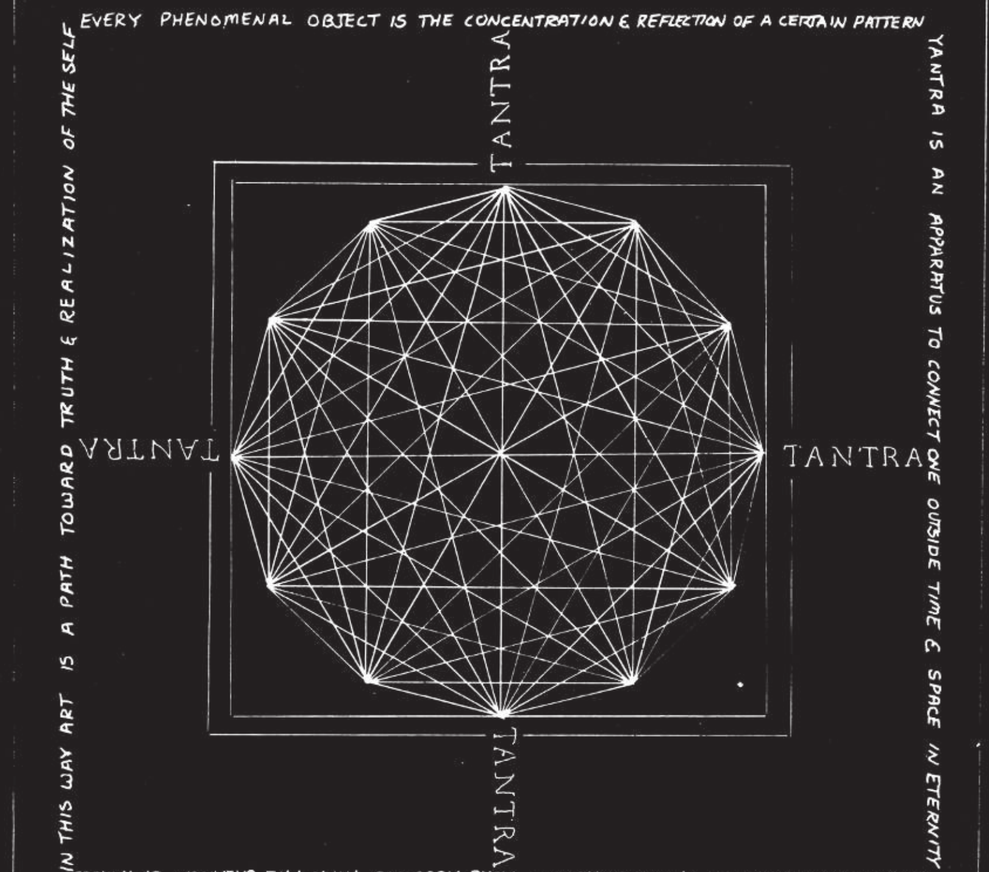


Fig. 153. *Antigonia capros.*

The engineer, who had been busy designing a new and powerful crane, saw in a moment that the arrangement of the bony trabeculae was nothing more nor less than a diagram of the lines of stress, or directions of tension and compression, in the loaded structure: in short, that Nature was strengthening the bone in precisely the manner and direction in which strength was required; and he is said to have cried out, 'That's my crane!'



TANTRA ART



FOR ANY ONE INTERESTED IN YANTRA, MANDALAS, ARCHETYPAL ART, "OBJECTIVE" ART THIS BOOK IS INVALUABLE. INCREDIBLE COLOR & B&W. REPRODUCTIONS OF WORKS NOT USUALLY AVAILABLE OR ATTAINABLE. THIS BOOK WILL BECOME A STANDARD DICTIONARY FOR "OBJECTIVE" LANGUAGE STUDY. RECCOMEND CONCURRENT READINGS OF TUCCI'S "THEORY & PRACTICE OF THE MANDALA" AS TEXT, WHILE POETIC & INTRESTING, IS NOT PRECISE OR SPECIFIC ENOUGH FOR THOSE DESIRING ALL DE TALES.

[Suggested by Ann Hogle. Reviewed by Steve Durkee.]

"What is here, is elsewhere.
What is not here, is nowhere."

Vishvasara Tantra

Tantra Art

Ajit Mookerjee
1966; 100 pp.

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[This is the only art book in the CATALOG]

Psychological Reflections

Jung in capsules and tasting like medicine.

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C.G. Jung [ed. Jacobi]
1945, 1953, 1961: 340 pp.

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The man who would learn the human mind will gain almost nothing from experimental psychology. Far better for him to put away his academic gown, to say good-bye to the study, and to wander with human heart through the world. There, in the horrors of the prison, the asylum, and the hospital, in the drinking-shops, brothels, and gambling hells, in the salons of the elegant, in the exchanges, socialist meetings, churches, religious revivals, and sectarian ecstacies, through love and hate, through the experience of passion in every form in his own body, he would reap richer store of knowledge than text-books a foot thick could give him. Then would he know to doctor the sick with real knowledge of the human soul.

A neurosis has really come to an end when it has overcome the wrongly oriented ego. The neurosis itself is not healed; it heals us. The man is ill, but the illness is an attempt of nature to heal him. We can therefore learn a great deal for the good of our health from the illness itself, and that which appears to the neurotic person as absolutely to be rejected is just the part which contains the true gold which we should otherwise never have found.

The secret of the earth is not a joke and not a paradox. We need only see how in America the skull- and hip-measurements of all European races become Indianized in the second generation. That is the secret of the American soil. And every soil has its secret, of which we carry an unconscience image in our souls: a relationship of spirit to body and of body to earth.

The greater the contrast, the greater is the potential. Great energy only comes from a correspondingly great tension between opposites.

No one develops his personality because someone told him it would be useful or advisable for him to do so. Nature has never yet allowed herself to be imposed upon by well-meaning advice. Only coercion working through casual connections moves nature, and human nature also. Nothing changes itself without need, and human personality least of all. It is immensely conservative, not to say inert. Only the sharpest need is able to rouse it. The development of personality obeys no wish, no command, and no insight, but only need; it wants the motivating coercion of inner or outer necessities. Any other development would be individualism. This is why the accusation of individualism is a cheap insult when it is raised against the natural development of personality.

It is naturally a fundamental error to believe that if we see an antivalue in a value, or an untruth in a truth, the value or the truth is then invalid. They have only become relative. Everything human is relative, because everything depends upon an inner polarity, for everything is a phenomenon of energy. And energy itself necessarily depends on a previous polarity without which there can be no energy. There must always be high and low, hot and cold, etc., so that the process of adjustment which is energy, can occur. The tendency to deny all previous values in favour of their opposites is therefore just as exaggerated as the former one-sidedness. Where generally accepted and undoubted values are suddenly thrown away, there is a fatal loss. Whoever acts in this way ends by throwing himself overboard with the discarded values.

The gigantic catastrophes that threaten us are not elemental happenings of a physical or biological kind, but are psychic events. We are threatened in a fearful way by wars and revolutions that are nothing else than psychic epidemics. At any moment a few million people may be seized by a madness, and then we have another world war or devastating revolution. Instead of being exposed to wild beasts, tumbling rocks, and inundating waters, man is exposed today to the elemental forces of his own psyche. Psychic life is a world-power that exceeds by many times all the powers of the earth. The Enlightenment, which stripped nature and human institutions of gods, overlooked the one god of fear who dwells in the psyche. Fear of God is in place, if anywhere, before the domination power of psychic life.

No doubt it is a great nuisance that mankind is not uniform but compounded of individuals whose psychic structure spreads them over a span of at least ten thousand years. Hence there is absolutely no truth that does not spell salvation to one person and damnation to another. All universalisms get stuck in this terrible dilemma.

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.

Messages are themselves a form of pattern and organization. Indeed, it is possible to treat sets of messages as having an entropy like sets of states of the external world. Just as entropy is a measure of disorganization, the information carried by a set of messages is a measure of organization. In fact, it is possible to interpret the information carried by a message as essentially the negative of its entropy, and the negative logarithm of its probability. That is, the more probable the message, the less information it gives. Clichés, for example, are less illuminating than great poems.

I believe that Ashby's brilliant idea of the unpurposeful random mechanism which seeks for its own purpose through a process of learning is not only one of the great philosophical contributions of the present day, but will lead to highly useful technical developments in the task of automatization. Not only can we build purpose into machines, but in an overwhelming majority of cases a machine designed to avoid certain pitfalls of breakdown will look for purposes which it can fulfill.

We are not stuff that abides, but patterns that perpetuate themselves. A pattern is a message, and may be transmitted as a message.

It is illuminating to know that the sort of phenomenon which is recorded subjectively as emotion may not be merely a useless epiphenomenon of nervous action, but may control some essential stage in learning, and in other similar processes.

It is the great public which is demanding the utmost of secrecy for modern science in all things which may touch its military uses. This demand for secrecy is scarcely more than the wish of a sick civilization not to learn the progress of its own disease.

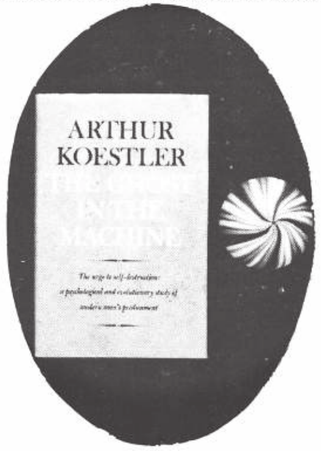
12 Whole Systems

The Ghost in the Machine

Koestler's latest book seems to be sharing the fate of Norman O. Brown's Love's Body : the book after the big influential one (Act of Creation, Life Against Death) is considered too far out, fragmented, excessive. . . and sells half-heartedly.

Nevermind. Koestler here is doing useful dirty work: savaging rat psychology, exploring broader implications of biological systems research, and foreseeing our imminent demise unless we organize our brain-use better. Which brings him to drugs. He proposes research to find a chemical which will voluntarily disengage old-brain from new-brain—the interior emotional kill-heavy unreprogrammable stuff from exterior rational flexible stuff. Our paranoia is accidentally designed in, he suggests, and may be designed out.

Get to it, outlaws. No nation is going to support this research.



The Ghost in the Machine
Arthur Koestler
1967; 384 pp.
$6.95 postpaid

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Front and Brown Streets
Riverside, Burlington County
New Jersey 08075
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ESCAPE FROM SPECIALIZATION

There is now strong evidence in favour of the theory, proposed by Garstang as far back as 1928, that the chordates—and thus, we, the verebrates—are descended from the larval stage of some primitive echinoderm, perhaps rather like the sea-urchin or sea cucumber (echinoderm = 'prickly-skinned'). Now an adult sea cucumber would not be a very inspiring ancestor—it is a sluggish creature which looks like an ill-stuffed sausage with leathery skin, lying on the sea bottom. But its free-floating larva is a much more promising proposition: unlike the adult sea cucumber, the larva has bilateral symmetry like a fish; it has a ciliary band—a forerunner of the nervous system— and some other sophisticated features not found in the adult animal. We must assume that the sedentary adult residing on the the sea bottom had to rely on mobile larvae to spread the species far and wide in the ocean, as plants scatter their seeds in the wind; that the larvae, which had to fend for themselves, exposed to much stronger selective pressures than the adults, gradually became more fish-like;and that eventually they became sexually mature while still in the free-swimming, larval state—thus giving rise to a new type of animal which never settled on the bottom at all, and altogether eliminated the senile, sedentary cucumber stage from its life history.

This speeding up of sexual maturation relative to the development of the rest of the body—or,to put it differently, the gradual retardation of bodily development beyond the age of sexual maturation—is a familiar evolutionary phenomenon, known as neoteny. Its result is that the animal begins to breed while still displaying larval or juvenile features; and it frequently happens that the fully adult stage is never reached—it is dropped off the life cycle.

This tendency towards a 'prolonged childhood', with the corresponding squeezing out of the final adult stages, amounts to a rejuvenation and de-specialization of the race—an escape from the cul-de-sac in the evolutionary maze. As J.Z. Young wrote, adopting Garstang's views: 'The problem which remains is in fact not "how have vertebrates been formed from sea squirts?", but "how have vertebrates eliminated the (adult) sea squirt stage from their life history? It is wholly reasonable to consider that this has been accomplished by paedomorphosis.' . . .

Neoteny in itself is of course not enough to produce these evolutionary bursts of adaptive radiations. The 'rejuvenation' of the race merely provides the opportunity for evolutionary changes to operate on the early, malleable phases of ontogeny: hance paedomorphosis, 'the shaping of the young'. In contrast to it, gerontomorphosis (geras = old age) is the modification of fully adult structures which are highly specialized. This sounds like a rather technical distinction, but it is in fact of vital importance. Gerontomorphosis cannot lead to radical changes and new departures; it can only carry an already specialized evolutionary line one more step further in the same direction—as a rule into the dead end of the maze. . . . .

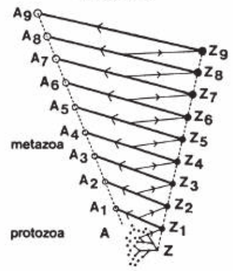
DRAW BACK TO LEAP

It seems that this retracing of steps to escape the dead ends of the maze was repeated at each decisive evolutionary turning point. I have mentioned the evolution of the vertebrates from a larval form of some primitive echinoderm. Insects have in all likelihood emerged from a millipede-like ancestor—not, however, from adult millipedes, whose structure is too specialized, but from its larval forms. The conquest of the dry land was initiated by amphibians whose ancestry goes back to the most primitive type of lung-breathing fish; whereas the apparently more successful later lines of highly specialized gill-breathing fishes all came to a dead end. The same story was repeated at the next major step, the reptiles, who derived from early, primitive amphibians-not from any of the later forms that we know.

And lastly, we come to the most striking case of paedomorphosis, the evolution of our own species. It is now generally recognized that the human adult resembles more the embryo of an ape rather than an adult ape. . . . . .

Figure 10 is from Garstang's original paper, and is meant to represent the process of evolution by paedomorphosis. Z to Z9 is the progression of zygotes (fertilized eggs) along the evolutionary ladder; A to A9 represents the adult forms resulting from each zygote. Thus the black line from Z4 to A4, for instance, represents ontogeny, the transformation of egg into adult; the dotted line from A to A9 represents phylogeny—the evolution of higher forms. But note that the thin lines of evolutionary progress do not lead directly from, say, A4 to A5 —that would be gerontomorphosis, the evolutionary transformation of an adult form. The line of progress branches off from the unfinished, embryonic stage of A4. This represents a kind of evolutionary retreat from the finished product, and a new departure towards the evolutionary novelty Z5 – A5. A4 could be the adult sea cucumber: then the branching-off point on the line A4—Z4 would be its larva; or A8 could be the adult primate ancestor of man, and the branching-off point its embryo—which is so much more like the A9—ourselves.

FIGURE IO



(after Garstang); see text

But Garstang's diagram could also represent a fundamental aspect of the evolution of ideas. . . . . .

The revolutions in the history of science are successful escapes from blind alleys. The evolution of knowledge is continuous only during those periods of consolidation and elaboration which follow a major break-through. Sooner or later, however, consolidation leads to increasing rigidity, orthodoxy, and so into the dead end of overspecialization—to the koala bear. Eventually there is a crisis and a new 'break-through' out of the blind alley—followed by another period of consolidation, a new orthodoxy and so the cycle starts again.

But the theoretical structure which emerges from the break-through is not built on top of the previous ediface; it branches out from the point where progress has gone wrong. The great revolutionary turns in the evolution of ideas have a decidedly paedomorphic character. Each zygote in the diagram would represent a seminal idea, the seed out of which a new theory develops until it reaches its adult, fully matured stage. One might call this the ontogeny of a theory. The history of science is s series of such ontogenies. True novelties are not derived directly from a previous adult theory, but from a new seminal idea—not from the sedentary sea urchin but from its mobile larva. Only in the quiet periods of consolidation do we find gerontomorphosis—small improvements added to a fully grown, established theory. . . . . .

At first sight the analogy may appear far-fetched; I shall try to show that it has a solid factual basis. Biological evolution is to a large extent a history of escapes from the blind alleys of overspecialization, the evolution of ideas a series of escapes from the bondage of mental habit; and the escape mechanism in both cases is based on the principle of undoing and re-doing, the draw-back-to-leap pattern.

The Year 2000

Is Herman Kahn the bad guy (as liberal opinion would have it) or a good guy (as in some informed opinion)? Kahn will hang you on that question and while you're hanging jam information and scalding notions into your ambivalence. He does this best with a live audience, but this book is a fine collection of the information he uses.

Here is most of the now-basic methodology of future study—multi-fold trends, surprise-free projections, scenarios, etc. And here are their results. It's the best future-book of the several that are out.

In my opinion, it is not particularily an accurate picture of the future but the most thorough picture we have of the present—the present statistics, present fantasies, present expectations that we're planning with. We are what we think our future is

If computer capacities were to continue to increase by a factor of ten every two or three years until the end of the century (a factor between a hundred billion and ten quadrillion), then all current concepts about computer limitations will have to be reconsidered. Even if the trend continues for only the next decade or two, the improvements over current computers would be factors of thousands to millions. If we add the likely enormous improvements in input-output devices, programming and problem formulation, and better understanding of the basic phenomena being studied, manipulated, or simulated, these estimates of improvement may be wildly conservative. And even if the rate of change slows down by several factors, there would still be room in the next thirty-three years for an overall improvement of some five to ten orders of magnitude. Therefore, it is necessary to be skeptical of any sweeping but often meaningless or nonrigorous statements such as "a computer is limited by the designer—it cannot create anything he does not put in," or that " a computer cannot be truly creative or original." By the year 2000, computers are likely to match, simulate, or surpass some of man's most "human-like" intellectual abilities, including perhaps some of his aesthetic and creative capacities, in addition to having some new kinds of capabilities that human beings do not have. These computer capacities are not certain; however, it is an open question what inherent limitations computers have. If it turns out that they cannot duplicate or exceed certain characteristically human capabilities, that will be one of the most important discoveries of the twentieth century.

The Year 2000
Herman Kahn and Anthony J. Wiener
1967; 431 pp.
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The Macmillan Company
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Riverside, Burlington County
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WHOLE EARTH CATALOG

TABLE IX

The Postindustrial (or Post-Mass Consumption) Society

1. Per capita income about fifty times the preindustrial
2. Most "economic" activities are tertiary and quaternary (service-oriented), rather than primary or secondary (production-oriented)
3. Business firms no longer the major source of innovation
4. There may be more "consentives" (vs. "marketives")
5. Effective floor on income and welfare
6. Efficiency no longer primary
7. Market plays diminished role compared to public sector and "social accounts"
8. Widespread "cybernation"
9. "Small world"
10. Typical "doubling time" between three and thirty years
11. Learning society
12. Rapid improvement in educational institutions and techniques
13. Erosion (in middle class) of work-oriented, achievement-oriented, advancement-oriented values
14. Erosion of "national interest" values
15. Sensate, secular, humanist, perhaps self-indulgent criteria become central

The Futurist

In part because the Future is a new field of methodic study this is a lively newsletter. It reports bi-monthly on new books books and programs having anything to do with social forecasting. Future study is like education: everybody thinks they're good at it. The newsletter has some of that diluted flavor, but it doesn't matter. Useful pointing at useful activities done here.

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medium of communication & entertainment.

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america needs indians, sensorium 9 - slides, movies,
sound tracks, flowers, food, rock'n 'roll, eagle lone
whistle, indians (senecas, chippewas, hopi, sioux,
blackfeet, etc.) & anthropologists. open theatre -
"revelations" - nudeprojections. "the god box" by
ben jacopetti. the endless explosion, the congress
of wonders, liquid projections, the jazz mice, the
loading zone rock'n 'roll, steve fowler, amanda foulger,
rain jacopetti, & the unexpectable.

SATURDAY, JANUARY 22

ken kesey, members of the s.f. tape music center,
big brother & the holding company rock'n'roll, the
don buchla sound-light console, overhead projection,
anthony martin, ramon sender, bill maginnis, bruce
baillie. "the acid test", the merry pranksters & their
psychedelic symphony, neal cassady vs. ann murphy
vaudeville, the grateful dead rock'n'roll, allen ginsberg,
roy's audioptics, movies, ron boise & his electric thunder
sculpture, the bus, hell's angels, many noted outlaws, &
the unexpectable.

SUNDAY, JANUARY 23

high energy experiments conducted in the cyclotron of
dome-shaped longshoreman's hall by america needs
indians, open theatre, s.f. tape music center, the
merry pranksters, gordon ashby (light matrix), henry
jacobs (air dome projections), kqed, don buchla, the
grateful dead, the loading zone, big brother & the holding
company, & many others still being assembled. since the
common element of all shows is ELECTRICITY, this even-
ing will be programmed live from stimuli provided by a
PINBALL MACHINE. a nikel in the slot starts the evening.

the general tone of things has moved on from the self-
conscious happening to a more JUBILANT occasion where
the audience PARTICIPATES because it's more fun to do so
than not. maybe this is the ROCK REVOLUTION. audience
dancing is an assumed part of all the shows, & the audience
is invited to wear ECSTATIC DRESS & bring their own GADGETS
(a.c. outlets will be provided).

design:
Wes Wilson

printing:
Contact Printing Co.

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New approaches in music education
Ortage Park Teachers Laboratory

PORTOLA INSTITUTE was established in 1966 as a nonprofit corporation to encourage, organize, and conduct innovative educational projects. The Institute relies for support on private foundations and public agencies, to whom specific project proposals are submitted.

Because Portola Institute is a private organization with no need to produce profits or guarantee "success", it can experiment with new and unusual educational projects that would be difficult to administer within more structured organizations. For this reason the staff and facilities of the Institute are deliberately kept small and flexible.

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We can't put it together.

It is together.