

EDGE

FOUNDATION, INC.

THE REALITY CLUB

Speaker: GEORGE DYSON

Title: "Baidarka: The Skin Boat as a Frame of Mind"

Date: Thursday, May 3, 1990

Time: Coffee at 7:30 PM; talk at 8 PM

Host: Hugh Downs

Place: Metropolitan Club (Morton Room), 1 East 60th St., New York City
(Please note: Jacket and tie required for men, skirts or dresses for women.)

Of the fact that the earth is round they were aware as a result of the following event: Their forefathers had sent out two baidarkas in which the travelers had set out young and had returned old men, and they had still not found the edge of the world. So they had concluded there was no edge of the world and therefore it must be round.

--Hieromonk Gedeon, Kodiak Island, 1804

"The first North Americans may well have arrived here in skin boats. Circumstantial evidence suggests the presence of kayaks in the North Pacific ten thousand years earlier than that. The subject began to attract international attention with the arrival of Russian adventurers on the North Pacific Coast in the 18th century, when, renamed baidarka, the ubiquitous vessel and its Aleut masters became the lifeblood of the Russian supervision, from northern Japan to Baja California in fleets numbering up to 800 boats.

"For some reason, about 20 years ago I became obsessed with bringing the Aleut/Russian baidarka back to life. I've done little else since, and as to the big question, Why, your guess is as good as mine. I'll be showing slides, with commentary, roughly divided in two parts: first, the graphic record of some 230 years in the history of the baidarka before I became involved, and second, my own experiences evolving another generation of these boats. The whole business raises a wide range of questions: about the distant past (how to comprehend the hydrodynamic genius of a deceptively primitive form of boat); about more recent history (how to fit the Russian-American colonial period into current scheme of things, and more specifically, how to explain the unprecedented cross-fertilization of Russian and Aleut culture in which the baidarka played a part); and about the future (how to navigate the boundary between Nature and Technology in mutually acceptable ways).

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George Dyson
page 2

"Lately, I suppose that my own work (so far) raises the question of how to nurture an obscure monomania through the 60's, the 70's, the 80's, and now into the 90's, without getting hopelessly distracted along the way."

George Dyson, born in Ithaca, New York, in 1953, has been building kayaks since the age of twelve. A high-school dropout, Dyson considers himself a follower of Nathaniel Bishop, who, while paddling through Dyson's home town in Princeton, New Jersey by kayak in 1874, urged the audience to "seek in his friendly canoe that relief which nature offers to the tired brain."

Dyson moved to British Columbia in 1970, becoming a dual citizen of Canada and the United States. A growing interest in Russian-American history accompanied his efforts at reconstructing the kayaks used in Alaskan waters in Russian-American times. Dyson is the founder of the Baidarka Historical Society (P.O. Box 5454, Bellingham, WA, 98227, USA), established in 1984 "to further our knowledge of the Aleut baidarka--its origins, its form and function, its role in Russian-American history--and to encourage, by way of its renaissance, the continued evolution of the skin boat."

Dyson is married to photojournalist Ann E. Yow. With their daughter Lauren, they have recently moved to Bellingham, Washington, where Dyson is working to develop a series of baidarka kits intended, in his words, "to allow other twelve-year-olds--in age or spirit--to continue where I leave off."

R.S.V.P. (if you plan to attend): Jennifer Grace - 874-0533

With the Compliments of

EDGE
FOUNDATION, INC.

July 27, 1990

Dear Esther:

I would love some feedback on
this draft.

Best regards,

John Brockman

Reality Club

brockman on the edge

FUNKY SUBSTRATES: "Science is the only news. When you scan through a newspaper or magazine, all the human interest stuff is the same old he-said-she-said, the politics and economics the same sorry cyclic dramas, the fashions a pathetic illusion of newness, and even the technology is predictable if you know the science. Human nature doesn't change much; science does, and the change accrues, altering the world irreversibly."

I always take Stewart Brand seriously, especially in matters involving new technologies. So what if he sometimes sounds like a naive realist? Our relationship in this regard goes back twenty-five years. I recall spending hours with him in the mid-sixties while he was working on the original *Whole Earth Catalog*. We sat together with a single copy of Norbert Wiener's *Cybernetics* underlining every page.

Stewart's prognostication on "deeply different, deeply useful tools" on the horizon?

- 'Electronic co-presence'—the term comes from researchers at Xerox PARC, who are demonstrating the usefulness of people working at a physical distance but in electronic intimacy over sustained periods of time. This kind of usage will force more leased lines and more flat-rate pricing by telecommunications companies.

- Massive parallel processing, such as the already commercial Connection Machine, may reverse the trend toward ever more computing power on the desk. Dumb terminals are gone, but your brilliant terminal may soon be praying for genius milliseconds of time from a remote Godlike throbbing massive parallel machine.

- Virtual reality—using eyephones and datasuit for bodily immersion in computer simulated worlds. Once this technology begins to flourish as a communications medium—'shared dreaming,' as Jaron Lanier calls it—then broadband really takes off.

- 'Artificial life'—the focus of implosion of all the 'connectionist' subdisciplines of computer science. These rich computer universes are inhabited with myriad diverse 'agents' that learn and self-organize into whole ecosystems and economies."

His bottom line: "The technology environment is bound to remain so turbulent and surprise-rich that only fine-grained constant adaptivity can ensure sustainability over time. High tech development flourishes best on a funky substrate."

Funky substrate??

DINNER AT PUNSCH: When you have dinner with a famous artist at an "in" restaurant in New York, you are surrounded by advertising executives dressed as famous artists. That's how it was at Punsch, the new hot Scandinavian restaurant when I sat down with artist Gary Stephan (and his wife, artist Suzanne Joelson). Gary, who shows with Mary Boone, is a leading abstract painter and a master of spatial contradiction. He also has a lot to say on the subject of arts and the culture:

"The Avant-garde saw the cracks in the old order. Revolutions put the blood of kings in the lime pits, the machine gun cutting chivalry down to size. The Bourgeoisie undermines world revolution, industry geometrically increasing all forces, keeping up with population.

"But the changes were not the point; the continuity of mass culture was more striking. The Avant-garde did not make things so much as relationships. Producing force by contrast, objects as context.

"In the last quarter of the twentieth century the field of culture against which the object of the Avant-garde was placed dissolved. There is no thesis of the parent state against which the child artist can rebel. Not seeing the end of the game the stakes are raised, more desperate acts are taken; many others withdraw from the field and curl up in pleasure's bed.

"Where does that leave us, what have we got? Pieces from spaceships, Black Magic, archaic technologies, labels and practices from the corporate state, all centrifuged by consumer culture's unquenchable desires, into the margins.

"The center crowded with the beautiful and hideous ghosts of empire may now be approached.

"A possibility, no guarantees, no radical credentials, maybe a waste of time; a normal object."

No. 1

"Nobody knows,
you can't find out,
and you don't
have to ask
permission."

EDGE

The Newsletter of
Edge Foundation, Inc.

Edited by
John Brockman

INSIDE

BROCKMAN ON THE
EDGE cont. on 2
Stewart Brand, Gary
Stephan, Mitch Kapor,
Art Kleiner, Peter
Schwartz, Eugene
Schwartz, Peter
Warshall

INTELLECTUAL

GRAFITII 4
Benoit B. Mandelbrot,
Peter Halley, Stephen
Jay Gould

EDGE INTERVIEW 5

"Artificial Life": A
Conversation with
Chris Langton and
Dayne Farmer

AT THE REALITY

CLUB 7
Reality Club East,
Reality Club Books

"There is a conspiracy of silence on this issue. It's not splashed all over the front pages of the industry trade press, but we all know it's true. Users are largely silent about this. There is no uproar, no outrage. But scratch the surface and you'll find that people are embarrassed to say they find these things hard to use."

HELL ON "THE WELL": "Do you want to sit out the 1990's?" a well-known computer jock asked me when I expressed my own lack of interest in computer teleconferencing. Well, not wanting to miss an entire decade, I had to rise to the occasion and sign up for The Well (The Whole Earth Electronic Link). Thus began many hours of frustration and unrewarding activity. No doubt teleconferencing is the future of interpersonal communication, but I refuse to accept the blame for my failure to deal successfully with The Well. Teleconferencing software is just too difficult to use.

Software designer Mitchell Kapor, founder of Lotus Development Corporation, notes that "the daily experience of using computers is still fraught with difficulty, pain, and barriers for most people." Mitch knows what he is talking about. He set the standard for elegance in design with "Lotus 1-2-3", which revolutionized the computer industry and changed the way large segments of the business world works. (He is now president of ON Technology, in Cambridge).

Mitch also says that "there is a conspiracy of silence on this issue. It's not splashed all over the front pages of the industry trade press, but we all know it's true. Users are largely silent about this. There is no uproar, no outrage. But scratch the surface and you'll find that people are embarrassed to say they find these things hard to use. They think the fault is their own. So users learn a bare minimum to get by. They under-use the products we work so hard to make and so don't help themselves or us as much as we would like. They're afraid to try anything else. In sum, everyone I know (including me) feels the urge to throw that infuriating machine through the window at least once a week. (And now, thanks to recent advances in miniaturization, this is now possible.)"

I plan to stay at it nevertheless and gradually surmount the learning curve. Too many people I respect are on The Well for me to simply ignore it. But, then what?

Communications savant Art Kleiner volunteered to get me up and running on The Well. After 45 minutes of glitches and false starts, we were stuck. Switching off the computer, Art revealed that he's

personally moving away from computer teleconferencing, which, he said, is designed to provide advantage to personality-deficient people.

I don't like the idea of my personal style being flattened onto a two-dimensional screen "talking" only to those people who have the technological skill and predilection for mastering ridiculously intricate software. I have noticed that when I call such people on the phone, they get irritated at the interruption because they're "talking" to someone on the computer.

So why bother? Not all personality-deficient people have interesting ideas. However, many people with interesting ideas are personality deficient. The Well is a place. A place where you meet people. Some people you meet in restaurants, others on-line. Frankly, I would rather hang out at Punsch.

French thinker Jean Baudrillard writes about "virtual man" in *Xerox and Infinity* "immobile in front of his computer, [he] makes love by the screen and gives classes by teleconference. He becomes a spastic, probably with a cerebral handicap too. This is the cost of becoming effective. Just as we can suggest that glasses or contact lenses might one day become the integrated prosthesis of a species whose gaze will have gone, so can we fear that artificial intelligence and its technical aids will become the prosthesis of a species whose thought will have disappeared."

LOGOLAND: On a recent visit, futurist Peter Schwartz ran a meeting of his Global Business Network (GBN) in the Board of Director's room at AT&T headquarters in New York City. Present to discuss business scenarios of the future were representatives from ARCO, Shell, Volvo, Swedebank, AT&T, and Bell South. Peter was in charge of developing the long range scenarios for Royal/Dutch Shell from 1981-1986. He founded GBN with his partner, philosopher Jay Ogilvy, in 1987. His non-business credits include Hollywood screenplays, books, and a maniacal devotion to The Grateful Dead.

Peter reports that "the discussions led to a sanguine view of the evolution of the financial system. Because of the way markets and technology are evolving together, it's hard to make money in

banking and securities. The markets are hyper-efficient. Eric Clemons of the Wharton School pointed out an example from Tom Wolfe's *Bonfire of the Vanities* of the investment banker who cuts the cake and lives off the crumbs left on the knife. In hyper-efficient markets the knife is a teflon knife. There are no crumbs."

GBN brings together their corporate clients with scientific and cultural leaders. Programs include a GBN computer conference on *The Well*, a book club run by part-time GBN'er Stewart Brand, and a newsletter, "The Deeper News."

There's something of Ezra Pound's "village explainer" in all this. Cultural heavies feeding mental sound-bites in large type newsletters to corporate executives who don't have the time outside of their own work to read or think for themselves. This reminds me of Gregory Bateson's dictum that "of all of our human inventions, economic man is by far the dullest."

Stewart Brand's response is that GBN is helping corporate people to think beyond the immediate bottom line and to push the envelope out beyond a 3-year horizon. GBN attempts to involve corporate executives who are interesting in their own right and occupy policy-making positions and are thus consequential in the culture. He wants the leaders of major corporations to think in Batesonian terms of "slow, deep, and long" in a broad business and cultural context.

WHAT ARE YOU BUYING, GENE?

I stopped by to see art collector Eugene Schwartz. He's an astute and enthusiastic participant in the New York art scene. Gene and his wife, Barbara Schwartz, have turned their Park Avenue penthouse into one of the most interesting and fashionable art salons in the world. I love to visit, check out the constantly changing walls, see their newly acquired works of art.

I rarely read art magazines and I usually avoid reviews. When I talk about art ideas with my artist friends, the subject often quickly shifts to dealers and the art market. My way of finding out the new ideas in the art world? I ask Gene, "What are you buying?" Some recent acquisitions:

"Mora Sheehan. Small sculptures in

which she employs cheap plaster casts of Catholic saints, and then covers their faces with masks taken from, say, Mayan sculptures, also made out of cheap plaster casts. She's showing that the imperialist religion tries to replace the weaker religion, but fails because the primitive power of the older religion prevails. They're small, startling, and extremely moving.

"Pruitt and Early. A possible viable next step for pop art. They make sculptures out of combinations of six packs of beer cans and cover them with the decals that teen-age boys use to decorate their rooms. Enormously decorative, really alive, funny as hell.

"The Starn Brothers. In their new show they explode photography into sculpture. They've taken photographic film that's about 3-5 years ahead of what's now available from Kodak, and using huge transparency sheets of this film, have transferred images onto it, while the sheets remain transparent. Then they transfix the transparencies onto armatures, and then they fold, bend, and project them out into the room. The sculptural quality of the photographic medium now accurately reflects the sculptural quality of the object photographed. A new breakthrough for photography. I'm nuts about it."

Gene is always quick to spot a trend. Five years ago it was Baudrillardian social criticism (i.e. Jeff Koons). Three years ago, it was landscapes (April Gornik). "Right now," he says, "there is no predominant emerging trend. As physicist Freeman Dyson says, 'Infinite in all directions.'"

THE ETHICAL EDGE: "The conflict is between preserving biodiversity on the planet on one hand and the interests of scientific entrepreneurship and boosterism on the other." Biologist Peter Warshall is talking about his involvement in the fight to save the red squirrel. There are about 100 red squirrels left in their home at the top of Mount Graham, outside of Tucson. This happens to be the place that the University of Arizona wants to build a \$200 million dollar observatory. "Until the university's decision," intoned a New York Times editorial, "no one cared much about the red squirrels on Mount Graham." The Times believes that "envi-

Cultural heavies feeding mental sound-bites in large type newsletters to corporate executives who don't have the time outside of their own work to read or think for themselves.

4—August 1990—EDGE

ronmental groups have got themselves on the wrong side of a silly debate." Peter begs to differ and claims that building the observatory will wipe them out.

Are we talking about a classic case of environmentalists vs. developers? Not according to Peter, who sees natural science once again fighting a losing battle against hi-tech science. In the spirit of our conversation he begins to talk in terms of "edges." "First, there is the 'ethical edge.' Do humans truly want to make sacrifices to preserve the biological diversity of the planet? This is an age old question that has been posed by St. Francis of Assisi, American Indians, and Buddha. It's a minority position in Christianity. Second, there is the 'political edge.' Will Americans accept the purchasing of laws by special interest groups? The two most important laws that special interests are trying to subvert are The Endangered Species Act and the National Environmental Protection Act. Third, there is the 'media edge.' Some people believe that the availability of information is going to help the world. I don't necessarily agree. Information isn't the question; control of information is the question. The 'political edge' has pushed the Interior Secretary Lujan to a comical position: 'Nobody's told me the difference between a red squirrel, a black one or a brown one,' he says.

"We are confronted with a case of species-side. What's happening in America is that 'environmentalism' is being co-opted as a word by people properly concerned with air quality, food quality, and toxic wastes. However, human-centered environmentalism is opposed to a larger, compassionate environmentalism that includes other species. 'Tree huggers' have been isolated, even by the humanists, as radicals. *The New York Times* attacks The Sierra Club on this issue. We are seeing the resurrection of a human-centered universe. It's a tough one: people are going to have to make an ethical choice."

intellectual graffiti

"I would like to propose to you that the modal complexity of life has never changed—it never will—that right from the beginning of life's history it has been what it is, it is today and ever shall be world without end or until it ends and that our view of complexity is shaped by our warped decision to focus on only one small aspect of life's history—and that the small bit of the history of life that we can legitimately see as involved in progress arises for an odd structural reason, has nothing to do with any predictable drive towards it."

Stephen Jay Gould

"We tend to think of our stream of consciousness as flowing by a particular point, called here-and-now, more or less like the frames in a film running through the projector. But of course there is no such place in the brain. When we think carefully about how the brain, with its relatively slow communications pathways, must solve its real-world coordination problems, we realize that it makes no sense to suppose that the brain is centered around such a point. Therefore, our experience of time (of sequence, simultaneity, duration, and of NOW) must be an artifact of processes of interpretation, rather than a directly or "immediately" experienced feature of those mental states. This has some surprising consequences: in particular, the order in which we experience events as happening need not be the order in which the experiences happen in the brain."

Daniel C. Dennett

"Why is geometry so often described as 'cold' and 'dry'? One reason may reside in its inability to tell what shape is a cloud, a mountain or a coastline. Clouds are not spheres, mountains are not cones, coastlines are not circles, and more generally Man's oldest questions concerning the shape of his world were left without answer by Euclid and his successors. In fact, they came to be disdained by Mathematicians, who viewed themselves as increasingly bulding theories totally unrelated to anything one can see or feel. By describing some highlights of the theory of fractals, of which he is the originator, the speaker will seek to deprive this self image of its foundation."

Benoit B. Mandelbrot

"The time has come to stop making sense—to replace History with myriad exaggerated theories of post-, para-, quasi-, and super-. History has been defeated by the determinisms of market and numbers, by the processes of reification and abstraction. These form the great juggernaut of modernity that has destroyed History by absorbing it, by turning each of History's independent concepts to serve its own purpose. Another kind of response is then called for: ideas that themselves change or dissipate as they are absorbed, that are formed with the presupposition that they will be subject to reification. Only a rear-guard action is possible, of guerrilla ideas that can disappear back into the jungle of thought and re-emerge in other disguises; of fantastic, eccentric ideas that seem innocuous and are so admitted, unnoticed by the media-mechanism; of doubtful ideas that are not invested in their own truth and are thus not damaged when they are manipulated; or of nihilistic ideas that are dismissed for being too depressing."

Peter Halley

edge interview

"artificial life"

a conversation with

chris langton and

doyne farmer

Chris Langton and Doyne Farmer are at the forefront of people defining the new field of "artificial life." They divide their time between Los Alamos and the Santa Fe Institute. They are similar in that they are both lean long-hairs, about the same age (Langton 40, Farmer 37), and are actively pursuing a vision of tackling the issue of biological complexity by developing and understanding emergent beings. I admire their intellectual hunger and desire.

I videotaped the following interview at lunch in a crowded and noisy New Mexican restaurant on Canyon Road in Santa Fe, much to the amusement of our waitress, the consternation of some diners (who were annoyed by the exuberant nature of Langton and Farmer), and the excitement of other diners (who believed they were watching the taping of a segment of "Lifestyles of the Rich and Famous.")

—JB

FARMER: The questions we are asking ourselves are: what are adaptive systems, what makes them tick, and why are they different from other things? As you begin asking these questions, you find yourself coming back to even more basic questions like: what is life, and why is life really different from something that isn't alive?

LANGTON: The whole notion of artificial life is to abstract the relevant details of living things from the probably irrelevant details of the particular material in which life happened to emerge on the planet earth. So the goal is to abstract what it means to be alive from the material.

BROCKMAN: What can you compare it to?

LANGTON: Ah, there's a loaded question. You can think of a computer in two ways: as something that runs a program and calculates a number, or as a kind of logical, digital universe which you can make behave in many different ways. Our belief is that we can put sufficiently complex universes into computers so that they can support processes which, with respect to that universe, must be considered alive. They would behave in that universe the way living things do in this universe. But they wouldn't be made out of the same stuff.

To do that raises a lot of possibilities. If we can accept that they are alive, the empirical base upon which we are going to be able to build general theories of life is broadened. As it stands, it is very difficult to build general theories of life based on theoretical biology. We can't make statements about what life would be like anywhere else in the universe. We can only talk about what we know here.

Also, it raises the awesome possibility that we are going to be participating in creating the next living things in the universe.

BROCKMAN: What might be an example of a life form that gets created?

LANGTON: I think there's a whole spectrum of possibilities, if we can get things going within computer environments which are effectively alive, using evolutionary principles to get them to adapt within these environments.

LANGTON: Computer viruses satisfy a lot of the criteria for living things.

LANGTON: They are rapidly proliferating.

BROCKMAN: Maybe the pro-life people will get into it ...

FARMER: Except we don't have rights for real viruses, or bacteria, or chickens for that matter. We somehow single ourselves out to have this right to life. I had an argument with a vegetarian friend, to whom I said, "If you're really a vegetarian, you should never turn off your computer!" It's just a matter of where you draw the cutoff on the hierarchy and whether you believe in that hierarchy.

6—August 1990—EDGE

One of the thorny questions here is: where does a model of a living thing turn into a living thing? Because if the model starts incorporating enough of the properties of a living thing, maybe it becomes alive at a certain point.

FARMER: Lifeness should perhaps be thought of as a continuous property. To me, a machine is a little more alive than a rock and probably less alive than a virus which is less alive than a bacterium which is probably less alive than I am. (Of course I put myself up at the top.)

But nature can throw Avogadro's numbers of computers at something because it's got zillions of molecules, all of which act like independent parallel processors. We can't really do that.

FARMER: One of the thorny questions here is: where does a model of a living thing turn into a living thing? Because if the model starts incorporating enough of the properties of a living thing, maybe it becomes alive at a certain point.

LANGTON: Many people have a problem with that basic distinction. They say that, no matter how like the real thing the model is, a life cannot really be attributed to it. It's a fundamental difference. We basically sit on the other side of that fence. We think that if it smells like a dog and barks like a dog and eats like a dog, you might as well call it a dog. Whether or not it's made out of the same stuff is irrelevant.

BROCKMAN: I imagine you have detractors.

LANGTON: Surprisingly enough, I'm getting some fairly severe criticism—not for artificial life per se, but for being a computationalist in artificial life.

BROCKMAN: Can I call my ten-year-old son, Max, a computationalist when he plays with his Nintendo "Game Boy"?

LANGTON: It depends on whether he believes that what's in the Nintendo game could actually have its own kinds of properties and its own kind of existence. It is the same kind of criticism that's being leveled against AI: that a computer could never be "conscious." The people who throw barbs are people who have been in systems science.

FARMER: Philosophers, too, like John Searle. To me, this is a silly debate. The biggest piece of ammunition Searle has is

that the artificial intelligence guys haven't come up with anything intelligent. If they had something that could pass the Turing test—that could do things which at least appear to be intelligent—they would have something to go back at him with. Eventually, I think they will. But it's just going to take longer than originally stated. They made the mistake in 1950 of saying that they could accomplish this in ten to twenty years.

FARMER: Part of the motive for studying artificial life instead of artificial intelligence is to tackle some easier problems first, rather than jump directly to intelligence. Let's see if we can even grasp the basic principles that keep a bacterium going. But there are a lot of commonalities between A-life and AI. The whole notion of adaptation and evolution clearly underlies both of those systems, and many of the organizational principles behind intelligence and behind life are similar. Intelligence sprang out of life. So there are a lot of common questions, common threads, and common brick walls.

LANGTON: I find it hard to draw a dividing line between them as well. Starting with a study of systems which determine their own behavior due to information structures they contain inside themselves, the AI people picked the most complex example in that group: intelligent things. They were misled by the fact that it is easy to get computers to do things that human beings consider hard. And so they met with a lot of initial success at what turned out to be not very difficult problems.

Richard Dawkins gives a nice example: if you take a dead bird and throw it into the air, it traces out a beautiful parabola in obedience of simple physical forces. However, if you throw a live bird into the air, although it is influenced by gravitational forces, its trajectory is largely determined by itself, using information processing going on in the bird. So my aim is to understand how, in a universe dominated by energy, there came to be processes dominated by information systems which determine their own behavior—far removed from basic physical forces which act upon them.

BROCKMAN: Where do you see your A-life work leading in the next five years?

FARMER: I hope we can come up with

some examples that we can call artificial life without having to cross our fingers and make a lot of exceptions and provisos. That would give us the platform to do the experiments we need to make a theory. This is analogous to the development of thermodynamics and statistical mechanics in the last century. We need a louse to get in there and find a set of simple experiments that have quantitative results.

BROCKMAN: What's that experiment going to be, if you had to guess?

LANGTON: After digesting everything that was presented at the first Artificial Life Workshop, we realized that there was a kind of fundamental architecture underlying most of the better models that we saw. In hindsight, it's lots of simple things interacting with one another to do something complicated collectively. Our goal at the moment is to try to build a software simulation package on the Connection Machine at Los Alamos. It's going to take that kind of machine, because, as Doyne mentioned, the kind of computational power that nature has thrown at the simplest living thing is far in excess of what we have. Technologies such as the Connection Machine are only beginning to bring us closer to the kinds of complexity of interaction of simple programs.

BROCKMAN: Is the Connection Machine in itself nature working?

LANGTON: It's a lot closer to the way nature works.

FARMER: Is there a threshold of complexity that we have to reach in order for something to behave as though it were alive? It is not clear to me whether the Connection Machine is powerful enough to reach such a threshold of complexity. There do seem to be such thresholds in a lot of systems. For instance, the machine that replicates ourselves—this templating, protein, DNA machine—seems to have a minimum complexity threshold below which it can't go. There's a limit to how much you can simplify that system and still have it work. And when you think about life, that's one of many interesting questions one would like to really address in a broader, more general way.

at the reality club

RECENT TALKS:

- Bob Schwartz: Man Here Says New Era Arriving Right on Schedule
- Jim Toback: The Big Bang
- Stuart Kauffman: Beyond Darwin: Can the Spirit of Physics Invade Biology?
- Ken Kesey: Collaborative Fiction
- Robert Rodale: What Price Reality
- Candace Pert: Peptide T: On the Nether Side of the Paradigm Chain
- Art Kleiner: Consequential Heresies
- Daniel Dennett: Time and the Architecture of Consciousness
- Janle James: Will Angkor Survive? A Recent Visit to the Capital of the Khmer Empire
- Paul Starr: The Liberal Renewal
- Stanislav Grof: The Healing Potential of Nonordinary States of Consciousness
- John & Nancy Todd: Ecological Engineering
- Elaine Pagels: Satan
- Jaron Lanier: Virtual Reality
- Nicholas Toth: The Knowledge of Edge: Origins of Human Technology
- Marat Akchurin: A Tartar's Tour of the Soviet Ethnic Republics
- Terence McKenna: Having Archaic and Fating It Too
- April Gornik: Landscape and Abstraction: Current Work
- George Dyson: Baidarka: The Skin Boat as a Frame of Mind
- Stephen Jay Gould: The Measurement of Progress in Baseball and Evolution: Some General Musings on the Assessment of Excellence
- Jerome Bruner: Autobiography: Prophetic Retrospect

REALITY CLUB EAST: We are currently in negotiations with the USSR Academy of Creative Pursuits to open a Moscow branch of The Reality Club (Reality Club East). This new Academy is concerned with science, culture, and social activities. We are considering ideas for developing this joint venture.

REALITY CLUB BOOKS: The Reality Club Book Series is being published by Prentice Hall Press. *Speculations* (#1) is scheduled for publication in August, *Doing Science* (#2), will be published in December, and *Ways of Knowing* (#3) will be published in January. The first volume of the German language edition was published by Heyne in July.

FARMER: It's hard to think that, in the early part of the nineteenth century, people didn't know what heat was. They only had vague ideas about it. That's the state we're in now when we talk about complex systems, and life, and structure, and complexity, and organization, and all these things. We bat them around as if we know what they are. But we really don't know in the more precise sense that scientists like to have.

BROCKMAN: No doubt you've given some thought to the philosophical implications of your work. Could you talk about them?

LANGTON: The idea of artificially created life is pregnant for any branch of philosophy. I think it's true that, whether it happens in the next ten or a hundred or a thousand years, we're at the stage where it has become possible to create living things that are connected to us not so much by material as by information. In geological time, we're literally at the end of one era of evolution and at the beginning of another.

LANGTON: A reporter once asked me how I would feel about my children living in an era where there was a lot of artificial life.

BROCKMAN: Maybe your children will be artificial?

LANGTON: Well, that was my answer. The children of the mind, to use Hans Moravec's phrase, or my biological children, are all going to be my children. We are going to be able to produce ideas that have lives of their own.

FARMER: I got called a mechanist by Rupert Sheldrake. "You mechanist!!!" he said. Sheldrake characterizes himself as a vitalist. What I kept trying to tell him is that you can be a mechanist and a vitalist at the same time. They don't have to be mutually exclusive. A system can be completely mechanistic at some low level. But because of nonlinear interactions between its parts, it can give rise to fascinating emergent behavior that is very vital. I think it's a mistake to separate those points of view.

As this whole area develops, what I hope emerges is a much clearer picture, a more synthetic philosophy that allows somebody to be vitalist and mechanist at the same

time, that doesn't denigrate the mystical properties of things but perhaps gives us a little more insight, another way of looking at what these things might be. This can prevent us from getting bogged down in silly and anthropomorphic questions. That's perhaps one of the most central ways in which these kinds of studies may help us sort out a more reasonable philosophy.

FARMER: I think human beings are learning as we go along not to place ourselves at the center or the pinnacle of everything that goes on. With the advent of artificial life, I think we will lose much of our monopoly on certain things—"we" meaning both people and the DNA carbon-based organisms that we see all around us. On both those levels at once, a certain sterile homogeneity will be lost.

LANGTON: It is going to be hard for people to accept that machines are as alive as they are. There's nothing special about human life that isn't achievable by any other kind of stuff if you just put it together in the right way. It's going to be as hard for people to accept that as it was that we aren't at the center of the universe.

LANGTON: Another philosophical issue this raises is one of our own existence, our own reality and our own universe. After you work for a long time at creating these artificial universes and wondering about getting life going in them, you find yourself looking over your shoulder every now and then and wondering if there isn't yet another level on top of ours. This is Fredkin's view.

BROCKMAN: The human as artifice?

LANGTON: Or this universe as artifice in some other, much more real universe. Until now, biology has taken apart what's already alive. Based on that, it tries to understand what life is. We're finding that you can learn a lot by trying to put things together, trying to create life, finding out what problems you run into. This notion of learning about your own universe by trying to build these simple models is nice, this notion of putting together an artificial universe. It makes me look over my shoulder and wonder—what sort of a universe am I really in?

EDGE
The Newsletter of
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Editor: John Brockman

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Kalinka Matson

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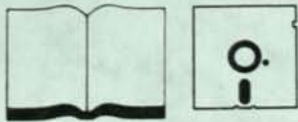
Edge Foundation was established as an outgrowth of an informal group known as The Reality Club. Its purposes are to promote discussion of issues of intellectual, philosophical, artistic and literary interest and to work for the intellectual, and social achievement of society. Edge Foundation, Inc. is a non-profit private operating foundation under Section 501 (c)(3) of the Internal Revenue Code.

Edge Foundation,
Inc., 2307 Broadway,
New York, NY 10024
Telephone
212 874-0533;
Fax 212-496-9509



John Brockman Associates, Inc.

2307 Broadway
New York, New York 10024
(212) 874-0500



John Brockman Associates, Inc. 2307 Broadway New York, New York 10024 (212) 874-0500

Katinka Matson
Executive Vice-President

Proposal:

THE REALITY CLUB BOOK SERIES

edited by John Brockman

The Editor

JOHN BROCKMAN, founder of The Reality Club and editor of The Reality Club, is a writer and literary agent. He is the author of By The Late John Brockman (Macmillan, 1969), 37 (Holt Rinehart Winston, 1970), Afterwords (Anchor, 1973), The Philosopher's Game (with Edwin Schlossberg; St. Martins Press).

THE REALITY CLUB BOOK SERIES

The Reality Club Book Series is an ongoing project based on the work and ideas of members of The Reality Club. U.S. and Canadian rights have been licensed by Prentice Hall Press. The first three volumes are complete and will be published in four-month intervals in June, 1990, October, 1990, and February, 1991. Subsequent volumes will be published every six months. Each volume will be devoted to a central theme (same as Granta). The first book, titled Speculations: The Reality Club, Vol. 1, will be about mind, brain, thinking, and consciousness. The second volume deals with physics and biology and is tentatively titled Nature: The Reality Club, Vol. 2. The third volume is concerned with communication, information, learning, and education and is tentatively titled Learning: The Reality Club, Vol. 3.

This series originally was under contract to Lynx Books, who published The Reality Club #1 in October, 1988 (please see enclosed copy), and was forced to cancel their trade publishing program due to financial problems. The new series has been re-conceptualized. Each volume will be about a subject of wide interest indicated by the title of that volume. All the essays included in The Reality Club #1 will be republished in the appropriate volume of the new series.

INTERNATIONAL EDITIONS

The plan is to create an international presence for The Reality Club, and the book series, through customized international editions. In each of these special editions one or two of the American authors will be replaced by like-minded nationals living and writing in that particular market. The selection of writers will be made in consultation with the foreign publishers. Thus, for example, readers and critics in England, France, or Italy can read their own writers in the context of the best that the U.S. has to offer.

German language rights to the series have been licensed by Heyne. Customized editions are also planned for England, Germany, France, Italy, Japan, Spain, and the Soviet Union.

Enclosed please find:

- (1) the table of contents and list of contributors for each volume
- (2) a copy of the rough art work for the first cover
- (3) Publisher's Weekly review of The Reality Club #1;
- (4) 1989-1990 Reality Club schedule and announcements
- (5) Lynx brochure for The Reality Club #1
- (6) a copy of The Reality Club #1

ABOUT THE REALITY CLUB

The motto of the Reality Club is "to arrive at the edge of the world's knowledge, seek out the most complex and sophisticated minds, put them in a room together, and have them ask each other the questions they are asking themselves."

Since 1981 The Reality Club has held free-for-all meetings once or twice a month, usually in New York. The evening consists of a one-hour talk or presentation by a speaker to Reality Club members. The talk is followed by lively, challenging, and often impolite discussion. Speakers are asked to represent an idea of reality by describing their creative work, their lives, and the questions they are asking themselves, and to share with the members the boundaries of their knowledge and experience.

Reality Club meetings are private. Membership in The Reality Club is informal, by invitation only, and reserved to individuals who have spoken before the club. Speaker selection is a word-of-mouth enterprise among the membership. There is no selection committee. The Reality Club is different from clubs of the past - The Algonquin, The Apostles, The Bloomsbury Group, The Club, The Lunar Society of Birmingham -but it offers the same quality of intellectual adventure.

Reality Club speakers include: space biospherian John Allen, biologist Isaac Asimov, zen-master Richard Baker-Roshi, anthropologist Mary Catherine Bateson, social critic Morris Berman, editor Stewart Brand, psychologist Jerome Bruner, actor Ellen Burstyn, neurophysiologist William Calvin, physicist Fritjof Capra, physicist Sidney Coleman, philosopher Daniel Dennett, essayist Annie Dillard, commentator Hugh Downs, nanotechnologist K. Eric Drexler, physicist Freeman Dyson, computer scientist Edward Feigenbaum, "chaos" physicist Mitchell Feigenbaum, theatrical director Richard Foreman, feminist Betty Friedan, zoologist Stephen Jay Gould, physicist Alan Guth, artist Peter Halley, anthropologist & shaman Michael Harner, computer scientist Danny Hillis, political activist (the late) Abbie Hoffman, software entrepreneur Mitch Kapor, novelist Ken Kesey, satirist Paul Krassner, energy experts Amory & Hunter Lovins, "fractal" mathematician Benoit Mandelbrot, biologist Lynn Margulis, biographer Paul Mariani, psychologist Rollo May, poet Michael McClure, religious historian Elaine Pagels, physicist (the late) Heinz Pagels, architect Witold Rybczynski, cognitive psychologist Roger Schank, art collector Eugene Schwartz, psychologist Robert Sternberg, American historian William Irwin Thompson, sociologist Sherry Turkle, biologist Francisco Varela, biogerontologist Roy Walford, and architect James Wines.

In 1989, The Reality Club was formally adopted as a project of Edge Foundation, Inc., a non-profit private operating foundation, under IRS section 501 (c)(3), with a mandate to explore cutting-edge ideas in our culture. EDGE interfaces with the general public in two ways. The first project is The EDGE Video Library consisting of tapes of Reality Club meetings, colloquia, and one-on-one discussions with individual members. These presentation-quality tapes are produced for archival purposes and are made available to interested parties free of charge. The second project is The EDGE Colloquia, a program featuring groups of Reality Club members appearing before public audiences.

SPECULATIONS

THE REALITY CLUB

Vol. 1

JOHN BROCKMAN

Editor

CONTENTS

The Reality Club
by John Brockman

A Flowing Sentence, A Train of Consciousness, A Rippling Arpeggio:
The Trilogy of Homo Seriatum
by William Calvin

Reality and the Brain:
The Beginnings and Ending of the Human Being
by Julius Korein, M.D.

Psychotherapy Systems and Science
by Robert Langs, M.D.

The Uses of Consciousness
by Nicholas Humphrey

The Evolution of Consciousness
by Daniel C. Dennett

Simulations of Reality
by William H. Calvin

The Two Faces of Creativity
by Morris Berman

Speculation on Speculation
by Lynn Margulis

Dreaded States and Cherished Outcomes
by Dan Ogilvie

Behind Closed Doors:
Unlocking the Mysteries of Human Intelligence
by Robert Sternberg

Memes vs. Genes:
Notes from the Culture Wars
by Mihaly Csikszentmihaly

Media-Neutral
by Wim Coleman and Pat Perrin
featuring Daniel C. Dennett as himself

What Narcissus Saw:
The Oceanic "I"
by Dorion Sagan

CONTRIBUTORS

MORRIS BERMAN is an author, lecturer, and social critic. His published works include Social Change and Scientific Organization (Cornell University Press), and The Reenchantment of the World (Bantam). His essay in this issue is adapted from Coming to Our Senses (Simon & Schuster).

WILLIAM H. CALVIN, neurophysiologist at the University of Washington in Seattle, is author of The Throwing Madonna: Essays on the Brain, and The River That Flows Uphill: A Journey from the Big Bang to the Big Brain (Macmillan/ Sierra Club). His two essays in this volume are adapted from Cerebral Symphony: Seashore Speculations on the Structure of Consciousness (Bantam).

WIM COLEMAN, playwright and poet, is co-editor of The jamais vu papers. He is the coauthor of PragMagic (with Marilyn Ferguson and Pet Perrin; forthcoming, Pocket Books). His essay is excerpted from his forthcoming book The Jamais Vu Papers (with Pat Perrin, Crown).

MIHALY CSIKSZENTMIHALYI, a research psychologist who studies "flow states," is Chariman, Department of Behavioral Sciences, University of Chicago, and author of Flow: The Psychology of Optimal Experience (Harper & Row).

DANIEL C. DENNETT, philosopher, is Distinguished Arts & Sciences Professor at Tufts University and Director, Center for Cognitive Studies. He is the author of Brainstorms: Philosophical Essays on Mind and Psychology (Bradford), and coeditor of The Mind's I: Fantasies and Reflections on Self and Soul (with Douglas Hofstadter).

NICHOLAS K. HUMPHREY, a theoretical psychologist from Cambridge, is the author of Consciousness Regained (Oxford), The Inner Eye (Faber & Faber), editor (with Robert Jay Lifton) of In a Dark Time.

JULIUS KOREIN, M.D., is a neurobiologist who studies brain states of death, vegetation, and life. He is professor of Neurology, New York University Medical Center.

ROBERT LANGS, M.D., is a clinically trained psychoanalyst and author of twenty books on psychotherapeutic interaction, including A Primer of Psychotherapy (Gardner Press), Decoding Your Dreams (Henry Holt), and Rating Your Psychotherapist (Henry Holt).

LYNN MARGULIS is a biologist, Distinguished Professor (Department of Botany) at University of Massachusetts at Amherst, and author of Symbiosis in Cell Evolution (W.H. Freeman), Origins of Sex (with Dorion Sagan; Yale), Microcosmos (with Dorion Sagan; Summit), and Mystery Dance (with Dorion Sagan; forthcoming, Summit).

DAN OGILVIE is a psychologist and researcher on aspects of life satisfaction over the life span. He is member of the department of psychology at Rutgers University.

PAT PERRIN, artist, is co-editor of The jamais vu papers. She is coauthor of PragMagic (with Marilyn Ferguson and Wim Coleman; forthcoming, Pocket Books). Her essay in this volume is excerpted from her forthcoming book The Jamais Vu Papers (with Wim Coleman, Crown).

DORION SAGAN is a writer, author of Origins of Sex (with Lynn Margulis; Yale); Microcosmos (with Lynn Margulis; Summit); and Biosphere (forthcoming, McGraw-Hill) and Mystery Dance (with Lynn Margulis; forthcoming, Summit).

ROBERT STERNBERG is IBM Professor of Psychology and Education, Yale University, and author of several books: The Triarchic Mind: A New Theory of Human Intelligence (Viking), The Triangle of Love (Basic), and the forthcoming Love the Way You Want It (forthcoming, Bantam).

NATURE

THE REALITY CLUB

Vol. 2

JOHN BROCKMAN

Editor

CONTENTS

What Are the Laws of Nature
by Paul Davies

Exploring Future Technologies
by K. Eric Drexler

Counting The Ways:
The Scientific Measurement Of Love
by Robert Sternberg

Bacterial Writing & the Metaphysics of Sex
by Dorion Sagan

On the Method of Theoretical Physics (Redux)
by Gerald Feinberg

How to Tell What is Science from What Isn't
by Richard Morris

Small Science
by James Lovelock

Chaos in Myth and Science
by Ralph H. Abraham

Big Trouble in Biology: Autopoiesis and Neodarwinism
by Lynn Margulis

The Body Thinks:
Why and How the Immune System is Cognitive
by Francesco Varela and Antonio Coutinho

The Evolutionary Striptease
by Dorion Sagan

Godel and Einstein as Companions
by Hao Wang

Space Biospheres:
An Interview with John Allen and Margret Augustine
by John Brockman

CONTRIBUTORS

RALPH H. ABRAHAM is Professor of Mathematics and Director of the Applied and Computational Mathematics Program at the University of California at Santa Cruz. He is the author of Chaos, Gaia, and Eros (forthcoming, Harper & Row).

JOHN ALLEN, Director of Scientific Development at Space Biospheres, is a founder of Institute of Ecotechnics, and dramaturge to the Caravan of Dreams Theater.

MARGRET AUGUSTINE, architect, is Managing Director of Sarbid, and Project Director and CEO of Space Biospheres Ventures. Sarbid, an acronym for synergistic architecture and biotechnic design, is a London-based architectural firm which has pioneered in the development of an ecological perspective in architecture.

PAUL DAVIES, Professor of Theoretical Physics at the University of Newcastle upon Tyne, is author of God and the New Physics (Simon & Schuster) Superforce (Simon & Schuster), and The Cosmic Blueprint (Simon & Schuster).

K. ERIC DREXLER is a researcher at M.I.T. and Stanford who is concerned with emerging technologies and their consequence for the future. He is the author of Engines of Creation (Anchor), and Nanotechnology (forthcoming, Morrow).

JAMES E. LOVELOCK, independent scientist, is President of Marine Biology Association, a fellow of the Royal Society, London, and author of GAIA: A New Look at Life on Earth (Norton).

LYNN MARGULIS is a biologist, Distinguished Professor (Department of Botany) at University of Massachusetts at Amherst, and author of Symbiosis in Cell Evolution (W.H. Freeman), Origins of Sex (with Dorion Sagan; Yale Microcosmos (with Dorion Sagan; Summit), and Mystery Dance (with Dorion Sagan; forthcoming, Summit).

RICHARD MORRIS, theoretical physicist, is author of Dismantling the Universe (Simon & Schuster); Time's Arrows (Simon & Schuster); The Nature of Reality (McGraw-Hill), and The Edges of Science (forthcoming, Prentice Hall Press).

DORION SAGAN is a writer, author of Origins of Sex (with Lynn Margulis; Yale); Microcosmos (with Lynn Margulis; Summit); and Biosphere (forthcoming, McGraw-Hill) and Mystery Dance (with Lynn Margulis; forthcoming, Summit).

ROBERT STERNBERG is IBM Professor of Psychology and Education, Yale University, and author of several books: The Triarchic Mind: A New Theory of Human Intelligence (Viking), The Triangle of Love (Basic), and the forthcoming Love the Way You Want It (forthcoming, Bantam).

FRANCESCO VARELA is a biologist who holds the Fondation de France Chair in Cognitive Science and Epistemology at Ecole Polytechnique in Paris. He is the author of Autopoiesis and Cognition: The Realization of the Living (with Humberto Maturana; D. Reidel) and The Tree of Knowledge: The Biological Roots of Human Understanding (with Humberto Maturana; New Science Library).

HAO WANG is professor of Logic, Rockefeller University and author of Beyond Analytical Philosophy: Doing Justice to What We Know (MIT) and Reflections on Kurt Godel (MIT).

LEARNING

THE REALITY CLUB

Vol. 3

JOHN BROCKMAN

Editor

CONTENTS

A Journey of Relativities
by Mary Catherine Bateson with Sevanne Margaret Kassarian

The Social Non-Sciences
by Page Smith

Johnny Can't Read (And Neither Can His Old Man)
by Roger Schank

In Defense of Elitism
by Gerald Feinberg

Another Reality Club
by Joan Richardson

Failure is Nice
Failure on a Computer is Even Better
by Roger C. Schank

The Questionable Reality of Media
by Joshua Meyrowitz

Relative to Relativity or It's About Time
by Joan Richardson

Where Linguistics, Archaeology and Biology Meet
by Vitaly Shevoroshkin and John Woodford

The School of the Future
by Howard Gardner

Video, Computers, and Memory
by Paul Ryan

Fiction--Its Uses and Misuses
by Mark Jay Mirsky

The Body of History
by Morris Berman

Berryman's Last Months: "I am Busy Tired Mad Lonely & Old"
by Paul Mariani

CONTRIBUTORS

MARY CATHERINE BATESON is Robinson Professor of Anthropology and English, George Mason University, and author of With a Daughter's Eye: A Memoir of Margaret Mead and Gregory Bateson (Morrow/ Pocket Books); Composing a Life (Atlantic Monthly Press); with Gregory Bateson, Angel's Fear: Toward an Epistemology of the Sacred (Macmillan/ Bantam); and with Richard A. Goldsby, Thinking Aids (Addison Wesley). SEVANNE MARGARET KASSARJIAN is a student at Brown University.

MORRIS BERMAN is an author, lecturer, and social critic. His published works include Social Change and Scientific Organization (Cornell University Press), and The Reenchantment of the World (Bantam). His essay in this issue is adapted from Coming to Our Senses (Simon & Schuster).

GERALD FEINBERG, a particle physicist, is Professor of Physics, Columbia University, and author of Life Beyond Earth (with Robert Shapiro, William Morrow) and Solid Clues (Simon & Schuster).

HOWARD GARDNER is a psychologist and director of Project Zero at Harvard University School of Education. He is the author of Frames of Mind: The Theory of Multiple Intelligences (Basic) and The Mind's New Science: A History of the Cognitive Revolution (Basic).

PAUL MARIANI is a biographer, critic, and poet and the author of seven books, including William Carlos Williams: A New World Naked (McGraw-Hill) and Tumult and Lamentations: The Life of John Berryman (forthcoming, Morrow).

JOSHUA MEYROWITZ, Professor of Communication at the University of New Hampshire, is the author of No Sense of Place: The Impact of Electronic Media on Social Behavior.

MARK JAY MIRSKY, novelist, is professor of English, City College of New York and the editor of Fiction magazine. He is the author of Blue Hill Avenue and Thou Worm Jacob.

JOAN RICHARDSON is a biographer, professor of English at City University of New York, and author of Wallace Stevens: The Early Years 1879-1923 (Morrow), and Wallace Stevens: The Later Years 1923-1955 (Morrow). Her article is adapted from her forthcoming book, Relative to Relativity (Viking-Penguin).

PAUL RYAN, cyberneticist and video artist, is the author of Cybernetics of the Sacred. His video work has been shown at the Museum of Modern Art, and Cathedral of St. John the Divine.

ROGER SCHANK, professor of Psychology and and Computer Science, Yale University, is author of The Cognitive Computer (with Peter Childers, Addison Wesley), and The Creative Attitude: Learning To Ask and Answer the Right Questions (Scribners).

PAGE SMITH, historian, is the former Provost of Cowell College, University of California, Santa Cruz, and the author of A People's History of the United States (8 volumes, McGraw-Hill/ Penguin). His article is excerpted from his forthcoming book, Killing the Spirit: Higher Education in America (Viking-Penguin).

VITALY SHEVOROSHKIN, linguist, is professor of Slavic Languages and Literatures at the University of Michigan. He is coauthor of The Mother Tongue: Uncoding the Most Ancient Language of Mankind (with John Woodford; forthcoming, Addison Wesley).

JOHN WOODFORD, journalist, is executive editor of the University of Michigan publicatin, Michigan Today. He is coauthor of The Mother Tongue: Uncoding the Most Ancient Language of Mankind (with Vitaly Shevoroshkin; forthcoming, Addison Wesley).

SPECULATIONS*The Reality Club, Volume One*

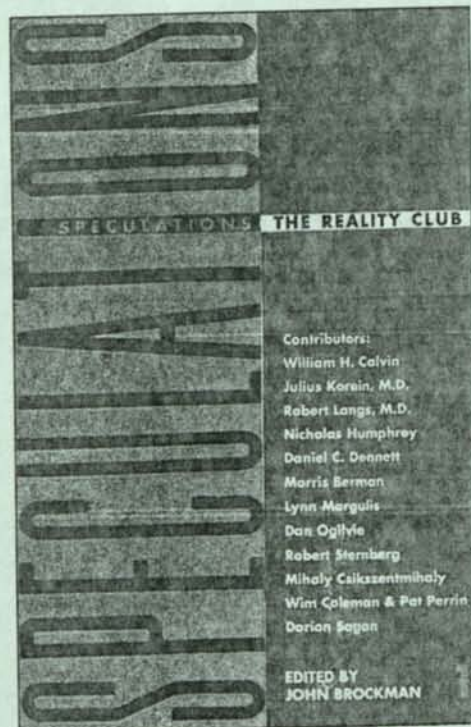
John Brockman, Editor

A chance to brainstorm with the cutting-edge minds of our time.

Neurophysiologist William Calvin. Social critic Morris Berman. Biologist Lynn Margulis. Philosopher Daniel Dennett. These are just a few of the pioneering thinkers featured in *Speculations*, a volume of provocative essays on the subject of The Human Mind, the first in a series of thematic books by members of The Reality Club.

The Reality Club is an informal group of adventurous intellectuals not unlike The Algonquin Round Table, The Cambridge Apostles, or The Bloomsbury Group, according to its founder, writer and New York literary agent John Brockman. Membership is by invitation only and includes a roster of names that amounts to a Who's Who of American arts, science, politics, and business, from zen masters to novelists to physicists to historians and philosophers.

The Club has been meeting in private, free-for-all sessions once or twice a month since 1981. Now it's going public in a series of books that will be required reading for anyone who appreciates the life of the mind, the unflinching search for truth, and reading for sheer intellectual pleasure.

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THE REALITY CLUB

Contributors:

William H. Calvin
Julius Korein, M.D.
Robert Langs, M.D.
Nicholas Humphrey
Daniel C. Dennett
Morris Berman
Lynn Margulis
Dan Ogilvie
Robert Sternberg
Mihaly Csikszentmihaly
Wim Coleman & Pat Perrin
Dorion Sagan

**EDITED BY
JOHN BROCKMAN**

SPECULATIONS

The Reality Club

John Brockman, Editor

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NONFICTION ORIGINALS

THE REALITY CLUB 1

Edited by John Brockman. Lynx, \$9.95
ISBN 1-55802-192-2

According to founder Brockman, the exclusive Reality Club, based in Manhattan and comprising philosophers, neurophysiologists, social critics, particle physicists, anthropologists and psychologists, charges its speakers "to represent an idea of reality by describing their creative work, their lives, and the questions they are asking themselves." Fortuitously, this stimulating collection of essays, offshoots of lectures by 14 Reality Club members, is, for all its sophistication and erudition, remarkably accessible. Nearly half of the selections explore speculative theories about the mind in its various aspects, such as the creative process, the sequential nature of thought and the origin of the brain. Other pieces cover future technologies, the measurement of love, teaching children to read critically, and a defense of elitism cum an attack on affirmative action. This volume offers many innovative insights, but perhaps is most valuable as a celebration of the process of thinking and questioning. (Nov.)

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The Reality Club is New York's most vibrant intellectual salon. Now THE REALITY CLUB is a biannual publication. Each volume features leading thinkers in the arts and sciences. Timely, thought-provoking, innovative, informative, and challenging, THE REALITY CLUB offers every reader a journey to the cutting edge of ideas and knowledge in our culture.

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Since 1981, The Reality Club has held meetings each month in New York. The speakers are challenged to represent an idea of reality by describing their creative work and discussing those questions they are asking themselves. Speakers have numbered over 100 and include some of the most eminent artists, scientists, writers, and scholars in the world.

The Reality Club dates back to the 60's when its founder John Brockman assembled friends, many of whom were avant garde contributors to our culture, for informal discussions. Participants

thrived on the opportunity to discuss ideas in a rigorous manner.

In 1981, Brockman formalized the club to the point of calling it The Reality Club. The name was a pun; the club's goal was to pose a challenge to contemporary ideas of reality.

In the years since its founding, The Reality Club has become New York's most vibrant intellectual salon. Now it is about to become a biannual publication. Lynx

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“The Reality Club is not just a group of people. I see it as the constant shifting of metaphors, the advancement of ideas, the agreement on, and the invention of, reality. Intellectual life is The Reality Club.”

—John Brockman,
Editor

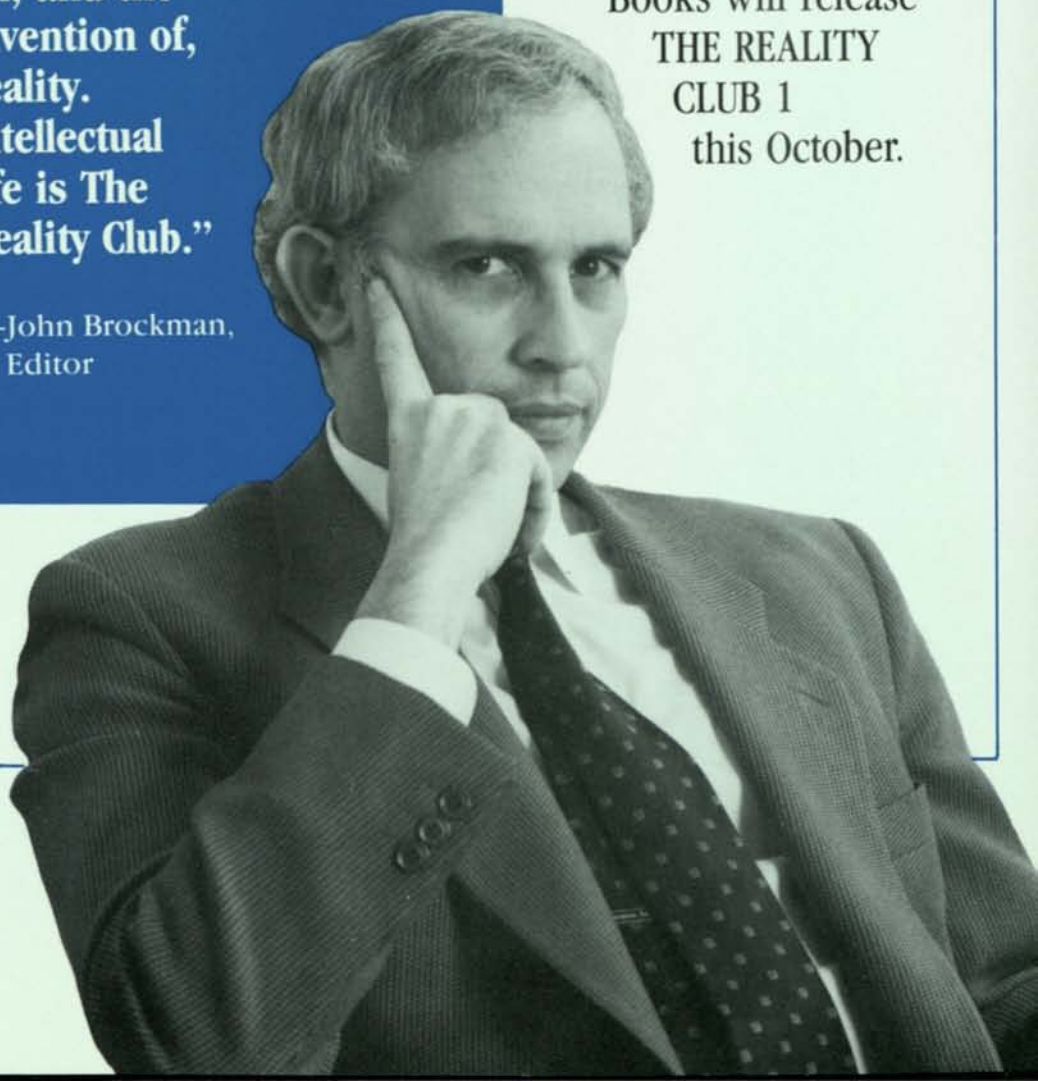


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THE REALITY CLUB 1. AN EXTRAORDINARY BOOK.

“The monks who developed European culture in the Middle Ages transmitted art and learning instead of genes . . . these two ways of transmitting information across time are often in conflict . . .”

Mihaly Csikszentmihalyi
*Memes vs. Genes:
Notes from the Culture Wars*

“As a virus reproduces itself by infiltrating the cell, so some notions would appear to latch on to the human imagination by being suggestive, self-contradictory, or symbolic.”

Dorion Sagan
*What Narcissus Saw:
The Oceanic ‘I’*

“With computers and robotic arms smaller than a living cell, [nanotechnology] will enable the construction of almost anything, building up structures atom by atom.”

K. Eric Drexler
Exploring Future Technologies

“The goal is not to teach reading at all. It is to teach children to be able to gather information and be critical in their understanding of that information.”

Roger Schank
Johnny Can't Read (and Neither Can His Old Man)

“Without the Reality Club prod no speculation on speculation would be possible.”

Lynn Margulis
Speculation on Speculation

“One can plausibly say that what a society holds most sacred is defined by those activities that it insists be done as well as possible.”

Gerald Feinberg
In Defense of Elitism

“Each of us has the sense of both concurring with and differing from our respective generations, and we share a tradition of elaborating self-knowledge through observation and encounters with others, for all observation of the other is also self-observation.”

Mary Catherine Bateson with
Sevanne Margaret Kassarian
A Journey of Relativities

“We must face the fact that humans have a better claim on the title ‘Homo seriatim’ than on ‘Homo sapiens’—we’re more consistently serial than wise.”

William Calvin
*A Flowing Sentence, a Train of
Consciousness, a Rippling
Arpeggio: The Trilogy of Homo
Seriatum*

This first edition presents 13 essays representative of Reality Club talks . . . essays that will take every reader to the cutting edge of today’s most challenging “realities.”

“Being conservative, we could estimate the onset of the life of a human being— as reflected by the organizational structure of the critical system of the brain and its incipient function—to be after twenty weeks; a person begins to emerge.”

Julius Korein, MD
*Reality and the Brain:
The Beginnings and Endings of the Human Being*

“ . . . modern creative work has a strong addictive or compulsive component to it; the artist is expected to outdo himself or herself with each succeeding product.”

Morris Berman
The Two Faces of Creativity

“Each aspect of love can be viewed as generating a different side of a triangle.”

Robert Sternberg
*Counting the Ways: The Scientific
Measurement of Love*

“I understand the term [unconscious] to designate a process, whereby emotionally charged information is systematically screened out of awareness, essentially for the purpose of survival.”

Robert Langs, MD
Psychotherapy Systems and Science

“The collective purpose of the Arensberg circle was to change the way human beings saw themselves in the world. The members of the group saw their errand into the wilderness clearly: It was to create contexts, worlds within worlds . . .”

Joan Richardson
Another Reality Club

EDGE

FOUNDATION, INC.

June 18, 1990

Esther Dyson
Release 1.0
375 Park Avenue
New York, NY 10152

Dear Esther:

Here is the first draft of the newsletter which I plan to have desktop published, 16 pages long, with no illustrations.

The "market" for the newsletter is hopefully much wider than the 150 or so people in the Reality Club community. I hope to reach out.

Any feedback?

Best regards,



John Brockman

JB:bw
encl.

P.S. This is a working draft, and I still have to clear some permissions, so please keep it confidential.

No. 1

"Nobody knows, you can't find out, and you don't have to ask permission."

EDGE

The Newsletter of Edge Foundation, Inc.

Edited by John Brockman

INSIDE

BROCKMAN ON THE EDGE.....XX
Stewart Brand, Gary Stephan, Mitch Kapor, Art Kleiner, John Allen,
Robert Langs, William Calvin, Roger Schank, Steven Levy,
Mary Catherine Bateson, Hugh Downs, Peter Schwartz, Roy Walford,
Lynn Margulis, Eugene Schwartz, Peter Warshall

EDGE INTERVIEW.....XX
"Artificial Life": A Conversation with Chris Langton and Doyne Farmer

AT THE REALITY CLUB.....XX
Stephen Jay Gould's "The Measurement of Progress in Baseball and
Evolution: Some General Musings in the Assessment of Excellence"
by Pamela McCorduck
Jerome Bruner's "Autobiography: Prophetic Retrospect"
by Mihai Nadin
George Dyson's "Baidarka: The Skin Boat as a Frame of Mind"
by Bruce Wilshire

INTELLECTUAL GRAFFITI.....XX
Benoit B. Mandelbrot, Peter Halley, Stephen Jay Gould, K. Eric Drexler
Alan Guth, Daniel C. Dennett, John Allen, Jaron Lanier, Jay Ogilvy,
Mihaly Csikszentmihalyi, William Calvin, Peter Schwartz, Gary Stephan

FYI.....XX
Reality Club East, Reality Club Books, 1990-91 Season

BROCKMAN ON THE EDGE

FUNKY SUBSTRATES I always take **Stewart Brand** seriously, especially in matters involving new technologies. I recall spending hours with him in the mid-sixties in Menlo Park while he was working on the original Whole Earth Catalog. We sat together with a single copy of Norbert Wiener's Cybernetics, reading and underlining every page. I see the same pattern to his current thinking in a recent statement: "SCIENCE IS THE ONLY NEWS. When you scan through a newspaper or magazine, all the human interest stuff is the same old he-said-she-said, the politics and economics the same sorry cyclic dramas, the fashions a pathetic illusion of newness, and even the technology is predictable if you know the science. Human nature doesn't change much; science does, and the change accrues, altering the world irreversibly."

In a talk at the International Technopolis Conference in San Francisco, Stewart, who is now based in Sausalito, talked about adaptivity in communications technology. "'Fast, cheap, and out of control,' a slogan from the frontiers of 'artificial life' research, characterizes the nature of adaptivity in communications-intensive technopoleis." This is a world of unpredictable adaptive changes:

" * A little over two years ago FAXes were a luxury for businesses. Last year they became a stone necessity. And despite the early bloom in Japan, neither the phone companies nor my futurist colleagues saw it coming.

" * Cellular phones were supposed to fill a modest niche market. Some niche. They are redefining telephone systems.

" * When backyard satellite dishes came out of the blue in the '70's, none of the major electronic manufacturers were in the game. Three billion dollars of dishes were designed and manufactured by--yes--garage-based businesses."

Stewart's prognostication on "deeply different, deeply useful tools" on the horizon?

" * 'Electronic co-presence' -- the term comes from researchers at Xerox PARC, who are demonstrating the usefulness of people working at a physical distance but in electronic intimacy over sustained periods of time. This kind of usage will force more leased lines and more flat-rate pricing by telecommunications companies.

"* Massive parallel processing, such as the already commercial Connection Machine, may reverse the trend toward ever more computing power on the desk. Dumb terminals are gone, but your brilliant terminal may soon be praying for genius milliseconds of time from a remote Godlike throbbing massive parallel machine.

"* Virtual reality -- using eyephones and datasuit for bodily immersion in computer simulated worlds. Once this technology begins to flourish as a communications medium -- 'shared dreaming,' as Jaron Lanier calls it -- then broadband really takes off.

" * 'Artificial life' -- the focus of implosion of all the 'connectionist' subdisciplines of computer science. These rich computer universes are inhabited with myriad diverse 'agents' that learn and self-organize into whole ecosystems and economies."

His bottom line: "The technology environment is bound to remain so turbulent and surprise-rich that only fine-grained constant adaptivity can ensure sustainability over time. High tech development flourishes best on a funky substrate."

Funky substrate??

Stewart, whose last book was The Media Lab, is now working on How Buildings Learn: and Fail to Learn.

DINNER AT PUNSCH Dinner with New York artist **Gary Stephan** (and his wife, artist Suzanne Joelson) at Punsch, the new hot Scandinavian restaurant. This is New York. Thus, when you have dinner with a famous artist at an "in" restaurant, you are surrounded by advertising executives dressed as famous artists. Gary, who shows in New York with Mary Boone, is a leading abstract painter and a master of spatial contradiction. He told me that he has just finished a set of color etchings for Crown Point Press, San Francisco. He'll spend the summer in Upstate New York preparing for a show at Soledad La Lorenzo in Madrid at the end of the year.

HELL ON "THE WELL" "Do you want to sit out the 1990's?," someone asked me a few months ago when I expressed my lack of interest in computer teleconferencing. Well, not able to resist a challenge, and not wanting to miss an entire decade, I had to rise to the occasion and sign up for The Well (The Whole Earth Electronic Link). Thus began many hours of frustration, and unrewarding activity. No doubt teleconferencing is the future of interpersonal communication, but I refuse to accept the blame for my failure to deal successfully with The Well. Teleconferencing software is just too difficult to use.

Recently, software designer **Mitchell Kapor**, founder of Lotus Development Corporation, noted that "the daily experience of using computers is still fraught with difficulty, pain, and barriers for most people." Mitch knows what he is talking about. He set the standard for elegance in design with "Lotus 1-2-3", which revolutionized the computer industry and changed the way large segments of the business world works. (He is now president of ON Technology, in Cambridge).

Mitch also noted that "there is a conspiracy of silence on this issue. It's not splashed all over the front pages of the industry trade press, but we all know it's true. Users are largely silent about this. There is no uproar, no outrage. But scratch the surface and you'll find that people are embarrassed to say they find these things hard to use. They think the fault is their own. So users learn a bare minimum to get by. They under-use the products we work so hard to make and so don't help themselves or us as much as we would like. They're afraid to try anything else. In sum, everyone I know (including me) feels the urge to throw that infuriating machine through the window at least once a week. (And now, thanks to recent advances in miniaturization, this is now possible.)"

Nonetheless, I plan to stay at it and gradually surmount the learning curve. Too many people I respect are on The Well for me to simply ignore it. But, then what?

Communications savant **Art Kleiner**, a former editor of The Whole Earth Review and editor of The Whole Earth Software Catalog, recently volunteered to get me up and running on The Well. However, after 45 minutes of instructions, glitches, and false starts, we were stuck. Art switched off the computer, turned to me, and explained that he's moving away from computer teleconferencing, which, he said, is designed to provide advantage

to personality-deficient people.

I don't like the idea of my personal style being flattened onto a two-dimensional screen "talking" only to those people who have the technological skill and predilection for mastering ridiculously intricate software. I have noticed that sometimes when I call such people on the phone, they get irritated at the interruption because they're on-line, "talking" to someone on the computer.

French thinker Jean Baudrillard writes about "virtual man" in Xerox and Infinity "immobile in front of his computer, (he) makes love by the screen and gives classes by teleconference. He becomes a spastic, probably with a cerebral handicap too. This is the cost of becoming effective. Just as we can suggest that glasses or contact lenses might one day become the integrated prosthesis of a species whose gaze will have gone, so can we fear that artificial intelligence and its technical aids will become the prosthesis of a species whose thought will have disappeared."

BIOSPHERE II The news from Oracle, Arizona (40 miles outside Tuscon) reads as follows: "Space Biospheres Ventures intends to create a second biosphere, Biosphere II, essentially isolated from the existing biosphere by a closed structure, composed of components from the existing biosphere. Like the biosphere of planet Earth, Biosphere II will be a stable, complex, evolving, materially closed, life closed, energetically and informationally open system containing five kingdoms of life, at least five biomes, plus humankind, culture and technics.

"As there is now only one biosphere, the creation of Biosphere II is of considerable significance for three principal reasons:

"* It would provide a formidable tool of study and greatly enhance understanding of our present biosphere; a scientific tool to work with basic ecology in the same way that the cyclotron opened up the world of basic particles.

"* Component ecological technics -- such as biological systems for purification and recycling of water, air and nutrients -- show much promise for application in natural resource management.

"* A biosphere would provide the most widely acknowledged potential means of establishing permanent stations in space or on other planets as research and observation bases and eventually settlements."

The structure is the length of two football fields and five stories high. Rising out of the desert, it's a magnificent sight. In fact, the scale of this project is larger than life. I first heard about it from biogerontologist **Roy Walford**, who said "get down there, it's the most exciting thing on the planet." Roy wasn't kidding. The significance of Biosphere II is two-fold. It can be looked at as a prototype space colony as envisioned by physicist Gerard K. O'Neill in his book The High Frontier. Or it can be studied as a control model of our own planet Earth, giving us a useful tool to look at our environment.

According to published reports, the project is costing anywhere from \$30 to \$50 million, with most of the funding coming from Texan Ed Bass. There are numerous interesting individuals and groups working on various aspects of

Biosphere II. **John Allen** (who spoke to The Reality Club), an engineer, is executive chairman of Space Biospheres Ventures (SBV), a founder of the Institute of Ecotechnics, and dramaturge to the Caravan of Dreams Theatre. Margaret Augustine, an architect and partner in Sarbid Limited, is president of SBV.

In a telephone conference call I asked John about the idea of Biosphere II as a potential space colony. "We don't see picking up a biosphere and launching it into outer space. But if you design a life system like this, you can start out with the seeds for the habitat and the intensive agriculture that would probably be the first module for a colony on Mars or on the moon, and you could take smaller parts of those systems and use them in near Earth orbit and become a space station. And then we look to the longer term stability of the longer term colony and on Mars or moon or space and then look at the overall biosphere system."

"You can look at the implications of Biosphere II", he went on, "in terms of being a tool to give us further information and understanding how we can manage a number of problems we are having here on this biosphere. These first biospherians that are going to go into Biosphere II are going to be the first products of the biosphere university in terms of being total systems managers. We're going to have to manage the water system because that's the water they are going to drink every night at their dinner tables. So if they are doing something over there in the rainforest or in intensive agriculture, they are going to get a feedback in a very quick time frame. And then we will have the information we're going to gain in having to design out of necessity. This will be the first application, this will be the first time we're closing a total water loop, closing the air loop, having to clean up the atmosphere inside Biosphere II. It's going to tell us a lot how we manage air quality in our homes in our offices, in cities and countries."

I pointed out to John that Buckminster Fuller said that it takes 20 to 30 years for military technology to wind up in household appliances. And I asked him to what extent will the technology that you are developing have fallout for the general benefit of society?

"We are looking at a five to ten year fallout for industrial and institutional applications," he replied, "and maybe fifteen for the household. An important part of our corporate planning is to speed up what we refer to as technology transfer. Of course, being a private capital venture, we have every motivation to do it that way."

John's question: "how far, how deep, how complex can we go, and how quick? Biosphere II is a very good tool for this exploration."

Margaret noted that "we're living in a time of great revolution on a cosmic scale," she says, "and also on a microcosmic scale and I think that without being in this field and energy of living in these revolutions we would never have the Biosphere II project going. Just in my lifetime I look out and there's an entirely new vision and understanding of the solar systems that we're living in. There's also a new view of microcosmic scale, the biological revolution. Biosphere II has the potential of taking off from both revolutions and starting a new revolution in biospherics. That's going to have an incredible impact on our future."

Biosphere II is scheduled to close in late October.

MIND LAWS "We're on the verge of a series of mathematical laws for the human mind and emotionally charged communication...we feel we are bringing mind lawfully into nature." So said noted psychiatric researcher **Robert Langs** to me on the phone recently. I'm going to follow this very closely. Bateson clearly pointed out the problems in using the language of Newtonian physics to talk about the mind. Bob, and others, are beginning to apply notions of quantum mechanics. Such bootlegging of concepts raises interesting possibilities and asks good questions, but the jury is still out.

Bob, author of Decoding Your Dreams and A Primer of Psychotherapy, is executive director of The Psychoanalytic Center for Communicative Education and Research in New York City. He's collaborating in this new work with mathematician Anthony Badalementi. Together they are writing The Physics of the Mind.

THROWING CHIMPS Neurophysiologist **William Calvin**, author of The Throwing Madonna and Cerebral Symphony checked in recently from Seattle to say that he attended the spring meeting of the Wenner-Gren Foundation for Anthropological Research in Cascais, Portugal in the company of anthropologists, developmental psychologists, chimpanzee researchers, and climatologists. The theme of the meeting: do tools lead to language or vice-versa, and what does intelligence have to do with all this. Bill reports that the developmental people were talking about how children develop tool using and conceptual skills, while primatologists were talking about sign language and tool using by chimpanzees. He talked with primatologist Sue Savage-Rumbaugh about whether tool using such as accurate throwing might carry over into other areas such as language skills. On his way back to Seattle, he stopped at her lab in Atlanta to meet the chimps and examine their throwing abilities.

A highlight of the conference was a trip to the Portugese beach at the westernmost point in Europe for a hands-on session with anthropologist **Nicholas Toth** in making stone age tools. Nick had just arrived in Cascais from New York where he gave a talk at The Reality Club.

Bill's new book is Ascent of Mind: The Ice Age Climate and the Rise of Intelligence.

COMPUTERIZED PEN I'm not surprised to hear that New York writer **Pamela McCorduck**, author of Machines Who Think and coauthor (with Edward Feigenbaum) of The Fifth Generation and The Expert Edge, is lending her technological expertise to PEN, not exactly noted as a hotbed of innovative ideas. Pamela is on PEN's Board of Directors, which is a very good thing for PEN. Her mandate is to expand their reading program to embrace new technology, i.e. computers. She plans to include teleconferencing so that students and other readers can meet and talk to authors online. "This is a new departure," she says, "for a group who frequently think they are technologically advanced when they use a manual Olivetti." The program is called "The Pleasures of Reading," and is intended to complement to other literacy programs. She hopes to use new technologies of communication to put writers in touch with readers and readers in touch with writers.

Her new book is Art, Meta-Art, and Artificial Intelligence: The Work of Harold Cohen.

FOOD AND WINE LOVER'S GUIDE TO THE MIND Eating and thinking are two subjects that have great appeal to cognitive psychologist and computer scientist **Roger Schank**, author of The Cognitive Computer and The Creative Attitude, and a noted gourmand and oneophile. He pursues his interests in Michelin three-star restaurants in France, sushi bars in Tokyo, kosher restaurants in New York, and Air France's first-class service: all in pursuit of his goal of thinking about food, wine, and thinking itself.

At his last appearance at The Reality Club in 1989, Roger was the speaker at The Reality Club Chinese banquet in New York City, holding forth on the nature of language, thought, reasoning, learning, memory, and education. Since then, he has given up the excitement of New Haven (and his joint appointment at Yale in computer science and psychology) for Northwestern University in Evanston, Illinois, where he has set up The Institute of Learning Science, funded to the tune of a reported \$30,000,000 by corporations such as Arthur Anderson, Ameritech, and IBM. He has hired a staff of eighty people on a budget of \$6,000,000 a year. The group includes professors of computers science, psychologists, educators, an army of programmers, Ph.D.s in artificial intelligence, and trainees from the corporations that support the institute.

"The Institute," he tells me, "will address questions such as how do people learn, what are the right things to teach, what are good methods for teaching, what is worth knowing, and how do you get machines to be intelligent enough to become good teachers." Roger is putting his experience in cognitive psychology and AI on the line to design educational software that works. What's at stake? "The future of our school systems," he says.

Roger's new book is Tell Me a Story: A New Look at Real and Artificial Memory.

ARTIFICIAL CREATURES New York writer **Steven Levy** (author of Hackers), and his wife, Pulitzer-prize winning journalist **Teresa Carpenter** (author of Missing Beauty), recently announced the birth of their son **Andrew Max Levy**. "I've been watching Andy Max's behavior emerge," Steve reports, "and he really illuminates the behavior of the artificial creatures I've been studying for my new book on artificial life. Basically, this juxtaposition helps me to see the significance, the close relationship of artificial adaptive systems and biological ones. (Andy Max is a lot cuter than the stuff I see on computer screens. On the other hand, you don't have to change mobile robots and you can turn the computer off all night.)"

ECOLOGICAL METAPHORS This reminded me to talk to anthropologist **Mary Catherine Bateson** in Cambridge, who was systematically observed by her anthropologist parents, **Margaret Mead** and **Gregory Bateson**. "Child-raising, usually regarded as a menial task," Cathy says, "instead becomes an intellectually rewarding thing to do. Watching your child is paying attention and learning something that can be very important to your personal and professional life. That's the important thing to say to people. I didn't

grow up believing that thinking systematically about your child is inappropriate. Margaret's mother studied her. And I studied my daughter Vanni." (Indeed, Cathy also looked closely at her parents, in With a Daughters Eye: A Memoir of Margaret Mead and Gregory Bateson). "Take your intellect into your personal life, learn something, and transfer that learning to wherever you can use it. You will benefit and so will your child."

Cathy is about to reissue Our Own Metaphor, a book originally published twenty years ago. "I now have a chance to think about twenty years of increasing ecological sensitivity. In 1967, The Wenner-Gren Foundation sponsored "The Effects of Conscious Purpose on Human Adaptation," an interdisciplinary conference that included biologist Barry Commoner, neurophysiologist Warren McCulloch, and Gregory Bateson to discuss the glitches in human patterns of thought that led us to make ecologically unsound decisions. The conclusion was that people would think ecologically if they had metaphors to think ecologically. One metaphor was the group process itself." Our Own Metaphor is her appraisal of the topics discussed at that conference.

SIMPLIFIED COMPLEXITY Remember years ago waking up in the morning, turning on the NBC's Today show, and after watching the soothing **Hugh Downs** for five minutes, wanting to go back to sleep? Well, guess what? This guy is no slouch. Now at ABC, and co-host with Barbara Walters of 20-20, Hugh recently convened his 11th annual physics dinner, which was held in the Nicholas Murray Butler Room of the august Metropolitan Club in New York. Since 1979, he has gathered together some of the great scientific minds once a year to explore new ideas about the physical universe. In the past three years he has begun to invite people from the life sciences as well.

"The background to these evenings," Hugh tells me, "was my first involvement with science as head of science programming for NBC in 1956. That year we did the first tv special on space, before Sputnik. In 1957, International Geophysical Year, I decided I needed more education so I went to Columbia and signed up for a course in astrophysics taught by Lloyd Motz. Over the years my interest in physics grew to the point that 21 years later, when I started doing 20-20 on ABC, I had developed my own theory of missing mass in the universe. I looked up Lloyd Motz, who remembered me as a student. He took two hours going over my theory before he spotted the flaw. I found it characteristic of him to say to me 'What have you been doing with yourself all these years?' 'I've been on tv,' I replied."

Among those attending the evenings have been biologist and author **Isaac Asimov**, physicist and New Yorker science reporter Jeremy Bernstein, former Hadyn Planetarium director Mark Chartrand, biologist and Rockefeller University president Joshua Lederberg, astrophysicist and author Robert Jastrow, artificial intelligence pioneer Marvin Minsky, biochemist **Robert Shapiro**, physicist Lloyd Motz, New York Times science reporter Walter Sullivan, physicist and author Gerard K. O'Neill physicist, and the late physicist, **Heinz Pagels**.

"The physics evenings are great fun," Hugh says, "mostly science although there are digressions, such as the time **Isaac Asimov** steered us into a discussion on limericks. We have had vigorous debates on subjects such as string theory, and some heated arguments on the idea of simplification of what I think is a terrible complexity in current particle physics. I am

awaiting the genius who can come to a new insight that could re-simplify things. Copernicus abandoned the geocentric universe concept. Gallileo got in trouble for the same thing. Newton hoped to make the universe orderly and simpler again. And his theory eventually led to anomalies that Einstein re-simplified. Look for some physicist to come forth who can cut through the complexities of today's physics." "Who might that be?," I asked. "I wish it were me," he replied.

LOGOLAND On his recent New York visit, futurist **Peter Schwartz** ran a meeting of his Berkeley-based Global Business Network (GBN) in the Board of Director's room at AT&T headquarters in New York City. Present to discuss business scenarios of the future were representatives from ARCO, Shell, Volvo, Swedebank, AT&T, and Bell South. Peter was in charge of developing the long range scenarios for Royal/Dutch Shell from 1981-1986. He founded GBN with his partner, philosopher **Jay Ogilvy**, in 1987. His non-business credits include screenplays, co-authorship of Seven Tomorrows and a maniacal devotion to the Grateful Dead. He reports that "the discussions led to a sanguine view of the evolution of the financial system. Because of the way markets and technology are evolving together, it's hard to make money in banking and securities. The markets are hyper-efficient. Eric Clemons of the Wharton School pointed out an example from Tom Wolfe's Bonfire of the Vanities of the investment banker who cuts the cake and lives off the crumbs left on the knife. In the hyper-efficient markets the knife is a teflon knife. There are no crumbs."

GBN acts as an interface between their corporate clients and interesting scientific and cultural leaders. Programs include a GBN computer conference on The Well (The Whole Earth Electronic Link), a book club run by editor and author **Stewart Brand**, and a newsletter, "The Deeper News." Participants at GBN network meetings have included nanotechnologist **Eric Drexler**, entrepreneur Paul Hawken, China-watcher Orville Schell, astronaut Rusty Schweikhart, computer scientist **Danny Hillis**, anthropologist **Mary Catherine Bateson**, computer expert **Esther Dyson**, management theorist Michael Porter, and energy expert Daniel Yergin. On the corporate side GBN attempts to involve executives who are interesting in their own right and occupy policy-making positions and are thus consequential in the culture.

I reminded part-time GBN'er **Stewart Brand** of Gregory Bateson's dictum that "of all of our human inventions, economic man is by far the dullest." Stewart responded that this is indeed a challenge for GBN, which is helping corporate people to think beyond the immediate bottom line and to push the envelope out beyond a three year horizon. He wants major corporations to think in Batesonian terms of "slow, deep, and long" in a broad and interesting business and cultural context.

Peter's new book is Thinking Ahead: Scenarios for the New Century.

THE ADAPTATION HYPOTHESIS Biogerontologist **Roy Walford.D.**, author of Maximum Life Span and The 120-Year Diet, reports that his research is going very well. The New York Times, among other leading publications, recently reported the successful experimental results of the theory. He and his co-workers at his lab at UCLA Medical School in Los Angeles are looking into the mechanism by which dietary restriction retards aging (undernutrition without malnutrition). "We think it has to do with differential gene

expression, the turning on and off of genes" he says. "I am working on what I call the 'adaptation hypothesis.' The life span extension you get from caloric restriction is an evolutionary adaptation whereby when food is scarce, the animal withdraws energy expenditure from growth, reproduction, and basal cell turnover, and redirects the available energy towards maintenance and repair in order to survive this period of shortage. And when food is available again, the animal directs it towards other places."

Roy works in many interesting and adventurous modes. Professionally, he is a world-class scientist. In his personal life he always lives close to the edge, writing for avant-garde publications, working with The Living Theatre, and associating with some of the most radical artistic people in the culture. He is now in the training program to becoming one of the eight "biospherians" who will spend two years in "Biosphere 2," which is being constructed on the desert in Tuscon, Arizona by Space Biosphere Ventures. "I have just finished a course in mushroom management," he says, "and I have taken over mushroom cultivation inside the biosphere. I am also involved in the marshes, and in getting together the general medical facility which will be highly compact and equivalent to what's inside a space station, or better."

MYSTERY DANCE Bombastic biologist **Lynn Margulis**, author of Symbiosis in Cell Evolution, reports from Amherst (she's at UMass) that she is thrilled by the discovery of kinetosome-centriole DNA by David Luck and his colleagues at Rockefeller University. For years, she has been in the wilderness, working as an outsider as a vigorous proponent of cell symbiosis theory. "After one hundred years," she says, "cell symbiosis theory, first suggested by Russian biologists, is shown to be correct. The significance of this discovery to my own work is that 'instead of three out of four aspects of my theories shown to be correct, now four out of four are correct.'"

Several years ago Lynn and her colleague, biologist **James Lovelock**, presented their revolutionary "Gaia Hypothesis" to a very quiet reception in the biological sciences. The science establishment now takes the position that "of course, Gaia is right; we always knew it."

Cathy Bateson notes that "Lynn is picking up where Lewis Thomas left off: to make it possible for people to understand our affinity with that which goes on at the microscopic level. The notion of organisms becoming involved with each other is illuminating in thinking about big creatures too."

Lynn is completing a new book, The Mystery Dance: The Meaning of Sex, co-authored with her son, science writer **Dorion Sagan**.

WHAT ARE YOU BUYING, GENE? I stopped by to see art collector **Eugene Schwartz**. He's an astute and enthusiastic participant in the New York art scene. Gene and his wife, Barbara Schwartz, have turned their Park Avenue penthouse into one of the most interesting and fashionable art salons in the world. They are constantly changing their walls, hanging their newly acquired works of art.

I rarely read art magazines and I usually avoid reviews. When I talk about art with my artist friends, the subject often shifts from ideas to dealers and the art market. My way of finding out the new ideas in the art world? I ask Gene, "What are you buying?" Some recent acquisitions:

"Mora Sheanan (Julian Pretto Gallery). Small sculptures in which she employs cheap plaster casts of Catholic saints, and then covers their faces with masks taken from, say, Mayan sculptures, also made out of cheap plaster casts. She's showing that the imperialist religion tries to replace the weaker religion, but fails because the primitive power of the older religion prevails. They're small, startling, and extremely moving.

"Pruitt and Early (303 Gallery). A possible viable next step for pop art. They take six-packs of beer cans and make sculptures out of combinations of them that are covered by the decals that teen-age boys use to make decorative their rooms. Enormously decorative, really alive, funny as hell.

"The Starn Brothers (Stux Gallery). In their new show they explode photography into sculpture. They've taken photographic film that's about 3-5 years ahead of what's now available from Kodak, and using huge transparency sheets of this film, have transferred images onto it, while the sheets remain transparent. Then they transfix the transparencies onto armatures, and then they fold, bend, and project them out into the room. The sculptural quality of the photographic medium now accurately reflects the sculptural quality of the object photographed. A new breakthrough for photography. I'm nuts about it."

Gene is always quick to spot a trend. Five years ago it was Baudrillardian social criticism (i.e. Jeff Koons). Three years ago, it was landscapes (April Gornik). "Right now," he says, "there is no predominant emerging trend. As physicist Freeman Dyson says, 'Infinite in all directions.'"

THE ETHICAL EDGE "The conflict is between preserving biodiversity on the planet on one hand and the interests of scientific entrepreneurism and boosterism on the other." Biologist Peter Warshall is talking to me on the phone from Tuscon, where he is one of the leaders in the fight to save the red squirrel. There are about 100 red squirrels left in their home at the top of Mount Graham, outside of Tuscon. This happens to be the place that the University of Arizona wants to build a \$200 million dollar observatory. "Until the university's decision," intones a New York Times editorial, "no one cared much about the red squirrels on Mount Graham." The Times believes that "environmental groups have got themselves on the wrong side of a silly debate." Peter begs to differ and claims that building the observatory will wipe them out.

Are we talking about a classic case of environmentalists vs. developers? Not according to Peter, who sees natural science once again fighting a losing battle against hi-tech science. He gets in the spirit of our conversation and begins to talk in terms of "edges." "First, there is the 'ethical edge,'" he says. "Do humans truly want to make sacrifices to preserve the biological diversity of the planet? This is an age old question that has been posed by St. Francis of Assisi, American Indians, and Buddha. It's a minority position in Christianity. Second, there is the 'political edge.' Will Americans accept the purchasing of laws by special interest groups? The two most important laws that special interests are trying to subvert are The Endangered Species Act and the National Environmental Protection Act. Third, there is the 'media edge.' Some people believe that the availability of information is going to help the world. I don't necessarily agree. Information isn't the question; control of information is the question. The 'political edge' has pushed Interior Secretary Manuel

Lujan to a comical James Watts position: 'Nobody's told me the difference between a red squirrel, a black one or a brown one,' he says."

"We are confronted with a case of species-cide. What's happening in America is that 'environmentalism' is being co-opted as a word by people properly concerned with air quality, food quality, and toxic wastes. However, human-centered environmentalism is opposed to a larger, compassionate environmentalism that includes other species. 'Tree huggers' have been isolated, even by the humanists, as radicals. The New York Times attacks The Sierra Club on this issue. We are seeing the resurrection of a human-centered universe. It's a tough one: people are going to have to make an ethical choice."

THE LIFE OF THE MIND

Edge Foundation was established as an outgrowth of an informal group known as The Reality Club. Its purposes are to promote discussion of issues of intellectual, philosophical, artistic and literary interest and to work for the intellectual, and social achievement of society. These purposes are achieved through stimulation and dissemination of the creative work of the leading thinkers of our time. The motto of the Club is "to arrive at the edge of the world's knowledge, seek out the most complex and sophisticated minds, put them in a room together, and have them ask each other the questions they are asking themselves."

The Reality Club began its activities in 1981 and was incorporated as the Edge Foundation in 1988. The Foundation sponsors approximately two or three meetings every month, which consist of a one-hour talk by a speaker to "members" of the club, followed by general discussion of the ideas presented. The speakers are selected by the Board of Directors of the Foundation, often on the basis of suggestions by other members.

"Membership" in the club is informal. It is comprised of individuals who have spoken at these meetings over the years, and is designed to draw together as broad a spectrum of disciplines as possible. No dues are paid, and there are no benefits or obligations of membership other than participation in these meetings. The primary purpose of these meetings is to stimulate creative work by the participating members through exposure to the thought of individuals outside their own disciplines. Speakers are charged to represent their concept of reality by describing their work, lives and the questions they are asking themselves ... and also by responding to the comments, criticisms and insights of other members.

The Foundation also makes the creative work generated from these meetings available to the general public. In addition to the bi-monthly meetings, the Foundation sponsors at least two open meetings annually, and is in the process of developing an archive of the meetings. Videotapes of each meeting are being collected and will be made publicly available either directly through the Foundation, or through a gift to the library of a major university.

Edge Foundation, Inc. is a non-profit private operating foundation under Section 501 (c)(3) of the Internal Revenue Code.

EDGE INTERVIEW

"Artificial Life"

A Conversation with Chris Langton and Doyne Farmer

(Chris Langton and Doyne Farmer are at the forefront of people defining the new field of "artificial life." They divide their time between Los Alamos and The Sante Fe Institute. They are similar in that they are both lean long-hairs, about the same age [Langton 40, Farmer 37], and are actively pursuing a vision of tackling the issue of biological complexity by developing and understanding emergent beings. I love their intellectual hunger and desire).

I videotaped the following interview at lunch in a crowded and noisy New Mexican restaurant on Canyon Road in Santa Fe, much to the amusement of our waitress, the consternation of some diners [who were annoyed by the exuberant nature of Langton and Farmer], and the excitement of other diners [who believed they were watching the taping of a segment of "Lifestyles of the Rich and Famous."] -JB)

FARMER: Okay, what questions am I asking myself? I guess the questions we are asking ourselves are what are adaptive systems, what makes them tick, why are they different from other things. As you begin asking these questions you find yourself rolling back to even more basic questions like what is life and why is life really different from something that isn't alive?

BROCKMAN: Is that latter question an important question or is it just a way of framing your work on adaptive systems?

FARMER: Both. You always have to take an angle on something, a take, you have to decide what attitude you are going have. I come at this as a physicist, and most of physics is focussed on properties of inanimate matter and on movements of matter, structure of matter, but all those questions are framed from a very reductionist point of view. If you want to understand how matter organizes itself, how information gets moved around between structures that contain matter, then you are forced to ask very different kinds of questions than the more reductionist kind that have traditionally been asked. The big difficulty has been that those kinds of questions are harder to ask, and may require new points of view than the traditional approaches that have been taken. Physics as a science has largely been defined by what's tractable and simple, what can actually be done. So physicists ferret out simple situations and then try to exploit that simplicity to make much stronger statements about nature than could possibly be made through other means, again largely because they have picked the problem very carefully. The thing that we are thrashing around with now is where are those simple problems, where you can use something like a hydrogen atom as a handle to delve into these questions and say something more definite about them. But we are still in the groping process at this point because, first of all, these questions are very hard, and secondly, we haven't gone very far towards addressing them because we haven't had the tools we need to really address them for very long.

BROCKMAN: All right, let's talk about the tools.

FARMER: The main tool is the computer.

BROCKMAN: How did people think about these things before computers, or did people think about them at all?

FARMER: People thought about these things, but what people didn't have in the past is a technological culture and the background of scientific knowledge to really make sense out of these questions. People thought about questions such as what is life. Shroedinger wrote a book by that name in the forties but at the time DNA wasn't known, the whole biochemical background that fuels organisms, that provides a framework for the way an organism operates, wasn't understood. Key pieces of knowledge like that really click things into place. Darwin's theory of evolution is an obvious example of something that the Greeks didn't understand. Greek philosophers, in my opinion, missed a lot of important things about the basis of life and the meaning of existence because they didn't have Darwin's theory to at least frame some of their questions.

BROCKMAN: What is your work going to do to Greek philosophy?

FARMER: I wouldn't be so presumptuous to say....

BROCKMAN: How do our perceptions of the world and ourselves change with the advent of new technologies in terms of your work and in light of the idea that we create tools and then become the tools?

FARMER: I'm not sure I agree with that. Actually, the person I would say first realized how important these issues were to philosophy was Herbert Spencer who coined such terms as "survival of the fittest" and "evolution," which is a term he used before Darwin. He used those terms to mean some very general things about the organizational properties of the world. He came up with the idea that evolution is the dominant principle operating in the universe to organize matter from creation of the universe onward. Evolution is a term he used broadly to refer to things going on in astronomy and geology, in politics and sociology, as well as biology, and he saw it as a central organizing force behind societies and as a very general kind of pervasive principle and I think he was right. The challenge is to try to go from Spencer's rather vague philosophical word descriptions to a mathematical theory that can actually explain all these things and that can make precise the analogies we observe.

BROCKMAN: Explain or invent?

FARMER: Explain.

BROCKMAN: They are there? They're out there? We're back to "the reality principle?"

FARMER: This is a philosophical stance every scientist has to take. We are trying to describe things that are out there in nature. Maybe we could also say we are inventing descriptions with our brains - that's a big thorny question. But the analogies are recognized by many different people in many different situations. Much of this work is trying to extend certain ideas outward from simple situations to more complicated situations. As Chris has pointed out, a good example of the power of this is Shannon's generalization of information theory. Shannon took the idea of entropy, which was originally formulated in a very specific way by Holzman to apply to physical

systems or gases, and he extended it to a much broader class of situations so that now you can think about it.

BROCKMAN: Leon Brillouin pointed out that scientific concepts get bootlegged appropriately and inappropriately into areas that they weren't originally intended for.

FARMER: I think there is a difference between taking a scientific concept and bootlegging it, just pasting it on to something, and really trying to come up with a general principle that is formulated in a sufficiently abstract mathematical framework so that you're not just pulling something out of one area and trying to paste it onto something else. The key is to create a framework into which you map a lot of things and that broad framework is then immediately generalizable to other circumstances. That's the big goal right now, to create such a framework. The Darwin theory of evolution doesn't have a proper mathematical framework even within biology, much less as something that goes beyond biology even though the analogy between, for example, the evolution in societies and the evolution of biological organisms is fairly clear and one that many people accept up to a point. But trying to pin that down, make it precise, and say exactly what's analogous and exactly what isn't analogous in a less ambiguous mathematical language, is a big problem that remains to be solved.

BROCKMAN: Chris, you look like you've heard all this before. Tell me something Doyne doesn't know.

LANGTON: The reason that Doyne and I are in the same group is because we are asking the same questions. We found each other through common interests.

BROCKMAN: Let's just pick up from where Doyne left off. Where is this new framework you are developing going to take you? What do you hope to discover or find out?

LANGTON: For a long time, science has been dealing with systems by coming up with models and explanations for things that were simpler than the systems themselves. In order to do that scientists have had to pick certain things in nature that were susceptible to being explained that way. The kinds of questions that we're asking are about the things in nature that, in some sense, may be their own simplest descriptions. So I think science is up against a new kind of problem, namely what is the scientist's role in trying to understand something for which he's probably not going to be able to come up with a much simpler description.

FARMER: Chris, I have to interject something. I believe responding to that is what abstraction is all about. You don't try to describe the whole thing. You try to extract out those properties that are less than the whole thing, that, nonetheless, give you some idea about what really makes that thing tick as opposed to the less relevant parts that you don't have to understand to get some salient feature. So the small disagreement with what you said is that I think that even with these adaptive systems they may be their own simplest description if you want to understand every little detail about them, but their salient parts I believe, and this is really just a belief, can be gotten after abstractions that are simpler than those things themselves. At the same time, of course, there may be irreducible levels of complexity in these descriptions that we can't dive past.

LANGTON: It's those irreducible complexities that I'm taking about. I

certainly agree with you that there are relevant salient features and that what the whole notion of artificial life is trying to abstract is what the relevant details of living things are from the probably irrelevant details of the particular material in which life happened to emerge on the planet earth. So the goal is to abstract that which it is to be alive from the material.

BROCKMAN: To what extent?

LANGTON: We would like to get a better understanding of what life is for many different reasons and it's very hard to do so by studying the life that we know because we just have this one example.

BROCKMAN: What can you compare it to?

LANGTON: Ah, there's a loaded question. You can think of a computer in two ways: you can think of a computer as something that runs a program and calculates a number, or you can think of a computer as a kind of logical universe, a digital universe that you can make behave in many different ways. Our belief is that we can put in computers sufficiently complex universes that they would support processes which, with respect to that universe, would have to be considered alive. They would behave in that universe the way living things do in this universe but they wouldn't be made out of the same stuff.

To do that raises a whole lot of possibilities. One is that if we can accept that they are alive, the empirical base upon which we are going to be able to build general theories of life is broadened. As it stands it is very difficult to build general theories of life based on theoretical biology which is in no where near the same state as theoretical physics. We can't make statements about what life would be like anywhere else in the universe, we can only talk about what we know here. However, you can talk about stars anywhere in the universe right now, you can talk about what categories they are going to be in, what is going on in their interiors.

Also it raises the awesome possibility that we are going to be participating in creating the next living things in the universe. If we can actually bring life into that which is not part of our tree, that's not part of this ancestral tree directly through the genes, if we are able to abstract the necessary information and dynamical structure from the material that has been informed by this structure and implement it in some other stuff, there is an enormous number of possibilities and questions.

BROCKMAN: Who is going to create these new life forms? Are you concerned about the reaction of critics such as Jeremy Rifkin?

LANGTON: He's certainly someone who will have an opinion about them that would probably be an interesting one to hear. I think that as with the development of any new technology, there's great potential for both use and abuse and it is certainly valid to get all opinions in early on to make sure that we're not surprised later on down the road.

BROCKMAN: What might be an example of a life form that gets created?

LANGTON: Well, it depends on what you mean by life form, of course, but I think there's a whole spectrum of possibilities. If we can get things going within computers, that is within environments within computers which are

effectively alive, using evolutionary principles to get them to adapt within these environments.

BROCKMAN: For example?

LANGTON: John Holland's classifier systems, or other things that use genetic principles in order to search a large problem space to help find optimal solutions or to help find better solutions than the ones we know. They are using principles imported from biology, of mutation and genetic recombination, programs that are represented in such a way that most of the operations we do to them will result in viable programs. You take populations of these programs and let them work on their environment which is the problem and the better ones reproduce, sexually, in some sense. They have crossover between themselves and create new variants, on the basis of a population of programs that did pretty well already. So you are using the principles of variation and natural selection within a computer and although you might not call them organisms, they are in fact evolving. Another example that comes close to being alive are computer viruses, which satisfy a lot of the criteria for living things.

BROCKMAN: And, they are rapidly becoming illegal.

LANGTON: They are rapidly proliferating.

BROCKMAN: Maybe the pro-life people will get into it...

FARMER: Except we don't have rights for real viruses, or bacteria, or chickens for that matter. We somehow single ourselves out to have this right to life. I had this argument with a vegetarian friend who I told if you're really a vegetarian you should never turn off your computer! It's just a matter of where you draw the cutoff on the hierarchy and whether you believe in that hierarchy.

BROCKMAN: Do you foresee a time when you could develop a sense of affection for these artificial life forms?

LANGTON: Certainly. I already have an affection for my first artificial life forms.

FARMER: I think hackers have strong affection for artificial life forms. Often more affection than they have for anything else!

BROCKMAN: Can you give me specific examples of life forms that you are creating in your Institute?

FARMER: That question raises the issue of the definition of the word life. If you want to make an either/or distinction, and say that something is either alive or it isn't, that's a subtle and delicate point. Liveness should perhaps be thought of more as a continuous property. To me, a machine is already a little more alive than a rock and probably less alive than a virus which is less alive than a bacteria which is probably less alive than I am. (Of course I put myself up at the top.) But nature can throw Avogadro's numbers of computers at something because its got zillions of molecules all which act like independent parallel processors. We can't really do that. We don't have that kind of computing power at our disposal so we are forced to make these abstractions where we take some aspect of something out and build a little model that does that so we have models of

living things. But one of the thorny questions here is where does a model of a living thing turn into a living thing? Because if the model starts incorporating enough of the properties of a living thing then, at a certain point, maybe it becomes alive.

LANGTON: Many people have a problem with that basic distinction and will say no matter how like the real thing the model is it can never be attributed a life like a living thing. It's a fundamental difference. We basically sit on the other side of that fence. We think that if it smells like a dog and barks like a dog and eats like a dog, you might as well call it a dog. Whether or not it's made out of the same stuff is irrelevant.

FARMER: I don't want to get too bogged down in this whole discussion. I have this Missourian attitude of "show me." And I think that's what we ought to do and that the burden is on us to do it. I don't want to spend a lot of time discussing whether or not it can be done because I'm convinced it can be done.

BROCKMAN: We're getting dirty looks. We're talking too loud.

FARMER: Sorry, whenever I get excited I always start talking too loud.

BROCKMAN: But this is for posterity, they don't understand! I imagine you have people who are detractors. What kinds of people, and in what branches of science?

LANGTON: Surprisingly enough, I'm getting some fairly severe criticism, not for artificial life per say but for being a computationist in artificial life.

FARMER: I got called a mechanist by Rupert Sheldrake. "You Mechanist!!!," he said.

BROCKMAN: Can I call my ten-year-old boy, with his Nintendo "Game Boy," a computationist?

LANGTON: It depends on whether he believes that what's in the Nintendo game could actually have its own kinds of properties and be a thing in and of itself, have its own kind of existence. It is the same kind of criticism that's being leveled against AI: that a computer could never be "conscious." The people who are throwing barbs are people who have been in systems science.

BROCKMAN: General systems theory?

FARMER: Philosophers, too, like Searle. To me this is really a silly debate. If Searle is hung up on these things that's his problem and I'm not going to waste my time worrying about it. I'm just concerned that the valid questions get addressed and not the silly ones.

FARMER: I think it is important to address the philosophical questions but all too often they get addressed from a silly point of view. The biggest piece of ammunition Searle has is that the artificial intelligence guys haven't come up with anything intelligent and if they had something that could pass the Turing test and even a non-hacker could develop some affection for, a thing that could do things that at least appear to be intelligent, they would have something to go back at him with. Eventually I

think they will but it's just going to take longer than originally stated. They made the mistake in 1950 of saying that they could accomplish this in ten to twenty years.

BROCKMAN: How does your work intersect with AI? Who are your mentors? How did you start? How did you arrive at where you are today?

FARMER: Beginning with your first question. Living systems are simpler than intelligent systems. Life can be achieved by a bacteria or maybe even a virus and it is clearly a much simpler thing than the human brain. Part of the motive for studying artificial life instead of artificial intelligence is to tackle some easier problems first, rather than jump directly to intelligence. Let's see if we can even grasp the basic principles that keep a bacteria going. But there are a lot of commonalities between A-life and AI. The whole notion of adaptation and evolution clearly underlies both those systems and many of the organizational principles behind intelligence and behind life are very similar. Intelligence sprang out of life. So there are a lot of common questions, common threads, and common brick walls.

As background, I was originally trained as a physicist. My original goal in life was to be a general relativist and cosmologist. In fact, I was embarking on that in graduate school at UC Stanford. I did three years of graduate school and was embarking on a thesis of galaxy formation when I got distracted, together with Norman Packard and others, by the problem of beating roulette using physical principles. I dropped out of school for a year and built computers to fit in shoes to try to predict motions of roulette balls. I got very interested in questions about predictability and unpredictability. Meanwhile, my friend Rob Shaw had gotten interested in Chaos so when I returned to graduate school, Norm and Rob, Jim Crutchfield and I started the Dynamical Systems Collective, and we studied chaos and non-linear dynamical systems theory. We all did our Ph.D. work on that largely independently, without an advisor, although Ralph Abraham was probably as close as we came to one. Then we came out here. And I've continued my work in Chaos, slowly drifting more and more into these kinds of issues which was what I wanted to do originally but didn't see a forum to do it in. Chaos served as a nice bridge. One of the reasons I jumped into Chaos is that it is a lot more like this stuff than general relativity.

BROCKMAN: How did you find your way to Santa Fe?

FARMER: I happened to see a poster for Oppenheimer Fellowships that caught my eye. I came out here and interviewed at Los Alamos and really liked the place, even though I had some problems working in a place that was a weapons laboratory. But I decided that the local environment was sufficiently well buffered from that and it had a great intellectual climate, a free and liberal place to work and think.

BROCKMAN: So you have a group here doing Artificial life?

LANGTON: Yes, I am also at Los Alamos. We both started here at a place called the Center for NonLinear Studies which is probably the most intellectually open and free part of the laboratory and the theoretical division. Then Doyne moved to the theoretical division. They've now created a group in the theoretical division called "Complex Systems" which Doyne is heading and now I've moved over and am working in that group. That group's charter is..... to go where no man has gone before (grin).

FARMER: We originally wanted to call it "The Life and Intelligence Group" but we decided that sounds pretentious and actually, believe it or not, we didn't want to get pinned down to anything.

LANGTON: The other possibility was "None of the Above".

FARMER: "Complex Systems" was sufficiently vague that we thought we could do whatever we wanted under that umbrella.

LANGTON: We are collecting together a group of people although up until now it has been hard for us to break away from our previous commitments. I, in particular, have a previous commitment that still has a grip on me - finishing my thesis. The simple reason for that was there was no way to do a thesis on artificial life in any sort of an academic institution so I had to take a detour to getting this artificial life stuff on the road at the time that I did. It was a missionary thing that I had to do.

Regarding your first question - life and intelligence - I find it very hard to draw a dividing line between them as well. Starting with intelligence, starting with a study of systems which determine their own behavior due to information structures they contain inside themselves, the AI people picked the most complex example in that group, intelligent things, and were misled a little bit by the fact that it is easy to get computers to do things that human beings consider hard. And so they met with a lot of initial success at what turned out to be not very difficult problems. Richard Dawkins gives a very nice example: if you take a dead bird and throw it into the air, it traces out a beautiful parabola in obedience to very simple physical forces. However, if you throw a live bird into the air, although it is influenced by gravitational forces, it's trajectory is largely determined by itself using information processing going on in the bird. So my aim is to understand how, in a universe dominated by energy, there came to be processes which are dominated by information systems which determine their own behavior very far removed from basic physical forces which are acting upon them. In my opinion, it is going to be very hard to understand these things by starting with intelligence. I think that we're going to learn some basic things about intelligence by studying other things which exhibit their own self-determining behavior, like bacteria and other similar things. Both living things and intelligent things behave and determine their own behavior and so it's the study of these behaving systems that I think we're all after.

BROCKMAN: Why would it be hard for you to pursue this kind of work in a conventional institution.

LANGTON: Largely because they are based around specific disciplines and these kinds of studies are highly inter-disciplinary. I found it impossible to put together the kind of interdisciplinary program that I wanted at any university. At the time there was no computer science department in the country that was willing to let me pursue these ideas and actually had a tradition of thinking of the proper domain of computer science to be information processing writ large across all of nature, anywhere, in nerves, in DNA. By the time I got there it turned out that philosophy had been tossed out the window because they had been absorbed by the engineering school which wouldn't have a anything to do with that kind of stuff.

I guess my mentors would be the writings of John Von Neumann and people like John Holland and Arthur Burks who is a grand old man in computer science. He

completed a lot of Von Neumann unfinished work about self-reproducing automatons, edited the results, completed some of the construction and published a follow-up book. He was largely responsible for founding the first computer science department in the country at the University of Michigan. And also for the philosophical emphasis of that department which was this notion that to study computation really means computation anywhere it happens, not as we train engineers to do it.

BROCKMAN: Chirs, what background do you have scientifically, how were you trained?

LANGTON: My approach to school was to sign up for a lot of courses at the beginning of a semester and then stay in the ones that seemed the most interesting so my undergraduate degrees are in philosophy and anthropology at the University of Arizona and my graduate degree is in computer science. And if I could have put together the proper interdisciplinary program, it would have involved a graduate level program in biology and, in hindsight, physics. My father was a physicist and so I tended to do something different but, in retrospect, if I had my life to do all over again I would have included a physics program. The problem with the study of complex systems is that you really have to be a master in all of the disciplines at the same time and since no one can really do that, it means you have to hook up with other people who are experts in other disciplines, but that's great. That's the kind of group we are trying to put together in complex systems. We are trying to get people who are good in all the different areas.

BROCKMAN: What kind of people do you have?

LANGTON: We've got some physics people, some computer science people. But when I mention our group, I'm not just mentioning people who are employed by our particular group, but our interest group, the people that we hang around intellectually - biologists, physicists, mathematicians, computer people.

BROCKMAN: How does the Los Alamos group connect with the Santa Fe Institute?

FARMER: Some of the people who are effectively in the group are actually employed by the Santa Fe Institute. Martin Casdagli and Wentian Li are both post docs at the Institute and they also spend a lot of time up at Los Alamos. There's a lot of interchange, back and forth. Both those guys are collaborating on projects with people at Los Alamos. Chris, myself, and Alan Lapedes all have what are called external professorships at the Santa Fe Institute. We each spend a day a week down there. Everyone in our group spends time at the Santa Fe Institute at some level, comes down there for talks, comes down if they want to run a few errands in Santa Fe and hang out there for the day.

BROCKMAN: The Institute seems to have a bent for economics. How does your adaptive systems approach apply to economics?

FARMER: One of the things the economists at the Santa Fe Institute have been doing is incorporating many of these ideas into economic theory, trying out systems with agents that make predictions based on ideas from machine learning like the classifier systems or neural networks, things like that. A lot of my work involves forecasting and prediction, nonlinear modeling. Given a bunch of data, how do you build a model that allows you to make predictions about the future behavior of the data and that has a very direct connection to economics. The Santa Fe Institute has concentrated on

economics but that's not the only thing that they do by any means.

BROCKMAN: Where do you see this A-life work leading in the next five years?

FARMER: One goal that I hope we can accomplish in the next five years is to come up with some example of things that we can call artificial life without having to cross our fingers and make a lot of exceptions and provisos. I see that as a central goal because that would give us the platform we need to do the experiments we need to do to make a theory. I see this very much as an analogy to the development of thermodynamics and statistical mechanics in the last century. We need a Joule to actually get in there and find some set of simple experiments that have quantitative results.

LANGTON: That's J-o-u-l-e.

BROCKMAN: What's that experiment going to be, if you had to guess?

LANGTON: After digesting everything that was presented at the first Artificial Life Workshop, which was organized very much just to find out what is being done out there, the following questions emerge: how are people going about modeling living things, how are they going about modeling evolution, what problems have they run into, things like that. Once we saw what everyone was doing, we realized that there was a kind of fundamental architecture underlying most of the better models that we saw and in hindsight it's lots of simple things interacting with one another to do something complicated collectively. And so our goal at the moment is to try to build something, a software simulation package on the Connection Machine that we have at Los Alamos.

BROCKMAN: You have a Connection Machine? **Danny Hillis**?

LANGTON: Yes, one of the Hillis connection machines! It's a fully-loaded, fall-on-the-floor, turbo-charged connection machine. And there is openness and willingness at the laboratory to make the machine available to everybody so that we can actually get some time on it and use it. It's going to take that kind of machine because as Doyne mentioned the kind of computational power that nature has thrown at the simplest living thing is far in excess of what we have. Technologies such as the Connection Machine are only beginning to bring us close to the kinds of complexity of interaction of simple programs.

BROCKMAN: Is the Connection Machine in itself nature working ?

LANGTON: It's a lot closer to the way nature works.

BROCKMAN: I mean is the fact of the tool and what the tool does what becomes real in the sense that without the tool, without the measurement, you don't have anything?

FARMER: The Connection Machine is a physical system. It's a physical system that's also designed to simulate other physical systems. You can use it in either mode. One of the points Chris was getting at earlier is that you can think of a computer as just a computational device for calculating the solution to a problem or you can think of it as a universe. You can view it as an artificial universe into which you can insert artificial laws of physics and of chemistry and push the start button and then you look and see what these artificial chemistries and physics give rise to. So we're very

much working this artificial universe approach in trying to understand nature.

LANGTON: It's artificial in the sense that it is created by us as opposed to anything happening in it being artificial.

BROCKMAN: Explain that.

LANGTON: Well, the term artificial has a number of different meanings. It is related to the word artifact which means made by man rather than by nature. Of course, that's already a funny distinction because man is a natural thing, but the other sense of the word artifact is that it is somehow false or fake.

FARMER: I think this other sense is a secondary sense, a derivative sense. It is interesting to me that people have come to the conclusion that their own efforts are more likely to be false, that they somehow have less validity than nature itself, although it's probably fair in view of the things people have done. But, to return to your original question, once we begin to have interesting things going on inside of artificial universes, then we can begin to use these things to try and get at basic questions, for instance your question about the connection machine. One, is there a threshold of complexity that we have to reach in order for something to behave as though it were alive? It is not clear to me whether the connection machine is powerful enough to reach such a threshold of complexity. There do seem to be such thresholds in a lot of systems. For instance, the machine that replicates ourselves, this templating, protein, DNA machine seems to have a minimum complexity threshold below which it can't go. There's a limit to how much you can simplify that system and still have it work, and when you think about life, that's one of many interesting questions one would like to be able to really address in a broader more general way. Once we have such simulations the ultimate hope is that they will really give us a handle to try to develop theories because you see, over and over again in nature, unless you have some concrete idealized system to apply your theories to, you can't really make a good theory, you have to have something like that firmly in mind to which to attach your mathematical apparatus. The experiments of Joule in thermodynamics really went a long way towards giving that to people like Clausius and Gibbs. Carnot is another example. Carnot and Joule provided the foundation, the handles, that were needed to sort out the way heat moves around, and even to define heat. It's hard to think that in the early part of the nineteenth century people didn't know what heat was, they only had very vague ideas about it. That's the state we're in now when we talk about complex systems, and life, and structure, and complexity, and organization, and all these things. We bat them around as though we know what they are but we really don't know what they are in the more precise sense that scientists like to have.

BROCKMAN: Even though you don't know what they are, people are talking about them, and books are being written about you and your ideas. No doubt you've given some thought to the philosophical implications of your work. Could talk about them?

LANGTON: The idea of artificially created life is pregnant for any branch of philosophy, be it ontology, epistemology, moral or social philosophy. I think it's true to say that whether it happens in the next ten or a hundred or a thousand years (I'm not going to do what the AI people did and say in ten years we're going to have intelligent machines) we're at the stage where

it has become possible to create living things that are connected to us not so much by material as by information. In geological time, we're literally at the end of one era of evolution and at the beginning of another. Its easy to descend into fantasy at this point because we really don't know what's coming up. If, in the next two years, we created a robot that could survive on its own, that could go out and refine it's own materials to construct a copy of itself and could do so in such a way as to produce variants and evolve, we don't have any way of predicting the outcome. There are quite a few issues we need to think about and address before we do that. A reporter once asked me how I would feel about my children living in an era where there was a lot of artificial life.

BROCKMAN: Maybe your children will be artificial?

LANGTON: Well, that was my answer. They are both going to be my children, the children of the mind, to use Hans Moravac's phrase, or my biological children. We are now open to be able to produce ideas that have a life of their own and I'm not going to even begin to try to parse that out in all the different philosophical questions. Clearly there are a great deal of questions and issues that can be raised.

FARMER: Back to the philosophical implications. People have always recognized just how fascinating it is that living organisms, human beings in particular, can do all the amazing things that they do and they tend to assign very mystical notions to this, like soul and free will. To me they're ideas that really mark how incredible it is that you can start with some thing that's built out of simple parts and somehow hook those parts together, or those parts get hooked up by evolution through some spontaneous process that gives rise to all sorts of fascinating emergent behaviors that are very difficult to reconcile with some nitty gritty low level description of what's happening. I think that once we can go out and create multiple examples of this phenomena, examples where we've got handles on each little piece so we can see that there's not any magical funny business going on, that these emergent properties can ...Well, to go back to this debate with Rupert Sheldrake who characterizes himself as a vitalist, what I kept trying to tell him is that you can be a mechanist and a vitalist at the same time, they don't have to be mutually exclusive.

A system that is completely mechanistic at some low and trivial level because of nonlinear interactions between its parts can give rise to this fascinating emergent behavior that is very vital and so I think it's a mistake to separate those points of view. As this whole area develops what I hope emerges is a much clearer picture, a more synthetic philosophy that allows somebody to be vitalist and mechanist at the same time, that doesn't denigrate the mystical properties of things like souls but perhaps gives us a little more insight, another way of looking at what these things might be, and prevents us from getting bogged down in silly questions: if people have souls, do dogs have souls. Those are classic examples of silly and very anthropomorphic questions and that's perhaps one of the most central ways in which these kind of studies may help us sort out a more reasonable philosophy.

BROCKMAN: Isn't it a conceit of scientists to say that pure science is not anthropomorphic?

FARMER: Pure science is certainly anthropomorphic, but we're constantly peeling an onion and breaking into levels that are less mired down in that

idea than the previous level. So when you jump from the Ptolomeic view to the Copernican view, you've taken a small step toward making our human view of the universe less anthropomorphic because we've stepped out of the center in one aspect. When we assign magical properties to ourselves, such as intelligence, that we refuse to assign to something else, then I think as we are confronted with things that are so overtly intelligent we will have to begin to accept that. Or, as we're confronted with things that are alive but out of the framework that gave rise to us, then I think it's one more layer of the onion getting peeled off, not to say that we've achieved some non-anthropomorphic view of the world but that we've achieved some view of the world that is less anthropomorphic than the one that went before it. I think human beings are learning as we go along not to place ourselves at the center or the pinnacle of everything that goes on. One of the big changes in evolutionary thought from the 19th century to the present regarding evolution is the ladder upon which human beings occupied the top rung. Even Wallace, who was one of the co-proponents of the theory of evolution, placed human beings outside the framework of evolution. It's a little bit pathetic that he believed that everything evolved except human beings and that they had to get exempted from that process. It's appropriate to be fascinated by all the amazing things that we can do but we shouldn't get carried away with glorifying how wonderful we are and exalting in our monopoly of certain properties. With the advent of artificial life I think we will lose much of our monopoly on certain things, we meaning both people and the DNA carbon-based organisms that we see all around us. On both those levels at once a certain sterile homogeneity will be lost.

LANGTON: It is going to be very hard for people to accept that machines can be as alive as they are, and that there's nothing special about our life that isn't achievable by any other kind of stuff out there if you just put it together in the right way. It's going to be as hard for people to accept that as it was that we aren't at the center of the universe.

Another philosophical issue this raises is one of our own existence and our own reality and our own universe. After you work for a long time creating these artificial universes and wondering about getting life going in them, every now and then you find yourself looking over your shoulder and wondering if there isn't another level yet on top of ours. This is Fredkin's view.

BROCKMAN: The human as artifice?

LANGTON: Or this universe as artifice, in some other much more real universe. Biology has until now been based on taking apart what's already alive, and based on that trying to understand what life is. But we're finding that you can learn a lot by trying to put things together, trying to create your own life, finding out what problems you run into. Things just aren't as simple as you think and this notion of what you learn about your own universe by trying to build these simple models is very nice, this notion of putting together this artificial universe. It really does make me look over my shoulder and wonder what sort of a universe I am really in.

BROCKMAN: Thank you very much.

AT THE REALITY CLUB

(*Steve Gould spoke to The Reality Club at my apartment. Steve teaches biology, geology and history at Harvard University. He is the winner of a MacArthur Fellowship as well as receiving a National Book Award. A prolific writer, his books include: The Mismeasure of Man, The Panda's Thumb, and Wonderful Life: The Burgess Shale and the Nature of History. -JB)*

Stephen Jay Gould's "The Measurement of Progress in Baseball and Evolution: Some General Musings in the Assessment of Excellence"

Commentary by Pamela McCorduck

Stephen Jay Gould, the ebullient paleontologist, comparative zoologist, raconteur, author, and world's most ardent baseball fan, is in search of excellence. Colleagues, critics, and a wide reading public would cheerfully agree that man himself long ago achieved it, but he's after something else: the nature and quantification of excellence in general. If its essence can be identified, its dimensions named and measured, might we then be able to encourage it, give ourselves opportunities for more?

"My talent lies in making connections," Gould told the Reality Club, "and my intuition tells me that in defining excellence, these four ideas are connected: horses, human history, baseball, and changing styles in art. The question is: How?

Horses? Gould reviewed for us the tale he suspected most of us got in school, the evolution of the horse from "tiny eohippus, the size of a fox terrier" to our present Kentucky Derby winners, a wonderful tale of ever-increasing efficiency, usefulness, and elegance. Or nonsense.

What seems, from a parochially human point of view, a tale of unimpeded progress toward excellence, is from an evolutionary biologist's point of view, a drastic pruning of a once dense, diverse, and robust biological bush down to one highly vulnerable twig--a story that could be told about an animal even nearer and dearer to human hearts, Gould added.

In evolutionary terms, it's always been the Age of Bacteria: other forms of life, especially mammals, are parvenus, their durability yet to be proved.

But when we tell the tale of human history, Gould went on, perversely we reverse matters, harking always back to a Golden Age when things were unquestionably better, and excellence was to be found everywhere, in contrast to the dreary, flawed present. (I've sometimes toyed with tracing that idea myself, believing that an unbroken line of Good-Old-Days myths can be found connecting Allan Bloom to Socrates, each deploring the degeneration of morals, the slip in standards, compared to the past, when men were noble, and women and other lesser beings knew their place.)

On the contrary, Gould argued, myths of a past Golden Age of anything are exceedingly implausible. Throughout human history, disease and social conditions have prevented most people from exercising whatever excellence they might have been capable of; moreover, not only do more opportunities exist now, but there are more of us, living longer and better, to take advantage of them. In short, the net amount of human excellence is unlikely to have declined.

To examine examples of past greatness is to discover only the miniature: great battles become afternoon engagements among a few score, perhaps a few hundred; great cities are no more than villages by current standards. (But we are ever vulnerable to myth, I thought, remembering my secret disappointment with the real castles of Europe after so many Saturday afternoons of Hollywood castles on the screen of the Senator Theater in Oakland, California.)

Yet surely a case can be made for genuine Golden Ages? Surely the disappearance of, say, .400 hitting in baseball suggests that, at least there, an excellence once existed that exists no longer.

Which brought Gould to baseball. Yes, in the 19th century, a number of players hit .400, and even in the early 20th century, it wasn't uncommon: as late as 1941, Ted Williams hit .406. Doesn't this argue for a lost Golden Age of baseball, victim of too many night games, of jetlag, of relief pitching, of more grueling schedules?

It argues for no such thing, Gould answered himself. Hitting .400 is not an "essence", a thing; instead it's the right tail of the distribution of hitting for some years, much influenced by physical changes in the playing field (moving or raising the pitcher's mound, for example). The curve that represents batting averages has actually flattened, and the average .260 (which hasn't changed much since the 1920's and is nothing more than a balance between pitching and hitting, which baseball authorities maintain by means of judiciously tampering with the rules), actually implies overall better baseball than the occasional .400 hitter of earlier times. No wonder: better training is now available to millions of players, widening the pool of potential professionals, raising the level of all-round performance, and, statistically speaking, decreasing variances in distribution. The top of the curve moves slowly, inexorably toward what Gould calls "the right wall", a limit set by human biomechanics: for example, with the best will, and the best talent in the world, no human can pitch a ball faster than about 100 m.p.h. As the curve moves nearer this right wall, it represents a change of variance rather than the disappearance of an essence.

Here Gould raised a question: Is there anything for which a case can be made that things were once better? And proposed the singing of the 18th-century castrati. With their male chest cavities, they probably could perform better than any subsequent sopranos, but the price they paid to achieve this was grotesquely--and to us, unacceptably--high.

Which brought him to his fourth notion, changing styles in the arts. The arts, at least in the Western tradition, have an ethos of constant innovation, he reminded us: no artist wants to repeat the style or form of another, nor would earn respect for doing so. Yet suppose there are only a limited number of accessible styles in artistic expression. Once those styles are used up, so to speak, artists are pushed by the relentless ethos of constant innovation into the arid position of speaking to fewer and fewer, finally only to coteries. While there are celebrated examples of innovative art not finding its audience for many years, there are also many more examples of art so impossibly inaccessible that no amount of time will ever make it palatable to more than a few: he conjectured that 12-tone music might be such an example.

Does the ethos of constant stylistic innovation prevent composers, who might otherwise be composing Mozart-like operas or Bach-like fugues, from giving us just a few more of those accessible masterpieces?

Finally, what do all these ideas have to do with excellence? Is it a question of how we understand systems over time? Whether we think of them as getting "better"? Or "worse"? Are essences what we should be looking for in trying to define excellence, or should we, as evolutionary biologists do, be concerned with variations and their expansions or contractions over time?

If Stephen Jay Gould had any more to enlighten us with, he never had a chance: discussion erupted passionately. For flavor: Weren't human physical limits something defined by the culture? The four-minute mile was thought to be an impossible barrier until Roger Bannister broke it, and was followed by many runners after. Is the old art of memorizing, now lost to us, comparable to the singing of the castrati? Didn't Charles Demming, the guru of excellence in manufacturing, define excellence as an effort to reduce variants? And wasn't science, or at least mathematics, impervious to fads like those that shake the art world?

I'd have liked to take strong exception to that last, but instead, I sat back, let Gould's four ideas wash over me, connecting them, for one thing, with the work of a painter whom I've been writing about, who's hypothesized that excellence in art is tied to universal human cognitive structures (though deeply mediated by a given culture), and that a work of art that misunderstands or denies that connection misses something essential.

Perhaps this is what Gould meant by "accessible style"--a set of representations that resonate with universal human cognitive structures (a part of our biological legacy), a repertoire even limited by those structures, somewhat the way human physical performance is limited by the biomechanics of the human body. I asked, and Gould nodded a tentative yes.

And so I offer some possible connective tissue:

Despite very wide variations in style and performance (from retirement-home shuffleboard to professional football), human physical performance is eventually limited by the real biomechanics of the human body. The four-minute mile was a cultural barrier, but the 30-second mile isn't, and neither is the 150 m.p.h. fastball.

Analogously, our human biological legacy has endowed us with certain cognitive structures, universal to all. Though these structures allow for a very wide variety of expressions (or representations), very wide is not the same as infinite. Styles of art that stray too far from such cognitive structures risk losing their audience--not just for a while, but forever.

Excellence, then, is a relative thing, perhaps no more than a cultural artifact, paradoxically rendering .400 hitting in 1896 inferior to .260 hitting in 1990; and both of these are ultimately limited by human biomechanics. Likewise cultural artifacts are the stories we've told ourselves about the evolution of horses and the devolution of history (both stories tied, I'd guess, to abiding and universal human cognitive structures that yearn for, and if necessary will impose, narratives of causation upon a cluster of events--the dream being the most obvious, naturally-occurring example). The same events would evoke different stories in other cultures, just as the random pulses from the brain stem that stimulate our dreams find an expression that's largely idiosyncratic to the dreamer.

And yet this leaves the nature, the essence, the measure (or mismeasure) of

excellence elusive. Must it ever be? Perhaps excellence in physical achievement is the gesture that pushes the envelope of the possible farther than it has ever been pushed before, in a multitude of directions simultaneously. But there is ultimately an envelope, its perimeter bounded by human biomechanics.

Excellence in artistic achievement is more problematic. Here, measures of excellence would depend first, on identifying such universal cognitive structures if they exist, and then, measuring fundamental congruences between those structures and a style of art, ignoring (or celebrating) the contingencies lent by a given culture. The ethos of innovation in the arts may itself be tied to a cognitive structure that craves the stimulation of novelty (but always just enough, not too much). Excellence here might also consist of pushing the envelope of the possible farther than ever before, in a multitude of directions simultaneously, but with the envelope's perimeter at last more rigorously defined by the very (but not infinitely) elastic capacities of human cognitive structures.

If these connections among Gould's four ideas are tenable, we have a very long journey ahead indeed. What say, Professor Gould?

Pamela McCorduck, a writer, is the author of Machines Who Think and The Universal Machine, and coauthor (with Edward Feigenbaum) of The Fifth Generation and The Rise of the Expert Company.

(Jerry Bruner is one of our intellectual treasures. He's 75 years old and still cooking. He talked to The Reality Club at The Council Room, New York Academy of the Sciences, hosted by Don Straus. Jerry is Research Professor of Psychology at New York University. He was formerly Professor of Psychology at Harvard University and the Watts Professor of Psychology at Oxford. Among his many books are Actual Minds, Possible Worlds, and Autobiography: In Search of Mind. -JB)

Jerome Bruner's "Autobiography: Prophetic Retrospect"

Commentary by Mihai Nadin

"The soul selects her own society..."

It was the second time that I listened to Jerome Bruner. The first time, at Brown University, and now, in the appropriate decor of the Council Room at the New York Academy of Science, I tried to understand what makes someone a psychologist and what it takes to become a living classic. I first disagreed with Jerome Bruner when I read "The Formats of Language Acquisition," printed in an issue (vol. 1, no.3, 1982) of the American Journal of Semiotics, in which, incidentally, my text on the meaning of sign theories also appeared. My disagreement was twofold: His subject belonged in a different context, where it could be properly discussed; secondly, if one accepts the context of semiotics, one should try to understand what it is about and not take a condescending tone (so obvious in respect to Charles S. Peirce, whose contribution I'm afraid Bruner still does not realize), projecting (no doubt unintentionally) the image of somebody who feels entitled to be confirmed even by those who lived before, not to say those who will follow.

These (I confess) unflattering thoughts should be put in the framework of my

discovering America and its intellectual and academic life. What in 1982 was probably an aggressive attitude (or disappointment) on my part turned out today as my assimilated tolerance or tamed exigencies. Since then, I have read quite a bit of Bruner's writings and suspected that sooner or later the "real" Jerome Bruner will stand up. The talk he gave us allows me to suspect that what makes the psychologist is his interest in everything that is human (...humani nil a me alienum puto) - from the nature of relations between parents and children, to people's behavior, motivations, hopes, and disappointments, and much more. As far as recognition goes, Jerome Bruner loves to quote Yeats: "Think where man's glory most begins and ends/And say my glory was I had such friends!" To attach to someone's name, as to his, friends who marked not only our thinking, but also our feeling, our outlook in the broadest sense of the word, means to have experienced excellence (Oh, do I fear this word, but not in this connection) and brought your own-as he certainly did-in touch with theirs.

What most excited me, in anticipation of the talk and again during the discussions, is Jerome Bruner's ability to search for new territory for his intellectual journey and his way of making it his, to appropriate it (or at least to try). Now I better understand why he regretted not having joined the MIT "neighbors" during the years when the computing paradigm was established. Every now and then you notice that no matter how well "connected" one is in the computer network, this does not automatically result in one's thinking in a new way. And if there is something revolutionary in the computer, it is not the speed of the central processor, nor the storage, but the ability to think about our questions in ways different from those we have experienced up to now. Leibniz understood this surprisingly well; the experimental psychologist Jerome Bruner is still captive (I suspect) to the statistical power of the tool (probably its most pervasive aspect, but by no means the most significant). His research (in 1956) anticipated cognitive science; but cognitive science never really became his territory. But I'd better stop this point here, before turning into Professor Boring. (Edward Garriques Boring was Bruner's professor at Harvard, and somewhat a father figure. As Bruner put it, "You knew immediately where you stood with Boring.")

I loved hearing Bruner talk to us, after some remarks about computers, about the constitution of the self in narration and about the patterns introduced by writing within cultures. "Listening to your version of yourself" is a powerful device, which his own In Search of Mind convincingly illustrates. Inspired by Christine Nystrom, Neil Postman, as very eloquent communications ecologist, stated, "Human beings require stories to give meaning to the facts of their existence." He goes on to say, "A story provides a structure for our perception." Listening to the well articulated account of a humanist interested in stories, I felt like asking the question Bruner already heard: Yes, yes, it's nice to hear you focus on narration and its psychological implications, but you were a developmental psychologist? And before we knew it, we heard about that strange child telling her evening stories, producing scripts while actually creating herself in those recorded testimonies that he commented upon. Her fascinating ways of handling, through stories, a world, that seemed so personal that I felt uncomfortable in becoming a remote witness, deservedly captured Bruner's attention.

The literary immediacy of almost everything I read of Bruner's work and the talk he gave is indeed so strong that I suspect him of having written not just a poem, but probably fiction. His writer friends mentioned during the

talk (Brodsky's remark about Central Europe seen far from eastern Asia will enlighten not only Cselav Milos, but many others who are so self-centered that they lose the sense of *topos*) confirm that Bruner not only has friends, but is a friend of many, a generous intellectual with a broad horizon and insatiable reading appetite. If "Commerce follows the flag," intellectual life follows the example of those who have power and will to change, to switch, to jump ship, to set sail on another, not only to their illustrious chairs, but to territories where nobody can guarantee them the honor they have grown accustomed to, or even the integrity of the new friends they might make. Once in the realm of the "left hand," Bruner is more direct, more intuitive, less self-righteous than in theory. We all realized that he enjoys art and knows how to make sense of it, although some of his observations get lost in the discourse. "There is a process by which ornaments become tools," he guessed some time ago, but I suppose, dropped the guess, one among many that we all enjoyed hearing but which were not pursued. With so many ideas, he can afford to be wasteful.

This world of ours, extending from Cambridge to Moscow, and from Oxford's Christ Church and Nuffield College to Jerusalem's Kotel ha Ma'aravi, is firmly his house, even when he feels uneasy about some of its rituals. His friend, Lionel Trilling, would place him graciously among those enjoying authenticity and making it his hallmark. When my new friends from the Reality Club asked me to write some notes about his lecture, I felt a little hesitant. It is not that this world where I now live did not become mine, or that I do not feel established in it. As I learned from Jerome Bruner's talk, authenticity and sincerity do not complement each other. Caught in the web of his arguments, I remembered a question he asked more than once, quoting Henry Adams: All the steam in the world could not, like the Virgin, build Chartres? In retrospect, the answer, prophetic or not, is not and cannot be authentic. In anticipation of everything we are, our minds should not formulate this question. Explaining things after they happen leads to nice fiction and interesting analytical residue. Determinism, psychological or cognitive, subjected to reverse engineering ends up in disappointment.

Mihai Nadin is a semiotician and an educator.

(George Dyson talked to The Reality Club at the Morton Room of New York's Metropolitan Club hosted by Hugh Downs, a long way from his tree house in British Columbia. He has been building kayaks since the age of twelve. A high-school dropout, George considers himself a follower of Nathaniel Bishop, who, while paddling by kayak through Princeton, New Jersey in 1874 (George's home town), urged the audience to "seek in his friendly canoe that relief which nature offers to the tired brain.")

George, who lived in a his tree house in British Columbia for many years, now lives in Bellingham, Washington, where he runs the Baidarka Historical Society (P.O. Box 5454, Bellingham, WA, 98227, USA). -JB)

George Dyson's "Baidarka: The Skin Boat as a Frame of Mind"

Commentary by Bruce Wilshire

The fact of George Dyson's life and work can easily be sketched in a way that discourages further inquiry. He is a high school dropout from Princeton, New Jersey, who became fascinated with kayaks over twenty years ago. In particular, it is the baidarka that interests him: a small

flexible boat with a light wooden and bone skeleton covered with seal skin, used for centuries for hunting sea mammals in the Aleutian Islands south of Alaska. He himself in his autobiographic mode uses a psychiatric terminology that reduces what the observer expects to find in his life and work. "For some reason, about 20 years ago I became obsessed with bringing the Aleut/Russian baidarka back to life. I've done little else since, and as to the big question, Why, your guess is as good as mine." Or..."my own work (so far) raises the question of how to nurture an obscure monomania...without getting hopelessly distracted along the way."

Indeed. He lived in the Pacific northwest in a tree house 85 feet above the ground and studied everything he could find that in any way concerns the baidarka: Captain Cook's logs, Russian accounts...anything. Destitute, he scrounged for bits of material, fashioned a crude baidarka out of bits of aluminum tubing and other scraps he found lying around, sailed alone in it for months at a time along the Canadian coast, endured hardship, went native along the foggy shores.

Sitting close before me now, flashing slides of his twenty year odyssey too rapidly for comfort, his eyes shine--perhaps they burn--as he speeds through an excited recounting of the history of the baidarka and of his personal experience in extending that history. Some of this could be just nervousness. After all, he has spent much of his life alone, and he is now in the Metropolitan Club--of all places--in Manhattan, and Hugh Downs is the host! But despite the august, glitzy setting, the suggestion of fanaticism remains. I find myself picking out a psychoanalytic tune that "explains it all:" His famous father--the brilliant physicist, and outspoken, unconventional peace advocate, Freeman--sits behind me. Now, I think, a young man has only two ways of individuating himself from such a father: he can become hyper-conservative, or he can become even more unconventional than his father--dangerously, perhaps even ridiculously unconventional.

But too often reductionistic psychological explanations have come between me and the well-springs of my being. There is a better explanation for George Dyson. More likely he is in the grip of archetypal attractions and rootings that would touch and nourish all of us if we could be open to them. I think he is pulled the way Heracles was to Hera's golden apples of regeneration, the way Jason was to Medea and to the golden fleece, the way Ulysses was to glory--and then to home and to Penelope. When I see the pictures of George at sea in his hand-crafted baidarka, it is most particularly Ulysses who comes to mind. But what is Dyson's Troy, and what his Ithaca?

Dyson's slides show that the ancient baidarka's sparse wooden skeleton mimicked the skeletal structure of a seal or sea-otter. Carved and polished sea-mammal bones formed ball and socket hinges where the struts met, so that as the boat moved through the water it also moved with the water, flexing responsively. The skin of the boat was the skin of seals. The sailors hunted sea mammals seated within a boat that was an extension of their conscious bodies and integral to them--and practically became sea mammals themselves. Instead of detachment and domination the baidarka sailors collaborated with the sea and its mammals, their near or distant kin. The sailors were thankful to the seals and sea otters they killed and consumed, knowing that at a later time it would be their turn to give back their own substance to the whole to be consumed--seal deaths and human deaths--each a part of the whole, merely different moments in the endless circle of energy-exchange in ever-reclaiming, ever-regenerating Nature.

I realize that it is true: the skin boat is a primal state of mind. Moreover, Dyson says that looking out levelly at the sea's horizon for hours induces a kind of trance. I don't doubt it--I'm sure this trance is the result not only of the repetitious rowing and of the waves, but is also a mystical and ecstatic union with Nature and with its creatures. Beyond the near and the far horizon lies the everything else--a living presence within one, all of Nature, the cosmos.

It strikes me that Dyson's Troy--his struggle and his triumph--is the skin-boat itself, his return to Ithaca the home-coming experience in which he is reunited with Nature. He is reunited, I think, through reenacting the earliest myths our forebears told about belonging to, and being one with, the basic divinities: Earth, Sky, Water. Dyson's intense preoccupation with this primal way of being is not the pejorative monomania he labels it; his laser-like focusing is necessary to bore through the thick layer of superficial cultural trash most of us live in; it opens-up certain fecund but neglected oceanic possibilities of his life--of all our lives. Only when one puts out to sea in a baidarka--or from some other primal vantage point--can one look back at our dessicated civilization and see how limiting and distorting it is for those who live only within it.

One of Dyson's slides shows a water-color of an Aleut made from life by a member of the Cook expedition to Alaska. The face shines with intelligence and sensitivity. The next slide shows how the European hand and mind denigrated the visage when reproducing it for a traveler's atlas: the bones piercing the nostrils are exaggerated, as are the brow ridges, and the man's look is now vacant and sullen. Unfortunately, from our "civilized," secular, "objective" vantage point, people and things too often only have value as objects to be manipulated for immediate gain; and too often primal or indigenous people appear to us merely as vacuous and brutish.

In bringing the baidarka and its state of mind back to life, George Dyson helps bring me back to life. I thank him for his unswerving, persevering efforts, and I wish him well.

Bruce Wilshire is professor of philosophy at Rutgers and vice-chairman of SOFIA.

INTELLECTUAL GRAFFITI

"Why is geometry so often described as 'cold' and 'dry'? One reason may reside in its inability to tell what shape is a cloud, a mountain or a coastline. Clouds are not spheres, mountains are not cones, coastlines are not circles, and more generally Man's oldest questions concerning the shape of his world were left without answer by Euclid and his successors. In fact, they came to be disdained by Mathematicians, who viewed themselves as increasingly building theories totally unrelated to anything one can see or feel. By describing some highlights of the theory of fractals, of which he is the originator, the speaker will seek to deprive this self image of its foundation."

Benoit B. Mandelbrot

"The time has come to stop making sense - to replace History with myriad exaggerated theories of post-, para-, quasi-, and super-. History has been defeated by the determinisms of market and numbers, by the processes of reification and abstraction. These form the great juggernaut of modernity that has destroyed History by absorbing it, by turning each of History's independent concepts to serve its own purpose. Another kind of response is then called for. Ideas that themselves change or dissipate as they are absorbed, that are formed with the presupposition that they will be subject to reification. Only a rear-guard action is possible, of guerrilla ideas that can disappear back into the jungle of thought and re-emerge in other disguises; of fantastic, eccentric ideas that seem innocuous and are so admitted, unnoticed by the media-mechanism; of doubtful ideas that are not invested in their own truth and are thus not damaged when they are manipulated; or of nihilistic ideas that are dismissed for being too depressing."

Peter Halley

"Physics envy, considered a near lethal pediatric disease of a young biological science, may instead lead to a more mature science that marries the image of evolution as a "tinkerer" with new principles of self-organization."

Stuart Kauffman

"I would like to propose to you that the modal complexity of life has never changed - it never will - that right from the beginning of life's history it has been what it is, it is today and ever shall be world without end or until it ends and that our view of complexity is shaped by our warped decision to focus on only one small aspect of life's history - and that the small bit of the history of life that we can legitimately see as involved in progress arises for an odd structural reason, has nothing to do with any predictable drive towards it."

Stephen Jay Gould

"We live in bodies made of atoms in a world made of atoms. How those atoms are arranged makes the difference between coal and diamond, between food and

poison, between life and death. Advances in biotechnology are leading us, step by step, toward a revolution in technology: toward molecular machines able to build complex systems atoms by atom. These molecular assemblers will enable us to convert coal into diamond - and to build self-replicating machines, computers smaller than a bacterium, devices able to enter and repair human cells, and much more. Assemblers will change technology at its foundations, transforming medicine, the economy and the arms race. For better or worse, assembler-based technology seems unavoidable. With it we will remake our world, or destroy it."

K. Eric Drexler

"While the big bang theory explains a great deal, it also leaves many questions unanswered. How did the distribution of matter and energy in the universe become so uniform throughout such a vast region of space? Why was the mass density of the early universe so close to the critical value that places the universe just at the borderline between eternal expansion and eventual collapse? What is the origin of the density perturbations that led to the formation of galaxies?

"Plausible answers to these questions have been found in the past few years in the context of a new theory called the inflationary universe. This theory agrees precisely with the standard big bang description for all times after the first fraction of a second, but the story for this first fraction of a second is dramatically different. According to the inflationary model, the universe underwent a brief period of extraordinarily rapid expansion, or 'inflation,' during which its diameter increased by a factor at least ten trillion trillion times larger than had been previously thought. In the course of this stupendous growth spurt all the matter and energy in the universe could have been created from virtually nothing."

Alan Guth

"We tend to think of our stream of consciousness as flowing by a particular point, called here-and-now, more or less like the frames in a film running through the projector. But of course there is no such place in the brain. When we think carefully about how the brain, with its relatively slow communications pathways, must solve its real-world coordination problems, we realize that it makes no sense to suppose that the brain is centered around such a point. Therefore, our experience of time (of sequence, simultaneity, duration, and of NOW) must be an artifact of processes of interpretation, rather than a directly or "immediately" experienced feature of those mental states. This has some surprising consequences: in particular, the order in which we experience events as happening need not be the order in which the experiences happen in the brain."

Daniel C. Dennett

"History is my main interest and today its action concentrates on Space, not only on extraterrestrial expansion, the satellite supervision of human activities on planet Earth, Near Space, Moon, Mars, Solar System expeditions, and search for other intelligence, but also the full discovery and management of planet earth itself, the world ocean, Antarctica and Arctic, the mantle, plate tectonics, the atmosphere, and the ozone layer.

The chief technical block to completing this stage of history is the achievement of Biospherics, the ability for complex, stable, enduring, evolutionary life systems to separate from Biosphere I and go off on their own."

John Allen

"Virtual Reality is about a new technology that will thrill everyone and is just around the pike. Computerized clothing is worn on the eyes, ears, and hands to transport the wearer into an alternate plane of reality. People can meet each other in this place, taking on any form they wish and having any experiences that can be imagined. VR is shared and objectively real like the physical world, composable like a work of art, and unlimited and harmless, like a dream."

Jaron Lanier

"If there is a dark side to postmodernism it lies in an inability to make commitments that are not tinged with irony. Postmodern man and woman are all dressed up with everyplace to go. They have costumes for every occasion, but no truly compelling reason to choose one occasion over another, one career over another, one life over another."

Jay Ogilvy

"After millions of years barely surviving as a helpless animal among others, only a few thousand years ago our ancestors became aware of the unique abilities. The creation of culture -- language, laws, technologies--led to memes rather than genes determining the course of history".

Mihaly Csikszentmihalyi

"My minimalist model for mind suggests that consciousness is primarily a Darwin Machine, using utility estimates to evaluate projected sequences of words/schemas/movements that are formed up off-line in a massively serial neural device. The best candidate becomes what "one is conscious of" and sometimes acts upon. What's going on in mind isn't really a symphony but is more like a whole rehearsal hall of various melodies being practiced and composed; it is our ability to focus attention upon one well-shaped scenario that allows us to hear a *cerebral symphony* amid all the fantasy."

William Calvin

"There was a time when one talked about education in the United States in terms of a Jeffersonian ideal of a well-educated citizen -what it took to be a contributor to the community and a well-developed human being, Now I'm impressed with the degree to which the discussion of education has to do with whether people are going to be competitive."

Peter Schwartz

"The Avant-garde saw the cracks in the old order. Revolutions put the blood of kings in the same pits, the machine gun cutting chivalry down to size. The Bourgeois undermines world revolution, industry geometrically increasing all forces, keeping up with population.

"But the changes were not the point; the continuity of mass culture was more striking. The Avant-garde did not make *things* so much as *relationships*. Producing force by contrast, objects as context.

"In the last quarter of the twentieth century the field of culture against which the object of the Avant-garde was place dissolved. There is no thesis of the parent state against which the child artist can rebel. Not seeing the end of the game the stakes are raised, more desperate acts are taken; many others withdraw from the field and curl up in pleasure's bed.

"Where does that leave us, what have we got? Pieces from spaceships, Black Magic, archaic technologies, labels and practices from the corporate state, all centrifuged by consumer culture's unquenchable desires, into the margins.

"The center crowded with the beautiful and hideous ghosts of empire may now be approached.

"A possibility, no guarantees, no radical credentials, maybe a waste of time; a normal object."

Gary Stephan

FYI

REALITY CLUB EAST We are currently in negotiations with the USSR Academy of Creative Pursuits to open a Moscow branch of The Reality Club ("Reality Club East"). This new (post-glasnost) Academy is concerned with science, culture, and social activities. **Marat Akchurin**, The Director General of Cultural Programs of the Academy, recently appeared before the Reality Club in New York to talk about the Soviet Ethnic Republics. Marat has put us in touch with Georgy Gladyshev, president of the Academy.

There has been quite a bit of interaction with the Soviet Union by members of The Reality Club. Recent travelers include **Esther Dyson**, who is running a computer conference; psychiatrist **David Olds**, who toured literary venues with his wife, poet Sharon Olds; environmentalist **Robert Rodale**, who is forming a joint venture between his Rodale Research Institute and Soviet Agricultural Ministries; publisher **Michael Fine**, who is developing a joint venture with Soviet Energy Ministries, and **Joseph Traub**, who is lecturing to his Soviet counterparts on subjects such as supercomputing and complexity.

Entrepreneur **Bob Schwartz** was Boris Yelstin's host during Yelstin's recent trip to the United States. **Dimitri Simes**, at the Carnegie Endowment for International Peace, is one of the leading political scientists studying the Soviet Union.

We are now considering ideas for developing this project.

REALITY CLUB BOOKS The Reality Club Book Series is on track. A three-book series is being published by Prentice Hall Press in the United States and a two-book series by Heyne in Germany. The series is edited by **John Brockman**. A Russian language version is being discussed with a Moscow publisher, and the project is being discussed with English, Italian, Dutch, Japanese, and Korean publishers.

The first volume in the Prentice Hall series, Speculations, is scheduled for publication in August. It is organized around the subject of the human mind, and includes essays by **Morris Berman**, **William Calvin**, **Mihaly Csikszentmihalyi**, **Daniel C. Dennett**, **Lynn Margulis**, and **Robert Sternberg**.

The second volume, Doing Science, will be published in December, and includes essays by **Ralph Abraham**, **Paul Davies**, **Eric Drexler**, **Gerald Feinberg**, **James Lovelock**, **Dorion Sagan**, and **Hao Wang**.

The third volume, Ways of Knowing, will be published in January and includes essays on learning, education and knowledge by **Mary Catherine Bateson**, **Howard Gardner**, **Mark Mirsky**, **Joan Richardson**, **Joshua Meyrowitz**, **Paul Ryan**, **Roger Schank**, **Page Smith**, and **Paul Mariani**.

The first volume of the German edition, which will differ in content from the American version, is being published in July.

1990-91 SEASON The Reality Club will move into its 10th year with a new style and format for meetings.

Small, select, groups of ten or under will be invited by EDGE's board of directors in conjunction with a meeting chairman to meet with a speaker with

the understanding that (1) the invited members read suggested books or articles by, or about, the speaker, and (2) they will be prepared to be called upon after the speaker's talk to present their own views on the subject.

The EDGE newsletter, will become the vehicle for presenting the meeting to the general membership. At each talk, one participant will be asked to write a personal appraisal of the meeting for EDGE. The meetings will be videotaped and the tapes will be made available on request.

A number of individuals have indicated an interest (subject to their schedules) in giving a talk during the coming season. They include Chris Langton and Doyne Farmer (see EDGE Interview); educator Howard Gardner, author of Frames of Mind; physicist and Nobel Laureate Murray Gell-Mann, psychologist Nicholas Humphrey, author of The Mind's Eye, paleoanthropologist Roger Lewin, author of Bones of Contention; artist and film-maker Robert Longo, neurologist Robert Restak, author of The Brain; and philosopher Bruce Wilshire.

EDGE
The Newsletter of Edge Foundation, Inc.

Board of Directors

John Brockman
Katinka Matson
Mark Mirsky

Editor: John Brockman

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Please forward short items to us about your life and your work for possible coverage in EDGE. Letters and opinion pieces will also be considered; submissions may be edited. Write to Edge Foundation, Inc., 2307 Broadway, New York, NY 10024; telephone 212-874-0533; fax 212-496-9509. Moving? Please make sure we have your correct address.

Amid the Publishing Slump, Norton Thrives

Reality Club

By EDWIN McDOWELL

At a time when many publishing houses are complaining about declining revenues and even losses, W. W. Norton & Company is not only profitable, but also independent.

And unlike other houses, it has never conducted sweeping layoffs or bought other publishing concerns to strip them of their backlists before disbanding them. Indeed, Norton is the only major house owned entirely by its employees.

"I think they're the best there is," said Roger W. Straus, president of Farrar, Straus & Giroux, another quality independent house. "They're absolutely first rate."

Two Best Sellers

Two Norton books are riding high on the best-seller lists: "Liar's Poker" by Michael Lewis and "The T-Factor Diet" by Martin Kahan. Earlier this year it had three best sellers at the same time. But the fortunes of Norton, which has a rich backlist of about 2,500 titles, do not rise and fall on best sellers.

"We're happy to have them, because they're good for the morale of our authors, editors and sales force," said Donald S. Lamm, Norton's chairman and president. "But our aim is to publish good books as well as we can. We don't see this as a trendy publishing house. In fact, I always say you can tell a trend has passed when Norton publishes a book on the subject."

Actually, Norton publishes many books on many subjects — about 250 titles a year, of which 30 percent are college textbooks. Mr. Lamm will not disclose revenues, but he said the college division accounts for most profits. He also said the 67-year-old house has been profitable for the last 25 years, although for a couple of years profits were "razor thin."

'Very Open and Very Smart'

"Norton has very little bureaucracy," said Thomas C. Wallace, a literary agent and former Norton editor. "Don runs the company, but he consults with others and he listens. He's very open and very smart."

Educated at Yale and Oxford, Mr. Lamm, 58 years old, is partial to what



The New York Times/Nancy Slesel

"Our aim is to publish good books as well as we can," said Donald S. Lamm, the chairman and president of Norton.

he calls "undermanagement." While there is a weekly editorial meeting, Mr. Lamm said he could not remember ever having a vote on whether to acquire a book. "We aim for a meeting of the minds," he said, "but there's a strong predilection on my part to let an editor with a passion for a book go ahead with it."

Moreover, there is no end-of-the-year tally of how much money an editor's books made or lost, now common in some houses.

Norton editors calculate the size of

advances on the basis of what the house alone can earn on a book — not from potential earnings from the sale of paperback or book-club rights. While that policy has kept the house from having to write off substantial unearned advances, it has also cost it an occasional name author.

Norman Cousins, for example, wrote two best sellers for Norton, "Anatomy of an Illness" and "The Healing Heart." But when Norton decided the asking price was too high for "Head First" — the Cousins book

recently published by E. P. Dutton — the house and the author reluctantly parted company.

Norton is best known in educational circles for books on economics and psychology, and for its anthologies and critical editions of literary classics. It also publishes an extensive list of music and science books.

Its longtime slogan is "Books That Live," and Norton has in fact published many such books, including "The Feminine Mystique" by Betty Friedan, "The Revolt of the Masses" by José Ortega y Gasset, "The Greek Way" by Edith Hamilton and "Philosophy" by Bertrand Russell.

A Norton specialty is the "crossover" book, published for both general and academic markets. A leading crossover author is Stephen Jay Gould, the Harvard paleontologist who has written nine books for Norton.

"Probably three-quarters of the books I personally edit have double markets," said Edwin Barber, the editorial director, who has edited textbooks for about one-half of his 33-year publishing career.

Mr. Lamm, who has spent his entire 34-year professional career at Norton, was also an editor in the college department.

Value of Continuity

"The thing Norton has, and I think we have, is continuity," Mr. Straus said. "Don Lamm and many other Norton people have been there for years, and they consider themselves part of a team."

In 1973, when independent houses were considered fair game for takeovers, George P. Brockway — Mr. Lamm's predecessor as chairman — vowed that Norton "has never been for sale and is not likely to be." Mr. Lamm has also spent many hours discouraging potential suitors.

After five years, employees are eligible to buy stock that under a 38-year-old "joint stockholders' agreement" must be tendered back to the company by retiring employees. The stock is currently held by about two-thirds of the 160 employees on the New York payroll. The company says that arrangement is the best safeguard against a takeover.

International B

Percentage of total print rights Sales of foreign book rights authors as well as publishers for more than half the total right of the print-rights sales for "Fa

Netherlands 1%

Brazil 1%

Spain 3%

Italy 7%

Norway

Sweden

Denmark

Wes
Gerr
13%

Source: Virginia Barber Literary Agency

Agents Fight Of Foreign

By ROGER COHEN

Lynn Nesbit, a literary agent, selling Tom Wolfe's next book around the world. Publishers in Europe have paid well in excess of \$1 million for it. Yet, Ms. Nesbit said: "It's not a book yet. It's not even an outline. In fact it's hardly even an idea."

Another novel, "Fade the Heat" by Jay Brandon, has just been sold to publishers in 11 countries for almost four times the six-figure advance paid by Pocket Books in the United States. Virginia Barber, an agent, said the sales were made even though the book is not due out in the United States for six months.

These days, even embryonic books have a market abroad. Indeed, the sale of foreign rights to American

"To arrive at the edge of the world's knowledge, seek out the most complex and sophisticated minds, put them in a room together, and have them ask each other the questions they are asking themselves."

2307 BROADWAY
NEW YORK, NEW YORK 10024
(212) 874-0533

**THE
REALITY
CLUB**

Schedule: 1989 - 1990 (Tentative)

<u>Date</u>	<u>Speaker</u>	<u>Host</u>
Thursday, September 7	Bob Schwartz	John Brockman/Katinka Matson
Tuesday, September 19	Jim Toback	Review Theatre #1
Wednesday, October 4	Stuart Kauffman	Robert Langs
Tuesday, October 24	Ken Kesey	Bob Schwartz
yes Tuesday, November 7	Bob Rodale	Pamela McCorduck/Joe Traub
Tuesday, November 14	Candace Pert	David Shaw
Wednesday, November 29	Art Kleiner	Frank Gillette
yes Thursday, December 14	Daniel Dennett	James Wines
Tuesday, January 2	Jamie James	Gary Stephan
Wednesday, January 17	Paul Starr	Eugene Schwartz
Thursday, February 1	John & Nancy Todd	David Shaw
Tuesday, February 13	BANQUET Elaine Pagels	TBA
Wednesday, February 28	Jaron Lanier	Frank Gillette
Thursday, March 15	Nicholas Toth	Hugh Downs
Tuesday, March 27	TBA	Pamela McCorduck/Joe Traub
Wednesday, April 18	TBA	Ed Barber
Thursday, May 3	George Dyson	Frank Moretti
Tuesday, May 8	Stephen Jay Gould	Bob Schwartz
Tuesday, May 15	Jerome Bruner	Don Straus

A Project of EDGE FOUNDATION, INC.

EDGE FOUNDATION, INC.
2307 Broadway
New York, NY 10024
212-874-0500

October 4, 1989

re: The Reality Club

Dear Members:

The Reality Club is becoming increasingly stimulating and interesting, witness the enclosed schedule for the '89-'90 season. The new members presently scheduled to address the club are novelist Ken Kesey, philosopher Daniel Dennett, zoologist Stephen Jay Gould, psychologist Jerome Bruner, aids researcher Candace Pert, biochemist Stuart Kauffman, movie director James Toback, business entrepreneur Bob Schwartz, environmentalist Robert Rodale, educator Art Kleiner, Angkor Wat expert Jamie James, sociologist Paul Starr, ecologists John & Nancy Todd, technologist Jaron Lanier, anthropologist Nicholas Toth, and kayak designer George Dyson. In addition, Elaine Pagels will be the speaker at the Reality Club banquet in February, and will talk about "The Devil."

Since 1981 I have been running The Reality Club on an informal basis and financially supporting its activities. I have increasingly felt that there is great potential for an expanded program which includes some public participation. In this regard, I have formed a non-profit entity to run The Reality Club and to serve as a sponsor of like-minded projects. This new entity, Edge Foundation, Inc., has just been approved by the IRS under section 501 (c)(3) as a private operating foundation. I have donated the initial capital, and hope to make similar yearly contributions. The foundation is open to receiving support from others as well. The Reality Club policy of no dues, fees, admissions, etc. for members will continue as before.

In the future you will be hearing about The Reality Club through EDGE (same address and telephone number). The enclosed schedule is, of course, tentative and subject to change. Please check your monthly invitations for the final schedule. Events can be cancelled and re-scheduled and new speakers may be added at the last minute. Please RSVP if you plan to attend specific events so we can notify you of last minute changes.

This year I plan to have a competent video person at the meetings to create presentation quality tapes for archival purposes and for circulation among Reality Club members who are interested in, and/or unable to attend certain meetings. Tapes will be circulated free of charge.

I am also interested in opening up The Reality Club to the public in certain limited situations. EDGE has a mandate to offer several events a year to the general public. I am now considering possibilities in this regard and will keep you posted.

.....

October 4, 1989
page 2

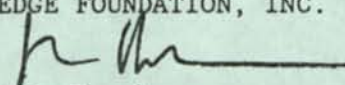
For your information, The Reality Club book series, which I am doing privately and not under the sponsorship of EDGE, was stalled due to unanticipated financial problems faced by Lynx Books when their book distributor suddenly went bankrupt. I have moved the series to Prentice Hall Press in a three-book deal (and options for more) with a revamped format in which each volume is devoted to a central theme, i.e. Thinking, Learning, etc., rather than presenting a potpourri as in "The Reality Club Issue" of The Whole Earth Review and The Reality Club #1. The essays originally published in #1, which was not widely distributed, will be made available in the various volumes of this series, as will the essays accepted for the original #2 and #3. The three volumes are tentatively scheduled for publication in June, 1990, October, 1990, and February, 1991. Reality Club members will receive complimentary copies of each volume. I am now soliciting essays for future volumes. Please let me know if you are working on anything interesting.

Thank you for your support. I am interested in your ideas for new members, public programs, uses of videos, suggestions for other projects of interest to you that EDGE could sponsor.

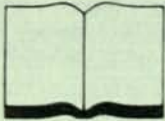
I look forward to your comments.

Sincerely Yours,

EDGE FOUNDATION, INC.



John Brockman
President



John Brockman Associates, Inc. 2307 Broadway New York, New York 10024 (212) 874-0500

June 27, 1989

MEMORANDUM

To: Clients, Editors & Friends
From: John Brockman & Katinka Matson
RE: JBA "CLIENTS & PROJECTS" LIST

Reality Club

Here is our Spring-Summer '89 list.

We recommend taking it to the beach for a great summer read!

JB & KHM

bw
encls.

E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z

F 7 I

J

pl. what about the Russian Book?

*READ SOMETHING
USA*

THE *jamaïs* *vû* PAPERS

VOLUME TWO, NUMBER SIX

• DID YOU EVER GET THE STRANGEST FEELING YOU'VE NEVER BEEN HERE BEFORE?

APRIL 1989

"Man is dead."

That was all the first page said. The rest of it was blank.

Astride Occam's Razor

Glasco had looked forward to meeting a prestigious and respected literary agent.

He hadn't reckoned on facing a man who believed in no reality whatsoever except for *words*—a man who had once proclaimed himself "the late John Brockman."

Glasco looked up from the book across a huge expanse of lush, green lawn. Central Park was strewn with hundreds of contented sunbathers. From a nearby radio, Glasco heard the Beach Boys singing "Good Vibrations." Glasco smiled slightly, touched by the sentiment. Many of the New York sunbathers were undoubtedly picturing themselves on Cali-

fornia beaches. Their visions didn't include stretches of sand littered with garbage. It was a mythic world of sun, song, and beautiful people. He wished the celebrants well in sustaining their illusion.

A laughing little girl played with a huge, yellow balloon while her parents watched blissfully. Glasco looked at the volume in his hand. It was noon, and the day was lovely. Did he really want to read a book that began with the words, "Man is dead?"

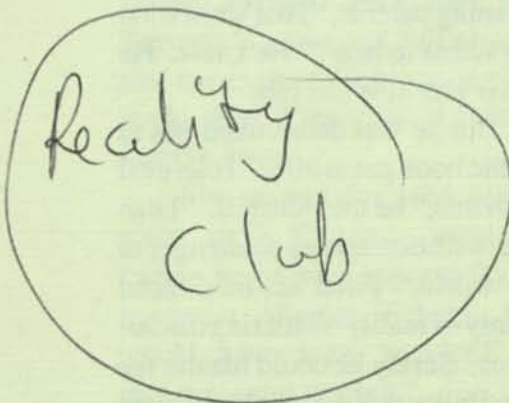
He glanced over a few of the pages. Each featured no more than a few lines of text situated at the top of a page, leaving at least half of every page completely blank. You could slice off the bottom half of the book and not lose a single word. Some pages contained but one line of text. One contained just two words:

"Facts smirk."

Glasco decided to peek at the end. He occasionally did this with iconoclastic philosophical writings, although rarely with murder mysteries. It was a practice which had saved him the trouble of reading *The Myth of Sisyphus*. After all, once you found out that Camus didn't kill himself at the end, why bother with the rest of it?

Turning to the end of this particular volume, Glasco encountered a sinister aphorism:

"Nobody knows, and you can't find out."



Nobody knows *what?* And *why can't* you find out? Despite the summer heat, Glasco felt a small chill of apprehension. What kind of issues would this book address? Would it be more than he could handle? Would it drastically change how he looked at the world? That didn't seem likely.

Glasco felt truly hardened. He'd experienced enough earth-shattering revelations during the last couple of years to fill an eventful lifetime. Further surprises seemed impossible. Nevertheless, he decided to thumb lightly through the book and skim a few of its pages. He had the vague feeling that to actually read this entire volume might somehow be a little bit self-destructive.

On one page he found this disturbing sentiment:

"Who's crazy? Mankind went out of its mind. There is no mind out of which to go. Who's crazy?"

It was not a sentiment Glasco wished to mull over. He quickly turned to another page:

"There is no past, there is no future, there is no time, there is no space. The beginnings, the endings, are all bound up in the multiplicity of neural operations."

Glasco's stomach shifted at the enormity of the thought. It was definitely time to try another page:

"Progress is merely decreation."

It sounded like an important observation, but Glasco had no idea at all what "decreation" meant. He looked elsewhere:

"Don't believe any of this. Place no value in the book, in the author. Give it up, the idea of author, of truth. Give up all belief: believe only in yourself. You: you are nothing but my experience.

Me: I don't. I don't believe any of this."

Which raised in Glasco's mind the obvious question: if you don't believe it, why bother to write it? He turned a few pages further.

"Perhaps the death of an abstraction is the most difficult death."

After a few more pages, the book's message started to dawn on Glasco. The dying abstraction was "man" himself. The author had obliterated his very own existence—and was now determined to raise serious questions about the reader's as well. Was anything real in the world of this book? There had to be something. If not, why try to communicate at all? Glasco couldn't restrain himself from looking further, where he found these words:

"There's no thinking subject: only words. Only descriptions."

So that was it! Words consti-

tute the only reality. Glasco thumbed a few pages further, and read:

"Universe is the big con."

Glasco shuddered and turned away from that idea very quickly. But the page he arrived at offered him scant comfort:

"The life you live is a lie. The world you inhabit is a lie."

And a few pages further, he unearthed this cryptic outcry:

"I'm going out of my mind. I'm trying to hold on to my body, my life. It's a horrifying experience."

Gasping in sympathy, Glasco clutched the bench he was sitting on. The world seemed to reel beneath him. He slammed the unprepossessing little volume shut.

The gesture was accompanied by a small explosion. He looked up. The yellow balloon had broken in the little girl's hands. She burst into tears. Her parents ran to her and hugged her. "It's not important," they said. They said it over and over and over again, trying to offer some comfort.

"It's not important."

Glasco's heart went out to the child. He wanted to tell her well-meaning parents, "That's not what she wants to hear." He knew. He knew just how she felt.

But he was determined not to let the book get to him. "I can deal with this," he told himself. "I can deal with outrageous challenges to my world." After all, he'd faced plenty of reality-shattering disclosures. Surely he could handle the possibility that the whole universe was nothing but a parcel of words.

Glasco had arrived in New York early that morning, with an afternoon appointment to meet one of the Big Apple's most aggressive literary super-agents. He intended to sell *the jamais vu papers* as a book project.

During the last year and a half, every time Glasco had handed a copy of his newsletter to a friend or colleague, he'd gotten the same reaction:

"Looks like you might have an interesting book idea here."

Glasco knew people were just looking for something—anything—to say in the face of utter perplexity. But he began to fantasize about whopping advances, obscenely lucrative royalties, television and film rights, critical controversy and acclaim, talk show appearances. . .

Yes, maybe he *did* have a book idea here. So he called up his friend Paul Krassner, the celebrated investigative satirist and hoaxer par excellence, to solicit advice. Krassner suggested that Glasco get in touch with John Brockman, who, with his home and business partner Katinka Matson, ran a thriving New York literary agency. Brockman was Krassner's agent and had negotiated the contract for his upcoming book, *The Winner of the Slow Bicycle Race*.

"My respect for John really went up," Krassner recalled, "when he had an opportunity to represent Werner Erhard, but would have been 'required' to take est—and refused."

Krassner went on to tell how Brockman was famous for selling books by thinkers out on the

edge—thinkers responsible for changing the way people look at the world. In recent years, he had acquired considerable notoriety as a literary agent, masterminding deals for unprecedented amounts of money—including a 1.3 million dollar advance for *The Whole Earth Software Catalog*.

"And there are other possibilities," said Krassner. "You might actually get into the Reality Club." And he went on to tell of an elite group of intellectuals, founded by Brockman, who met regularly in New York to "ask each other the questions they've been asking themselves." The Reality Club's roster of speakers was staggering—a virtual Who's Who of contemporary ideas: Rupert Sheldrake, Betty Friedan, Fritjof Capra, Rollo May, Annie Dillard, Page Smith, the late Abbie Hoffman, and many others. Glasco was giddy at the thought of sharing such company, exchanging ideas as a peer.

But Krassner did not mention one important name: Imogene Savonarola. Glasco chuckled. He'd enjoy meeting Imogene in a lucid dream sometime soon and telling her he'd gotten into the Reality Club ahead of her.

"Maybe you should pay Brockman a visit," suggested Krassner. "I'll tell you what. I'll give him a call right now, and put

in a bad word for you."

The call from Brockman's office suggested he send along a proposal, but Glasco had vigorously insisted on coming to New York to meet with John Brockman in person.

Looking for a way to pass the time shortly after his arrival in Manhattan, Glasco had popped into a second-hand bookstore and,

**"There is no past,
there is no future,
there is no time,
there is no space.
The beginnings,
the endings,
are all bound up in the
multiplicity of neural
operations."**

quite by accident, run across a book called *Afterwords*—written by none other than John Brockman himself. Glasco was indeed surprised to learn that, aside from his credentials as agent and the founder of the Reality Club, Brockman was also known as a radical epistemologist. He had bought the book and headed for Central Park.

And now he was recoiling from his random glances through *Afterwords*. Glasco wondered if the whole idea of meeting Brockman was just another of Paul Krassner's infamous pranks. Glasco had looked forward to meeting a prestigious and respected literary agent. He hadn't reckoned on facing a man who believed in no reality whatsoever except for *words*—a man who had once proclaimed himself "the late John Brockman."

But Hector Glasco had long since given up on life being predictable.

Glasco found himself standing at a reception desk in a building on Broadway, close to 83rd Street. He had no clear recollection of having come here from Central Park. It was one of those somewhat startling "scene changes" he had long since gotten used to in his life—just another consequence of being a fictional character. Written on the wall behind the receptionist was the word "Information." He turned to see if anything was written on the opposite wall. It bore the word "Power."

Glasco mulled over the implications. Did these words really have any meaning? Weren't they just abstractions, and dead ones at that—just like "man"?

Oh, well, it was hardly time to think about such things. In another instant, Glasco found himself in a spacious, high-tech office. A severe-looking primitive bird mask hung off one of the walls. "*An ancient Mayan god of royalties?*" mused Glasco for a split second. But before he could consider the cryptic object further, he was shaking hands with John Brockman himself, an elegantly dressed gentleman (Glasco suspected the complicity of Giorgio Armani) with steel-gray hair and an inscrutable demeanor. Glasco was immediately intimidated by his smile.

"What have you got for me, Hector?" asked Brockman, offering Glasco a seat. Glasco opened his briefcase.

"I believe I've got material for an important book here," he said, piling papers and manuscripts on

Brockman's desk. It was a veritable mountain of written material, including copies of his newsletter, various bits of correspondence, news clippings, and documents of all kinds. "I've been at the center of an incredible whirlpool of ideas for the last year and a half. Let me tell you all about it."

And Glasco proceeded to recount his entire story, beginning with

the disappearance of his patient, the founding of *the jamais*

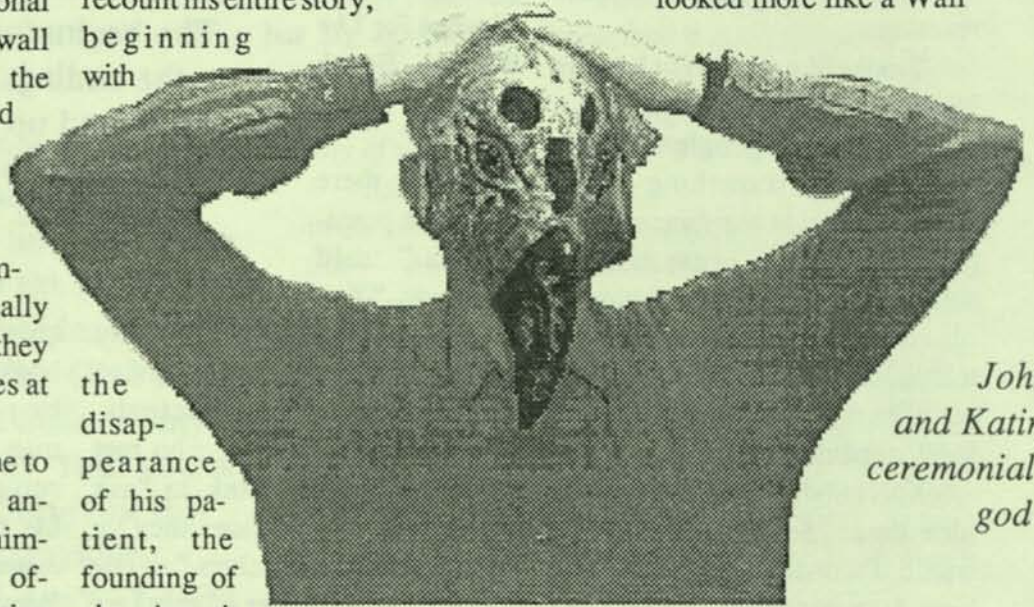
vu papers, continuing through his early encounters with the Ancient Order of Brothers and Sisters of Thaumaturgy, the arrival of reams of mysterious news clippings, his discovery of his own fictionality, his lucid dreams involving Imogene Savonarola, and his interactions with an astounding cast of real-life thinkers and doers.

Brockman listened with what Glasco could only construe to be a fair degree of interest. Then, without saying a word, Brockman picked up one of the newsletters and started reading.

Glasco became terribly nervous. "*Am I just going to sit here and watch, waiting for him to read all this stuff?*" he wondered. He

fidged and paced. "*You will if you know what's good for you,*" he told himself. "*The best thing to do is let him read and decide for himself. You're bound to put your foot in it if you say anything.*"

But Glasco kept thinking back to Brockman's enigmatic book. Could this snappily-dressed, nonsense businessman who looked more like a Wall



John Brockman
and Katinka
ceremonial guardian
god of

Street investor than an avant garde thinker truly have been the author of such a perplexing little tome? A question arose in his throat. He tried to fight it down, but it popped out of him anyway.

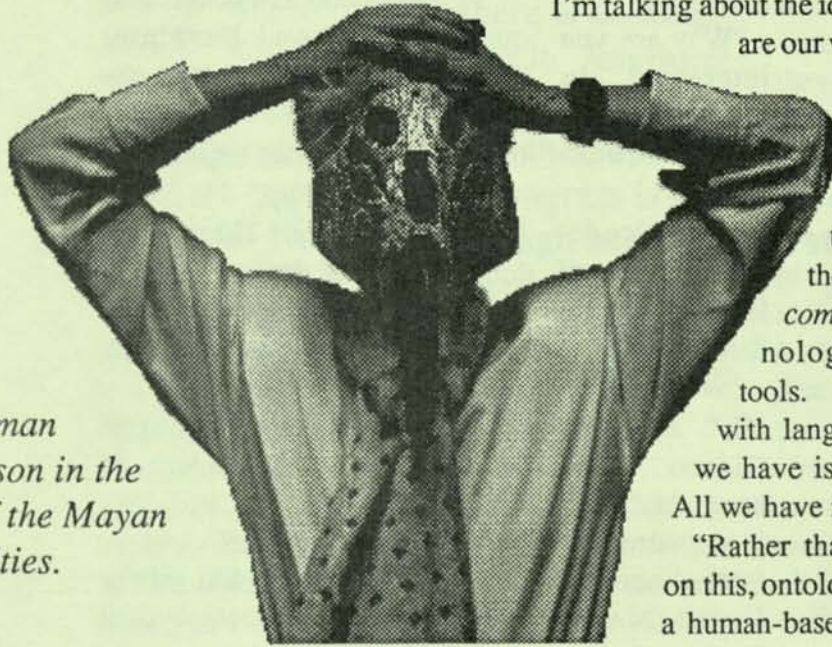
"Mr. Brockman," stammered Glasco, "what on earth do you mean by the word 'decreation'?"

Brockman looked up from the papers. His expression was absolutely impenetrable. Was he pleased at Glasco's interest in his work, or merely irritated by the interruption? Glasco had no idea.

Brockman leaned back in his chair, and began to speak with brisk efficiency.

"To me," he said, "it refers to the idea that reality is not an accre-

tive process, where one word leads to the next. It's the idea that all ideas exist in any, and that the words of the world are the life of the world, and nature is not created, nature is said. Wallace Stevens talked about decreating the world, and said, 'Throw away the lights, the definitions,/'



Brockman
Matson in the
orb of the Mayan
royalties.

And say of what you see in the dark/That it is this or that it is that,/ But do not use the rotted names.' Or as William of Occam said, '*Entia non sunt multiplicanda praeter necessitatem*'—'entities must not be multiplied beyond what is necessary.' That means, do not use unnecessary units of language."

Having completed this explanation of Occam's razor, Brockman promptly buried himself in the papers again. But Glasco found himself curiously unsatisfied. He wrestled briefly with his own better judgment before another question jumped out of him.

"Do you mean that words actually affect reality?"

Brockman looked up again.

This time, Glasco believed he detected just a trace of impatience in his expression.

"If it's not in the language," he said, "it *isn't*. If you can't say it, it isn't. What I'm talking about overall is limits, Wittgenstein's notion that the limits of my language are the limits of my world. I'm talking about the idea that we

are our words. We

create technologies and tools, and then we become the technologies and tools. So, too, with language. All we have is language. All we have is ideas.

"Rather than looking on this, ontologically, as a human-based world, I see a word-based world.

James Lee Byars, the conceptual artist, said, 'Thank God for the names of the body.' Those names become our reality. We talk about the heart as a pump. It isn't *like* a pump. It *is* one. But the pump came long after the heart. That metaphor is a human invention. Prior to Newtonian mechanics, the body was talked about in an entirely different way. In the late '50s, John Lilly started playing around with computer models of the brain and all the humanists went up in arms, and now we talk about the brain as a computer. That's something you couldn't have talked about thirty years ago, or certainly before Norbert Wiener came along."

Brockman paused a moment, leaning back in his chair. "We create technologies," he continued, "and we become the technologies. Language to me is a technology. And there is nothing outside of it. Anything else is metaphysical, including the physical. To me, progress is not made through accretion, it is made through decreation. Success is when you tell me I'm wrong."

He said it with a note of challenge. Glasco believed it was an invitation to further conversation. Perhaps it was time to drop a little hint. . .

"Could you tell me," he asked cautiously, "how one gets into the Reality Club?"

"People are invited to give talks at Reality Club meetings," said Brockman with a shrug. "If you give a talk, you're a member." And he returned to the papers at hand.

Glasco was a little dismayed at the brevity of Brockman's explanation. He would certainly be delighted to speak before the Reality Club. But how was he going to finagle an invitation?

"How do you decide, uh, who's got an interesting idea, who you'd like to speak?" he blurted.

Brockman looked up from the papers. He gazed at Glasco, volunteering no explanation. He just looked at him. Glasco felt as though time itself had come to a grinding halt.

"Uh, what I mean is, what kind of discussion goes on at these meetings?" Glasco said, trying to break the icy silence.

"We're interested in thinking 'smart,' versus the anesthesiology

of 'wisdom,'" Brockman said after the excruciating hiatus. "If someone presents some fact or theory which is a part of a body of work that other people feel they are familiar with, if they're wrong they'll get nailed. On the other hand, that doesn't often happen since our speakers are mostly experts who know what they're doing. The arguments come from various epistemological positions. For instance, we have a number of scientists who actually think there is a real world, and they think there is a universe and it was born ten-to-the-minus-x billion years ago, and in a split second the universe was born. I don't know what a billion years means, and I don't think anybody can even talk about it. Other people feel the same way, and in the discussions we ultimately get down to these epistemological camps where various people come from various positions. To me, that's the most interesting aspect of the group. I find that the empirical scientists are almost religious in their belief in the scientific process. Call it naive realism."

"I'm looking for people who are changing the world. What we call reality is literally taken off the tongues of a finite number of individuals throughout history, a number of whom are alive today, and I want to find those people. I want to ask them what questions they are asking themselves and get them to come to these meetings and present their ideas and have a back and forth discussion with people their own size."

Glasco's heart sprang inside him. So Brockman was mistrustful of reality! A common reference point at last!

"I can assure you," said Glasco smugly, "*the jamais vu papers* are *anything but* realistic! We prefer the language of poetry to the language of science."

"Why are you interested in poetry, Hector?" asked Brockman.

Did Glasco detect a glimmer of interest? He dared to hope.

"Well, after all," chortled Glasco, "the drug M itself was derived from a line out of Gerard Manley Hopkins."

"Interesting," mused Brockman. "A line out of which poem?"

Glasco almost choked. Why did he have to

bring Gerard Manley Hopkins into this? "Well, to be perfectly honest, I don't know."

"I have his poetry at home," said Brockman politely. "Perhaps I could find it for you."

"Yes," Glasco said. "That would be most helpful." He felt like a perfect fool. Literary agents weren't supposed to spend their time tracking down metaphors. Then Glasco frantically tried to

explain some of the ideas which had unfolded during the publication of *the papers*—the literal reality of metaphors, the hoax principle, fictions without authors. He talked on and on and on and on.

Then he shuddered to notice Brockman trying to repress a yawn.

"I find fiction as a convention quite limiting," said Brockman, "and not as interesting as the exploration of what one would call the non-fiction of the world."

Glasco froze up. He didn't know what to say. There was a long moment of deafening quiet. Brockman's yawn, which had lain dormant for many long moments now, erupted with fury.

"Hector," said Brockman at long last, "why did you want to talk to me?"

"I beg your pardon?"

"I'm very busy, and you're talking about all this metaphysical crap."

Glasco recoiled with shock. The phrase "unnecessary units of language" sprang into his head. He had just spouted torrents upon torrents of unnecessary units of language. He had piled Brockman's desk with thousands of unnecessary units of language. It was all perfectly worthless, empty, meaningless. He was astride Occam's razor.

"I was hoping," sputtered Glasco, thrashing about like a drowning man, "that you might be able to help me with my book."

Brockman leafed through the pages in front of him, making a last effort to awaken some faint glimmer of professional interest. "Who is it you're looking for

again?" he asked. "You're looking for somebody, right?"

"My God!" thought Glasco. "I haven't thought about my missing patient since I got this stupid book idea! I haven't thought about anyone except myself!"

"Hilary," he said, almost in a whisper. "I'm looking for Hilary."

"Well," said Brockman, arranging Glasco's material into an untidy stack, "if you want to make money with your book, you've got to find Hilary. Write the book after you've found Hilary. Who wants to read a book at this point? Everybody wants the payoff. You could write the book now, you could get a publisher, and while it's in print, Hilary might turn up somewhere in very mundane circumstances, and the story is finished and you missed out on the whole thing. Everybody wants to know the ending, Hector."

"So you're not interested in representing me?"

"Well, I think you're wasting my time right now."

"But—what about the Reality Club?"

"What about the Reality Club?"

"Is there a place in it for me?"

"Hector, read my lips. I'm looking for people who are chang-

ing the world. What we call reality is literally taken off the tongues of

a finite number of individuals throughout history, a number of whom are alive today, and I want to find those people. I want to ask them what questions they are asking themselves and get them to come to these meetings and present their ideas and have a back and forth discussion with people their own size."

"Does that mean no?"

Brockman leaned across the desk toward him. "What have you done lately?" he said.

Glasco stammered. "If I find Hilary, would I qualify to be a member?"

"If it changes the way we think about the world, if it's on the edge. If not, forget it." Brockman touched the button on his intercom, and spoke to the receptionist. "Could you please send someone by to show Dr. Glasco the door?"

Glasco hastily grabbed the papers off Brockman's desk and started shoving them into his briefcase. He had images of burly security men coming to drag him away, perhaps throwing him down a flight of stairs or through a plate glass window.

"Thank you for your time, Mr. Brockman," he said, shaking from head to foot.

"Any time," said Brockman amiably. "Let me know what develops."

As Glasco walked to the door, his briefcase burst open. The copy of *Afterwords* fell open on the floor. Words glared up at him:

"There is no need for fiction in the world: the world is the only fiction."

Glasco stared at the words for a brief moment, then gathered the contents of his briefcase together. Brockman's phone rang. "Oh, hello," Glasco heard Brockman say. "Thanks for getting back to me. Oh, no, you're not interrupting anything. . .

"Just another psychiatrist with a book idea."

Flushed with humiliation, Glasco hurried away.

John Brockman is the editor of *The Reality Club*, a biannual publication featuring essays by leading thinkers in the arts and sciences.

The Reality Club 1 is available for \$9.95 from Lynx Books; *The Reality Club 2* will appear in May.

THE *jamaïs vu* PAPERS

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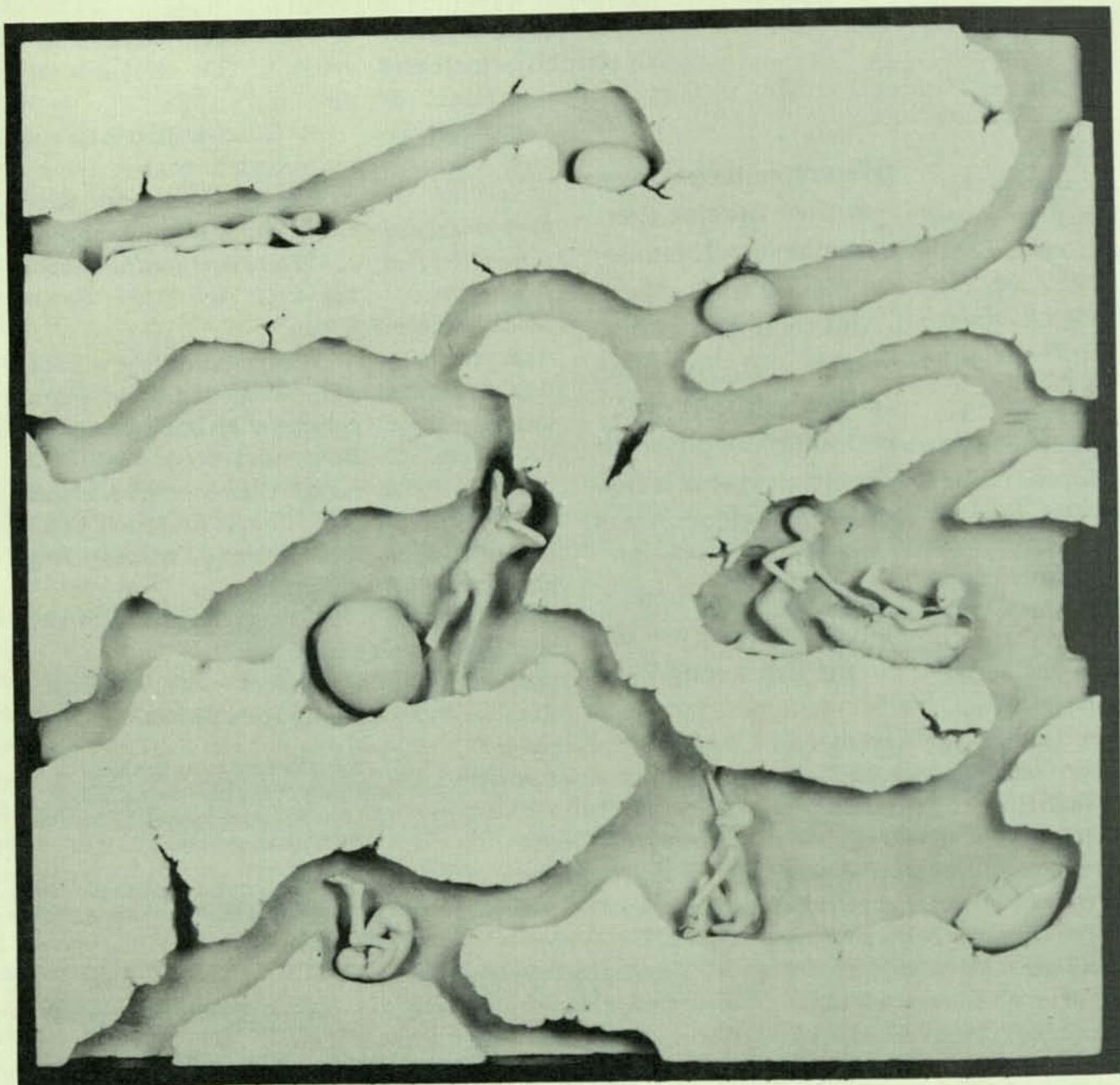
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"Nursery"
by Patti Warashina

a porcelain and mixed
media sculpture, 1984
48" H x 48" W x 6" D

Photo: Roger Schrieber

THE *jamaig vü* PAPERS

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THE
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In Memory of
Abbie Hoffman
(1936-1989)

Abbie. We Hardly Knew Ye...

When a woman approaches the newsstand at 3rd Avenue and St. Mark's Place in New York City and sees the headline--Abbie Hoffman Dead--she takes the pile of newspapers and, in a gesture of total denial, throws them onto the sidewalk. Meanwhile a couple of Buddhist meditators are toasting him with egg creams. And fresh graffiti shout, Abbie Lives!

A black man just out of prison carries a copy of a letter Abbie wrote to the governor on his behalf. "Justice will be served," it concludes, "if you will act with compassion." Both the San Francisco Board of Supervisors and the Los Angeles City council adjourn in Abbie's honor.

A memorial is held for him at the Mitchell Brothers live porn theater. A Hearst paper publishes an editorial in praise of Abbie Hoffman's radicalism. A student calls me and, between tears, asks, "Who will teach us how to organize now?"

What can sum up the essence of this modern folk myth in the making? Abbie's own words: "You go to the edge and you poke your nose in, that's it."

--Paul Krassner



THE NEW YORK ACADEMY OF SCIENCES

AN INTERNATIONAL ORGANIZATION

HEINZ R. PAGELS
Executive Director

Ms. Esther Dyson
President
EDventure Holdings
375 Park Avenue
New York, NY 10152

April 12, 1988

Reality Club

Dear ~~Ms. Dyson~~: *Esther*

The highly successful reception and continuing support for the HighTech/Business Forum of the New York Academy of Sciences is evident in the consistent attendance by acknowledged leaders in science, business, government, and foundations. The Forum's breakfast meetings facilitate lively discourse on topics having direct impact on current and future policy. We are flattered that the caliber of our speakers and quality of the meetings have stimulated the interest of our members and of others seeking to emulate our Forum. The attached list of speakers attests to the effectiveness of the program.

The Academy is committed to maintaining the breakfast meetings at established levels of interest and excellence, although the program speaks to a larger audience than the Academy itself. I am pleased to note that you have attended. I am confident you found the meetings beneficial and will continue to attend.

I ask your organization to make a contribution of \$3-5,000 to assist our underwriting the \$37,000 annual cost of continuing this exemplary program. Your support will also allow us to acknowledge your organization in an emerging list of contributors appearing on the formal invitations. Contributions are not a requisite for participation in the program, however, your support is viewed as a contribution to its continued quality and longevity.

Because of your participation in the High Tech/Business Forum, EDventure Holdings may wish to become a Corporate Member of the Academy. I would be pleased to provide you with information about the Corporate Membership Program, which began in 1987 and includes a growing number of leading firms whose interests coincide with the purposes of the Academy.

The New York Academy of Sciences has firmly established the High Tech/Business Forum as a vital clearinghouse for ideas affecting our professional and personal lives. Please join us in continuing to achieve its ideals.

Sincerely,

Heinz R. Pagels
Executive Director

HRP:cp
encl.

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-2-

THE NEW YORK HIGH TECH/BUSINESS FORUM

Speaker List

Dr. Joseph P. Trank
Chairman
Computer Science Department
Columbia University
Paul Glaser
Chairman of Corporate Technology
Citicorp
"Technology Impact On Financial Services"
Tuesday, September 15, 1987

Dr. Abraham Peled
Vice President, Systems
Director, Computer Sciences
IBM Corporation
"Advanced Computing Systems"
Tuesday, October 13, 1987

Dr. Nicholas Metropoulos
Professor
Martin L. Leibowitz
Managing Director
Salomon Brothers, Inc.
"The New Role Of Analytical Research
In Financial Markets"
Tuesday, November 17, 1987

Dexter Senft
Managing Director
Fixed Income Research
First Boston Corporation
"The Impact Of Technology On Wall Street"
Tuesday, December 8, 1987

Robert H. Flast
Vice President, Technology Strategy
American Express Company
"Computer-Assisted Employees or
Employee-Assisted Computers --
The Case For Artificial Intelligence
In Financial Services"
Tuesday, January 12, 1988

Dr. Joseph F. Traub
Chairman
Computer Science Department
Columbia University
"Is What's Good For Hi-Tech Manufacturers
Good For Financial Services?"
Tuesday, February 9, 1988

Dr. Ian M. Ross
President
ATT Bell Laboratories
"Telecommunications Technology In The 90's:
The Business Impacts"
Tuesday, March 15, 1988

Dr. Nicholas Negroponte
Professor of Media Technology
Director of the Media Laboratory
Massachusetts Institute of Technology
"Media Technology:
The Quality Of Life In An Electronic Age"
Tuesday, April 12, 1988

Casimir S. Skrzypczak
Vice President Science & Technology
NYNEX Corporation
"Bringing Telecommunications Technology To Fruition"
Thursday, May 26, 1988

"To arrive at the edge of the world's knowledge, seek out the most complex and sophisticated minds, put them in a room together, and have them ask each other the questions they are asking themselves."

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November 3, 1988

Esther Dyson
Release 1.0
375 Park Avenue
New York, NY 10152

Dear Esther:

The Reality Club 1 was published in October and the initial public response has been gratifying. The first review, in Publishers Weekly set the tone: "this stimulating collection of essays, offshoots of talks by 14 Reality Club members, is, for all its sophistication and erudition, remarkably accessible...(it) offers many innovative insights, but perhaps is most valuable as a celebration of the process of thinking and questioning."


The manuscript for RC2 is in production for publication in April, 1989. (Please see the attached tentative table of contents.) I am writing to you to ask for material for RC3 (publication, October, 1989).

I am looking for essays around 5,000 words in length written in non-technical language and non-academic style for an intelligent readership. I will only consider original work not previously published. The arrangement is for first publication rights, exclusive for 180 days following the RC publication date, non-exclusive thereafter. The project is being run under the auspices of Edge Foundation, Inc., a non-profit corporation. The writers budget, to be divided among the contributors, is \$5,000 and payment is on publication.

My vision for The Reality Club is to create an exciting, talked about, and influential publication which will present the cutting edge of ideas and knowledge in our culture to a wide readership. As editor, my criterion for choosing contributors is to "seek out the most complex and sophisticated minds and have them ask the questions they are asking themselves," and in this regard I am focusing, but not limiting, my attention on Reality Club members. I hope to encourage ideas that have not been generally exposed and I want material that is new, important, and conveys knowledge and not just information.

The closing date for The Reality Club 3 is January 5, 1989. Please let me know if you are interested in contributing.

Sincerely,


John Brockman

JB:st
encl.

ps I would love to have a piece from you in RC3.

THE REALITY CLUB #2 - TENTATIVE TABLE OF CONTENTS

What Are the Laws of Nature
by Paul Davies

Chaos in Myth and Science
by Ralph H. Abraham

Big Trouble in Biology: Autopoiesis and Neodarwinism
by Lynn Margulis

Immuknowledge
by Francesco Varela and Antonio Coutinho

The Evolutionary Striptease
by Dorion Sagan

Where Linguistics, Archaeology and Biology Meet
by Vitaly Shevoroshkin and John Woodford

Dreaded States and Cherished Outcomes
by Dan Ogilvie

Behind Closed Doors:
Unlocking the Mysteries of Human Intelligence
by Robert Sternberg

The School of the Future
by Howard Gardner

Video, Computers, and Memory
by Paul Ryan

Media-Neutral
by Wim Coleman and Pat Perrin
featuring Daniel C. Dennett as himself

Fiction--Its Uses and Misuses
by Mark Jay Mirsky

The Body of History
by Morris Berman

Godel and Einstein as Companions
by Hao Wang

Berryman's Last Months: "I am Busy Tired Mad Lonely & Old"
by Paul Mariani

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THE
REALITY
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September 23, 1988

Schedule Corrections

There were three typographical mistakes in the schedule sent to you in September. The correct dates are as follows: Gary Stephan will talk on Wednesday, October 27th; Elizabeth Diggs will talk on Wednesday, January 4th; David Olds will talk on Thursday, February 9th. In addition, a new event has been scheduled: Myles Tierney will talk on Wednesday, March 8th.

Revised & Corrected Schedule

Wednesday, September 14th	Peter Halley
Wednesday, October 5th	Francisco Varela
Sunday, October 16th	Bert Dreyfus
Thursday, October 27th	Gary Stephan
Tuesday, November 8th	Richard Kostelanetz
Tuesday, November 22nd	Charles Levinthal
Wednesday, December 7th	James Wines
Wednesday, January 4th	Elizabeth Diggs
Thursday, February 9th	David Olds
Wednesday, February 22nd	John Culkin
Wednesday, March 8th	Myles Tierney

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THE
REALITY

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W

OCTOBER, 1988
Page 2

Bert Dreyfus is author of What Computers Can't Do and the newly published, Mind Over Machine. He has made significant contributions to the study of the works of Nietzsche, Heidegger, and Michel Foucault, and recently appeared on the BBC series, The Great Philosophers. A recipient of a Guggenheim fellowship, he has taught in France, Austria, and Germany, and is currently Professor of Philosophy at the University of California at Berkeley.

Date: Sunday, October 16, 1988
Time: Coffee at 7:30 p.m., talk begins promptly at 8:00 p.m.
Host: John Brockman & Katinka Matson, 241 Central Park West - Apt. 2H
(corner of W84th St.), tel: 787-8201.
RSVP: 874-0533

.....

GARY STEPHAN - "RECENT PAINTINGS"

"I will be talking about my newest paintings which involve the relationship of history to modernism and the distance between the paintings' subject matter and its purposes."

Gary Stephan is an artist whose work has been displayed in The Whitney Museum, The Metropolitan Museum of Art, The Museum of Modern Art, The Guggenheim Museum, and the Museum of Contemporary Art.

Date: Thursday, October 27, 1988
Time: Coffee at 7:30 p.m., talk begins promptly at 8:00 p.m.
Host: Hirschl & Adler Art Gallery, 851 Madison Avenue (between 70 & 71st - 2nd floor) 744-6700
RSVP: 874-0533

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THE
REALITY
CLUB

September 6, 1988

Dear Members,

By now most of you have heard the news that Heinz Pagels, president of The Reality Club, died on July 23rd, in a mountain climbing accident on Pyramid Peak in Aspen, Colorado. (For your information I am enclosing The New York Times obituary). This is a terrible tragedy for his wife Elaine, and their two children, Sara, age 3, and David, age five months. Heinz's death has also had an enormous impact on a wide and disparate range of individuals who, each in their own way, were affected by his inquiring mind. The depth of feeling, the outpouring of concern and emotions, speak eloquently of his life and his work.

For me, Heinz's death is the personal loss of an intimate friend and colleague, and the abrupt end of a twenty year dialogue on the nature of reality. Lest this sound too lofty, this "argument" was our ongoing discussion and banter, usually characterized by humor, good-natured repartee, and ad hominem epithets that we would throw back and forth and each other. "The Bagel," as I called him, dubbed me a "neonominalist" and "primitive solopsist." I referred to him, in turn, as a "naive realist," and "society physicist."

During this summer, Heinz seemed to be finally recovering from the death of his son Mark, age 6, little more than a year before, and was once again sparkling with humor and joie de vivre. His third book had just been published. His work with student Seth Lloyd on the subject of complexity, had been reviewed in Scientific American (see enclosed article). In addition, he was laying the groundwork for new book which he felt would be a major breakthrough in social theory for the technological age.

Ezra Pound, when asked how to honor a writer, exclaimed, "read him." In this regard I am planning a special evening in honor of Heinz in early 1989. The focus of the evening will be a discussion of Heinz's new book, Dreams of Reason: The Computer and the Rise of the Sciences of Complexity. I am putting together a panel of experts in various fields of the sciences of complexity to discuss the book in relationship to their own work. Dreams of Reason is now in the bookstores (Simon & Schuster, \$18.95). Buy it and read it!

September 6, 1988
page 2

A memorial service for Heinz will be held on Thursday, October 13th at 3:30 p.m. at Caspary Auditorium, Rockefeller University, York Ave. & 66th St., New York City. Reality Club members are invited. A reception will follow the service.

If anyone wishes to write to Elaine Pagels, her address is 27 West 87th Street, New York, NY 10024.

.....

Paul Ryan has agreed to serve as president of The Reality Club for this coming year and will head a steering committee that includes Gerald Feinberg, Pamela McCorduck, Richard Rabkin, Eugene Schwartz, and myself.

We are terminating the guest membership program. The number of people attending meetings last year was becoming too large. We will, however, be inviting certain guests on a one-time basis for those specific occasions where an individual's expertise in the subject at hand might enhance the dialogue. If you have any suggestions regarding guests, or any ideas for future speakers, please talk to Paul Ryan (662-8516) or myself.

Otherwise, the no-spouse, no guest policy remains in effect. We are asking our speakers and members to attend by themselves.

There is interest this year in planning a Reality Club weekend in a New York area conference center or resort-type environment. We will keep you informed as plans develop.

.....

For your information, during the summer we had two ad-hoc meetings in New York City. On August 1, Paul Krassner, editor and publisher of The Realist talked about Reality and Satire, and his notions of "preventive journalism." On August 11, James Henry, economist and lawyer, discussed The Debt Hoax, in which he explored third world loans and where they went in terms of a fundamental aspect of economic reality.

.....

We are now videotaping meetings for the purpose of creating a Reality Club archive, and also to give members an opportunity to view meetings they are unable to attend.

.....

The following is a working schedule of talks for the next six months. Since there are often changes in schedule, cancellations, etc., please note the details on the individual invitations you will be receiving for future meetings. Also, please make it a point to r.s.v.p. if you plan to attend a

September 6, 1988
page 3

meeting. This will allow us to plan for the size of the group and to contact you in case of last minute changes. The announcement for Peter Halley's talk on September 14th is enclosed.

<u>Date</u>	<u>Speaker</u>	<u>Host</u>
Wednesday, September 14th	Peter Halley	Robert Langs
Wednesday, October 5th	Francesco Varela	Myles & Hanne Tierney
Sunday, October 16th	Bert Dreyfus	John Brockman & Katinka Matson
Thursday, October 2th	Gary Stephan	Hirsch & Adler Gallery
Tuesday, November 8th	Richard Kostelanetz	
Tuesday, November 22nd	Charles Levinthal	
Wednesday, December 7th	James Wines	
Wednesday, January 5th	Elizabeth Diggs	
Thursday, February 9th	David Olds	
Wednesday, February 22nd	John Culkin	
Wednesday, March 8th	Myles Tierney	

.....

Copies of The Reality Club 1 are scheduled to arrive from the printer this week. Publication is in October. Members will be receiving their copies in a few weeks. Any comments on the issue are welcome. Please call or write. I also want to encourage "letters to the editor" regarding individual articles. I don't know if such a section would work in the context of the book series (due to time lag in publication), but I can see the possibility of privately circulating such comments to the members.

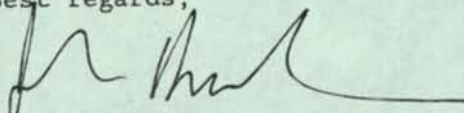
The Reality Club 2 has been delivered to Lynx Books and will be published in April, 1989. For your information, I am enclosing the tentative table of contents for #2.

I am interested in any new work members may be doing, and, in this regard, I am now soliciting articles for #3 and #4 which will be published in October, 1989, and April, 1990, respectively. Please let me know if you have any material for consideration.

.....

I hope to see you often during the coming year. In particular, I would like to hear from out-of-town members who may be passing through New York City.

Best regards,



John Brockman

JB:st
encls.

Dr. Heinz Pagels, 49, a Physicist, Dies in Fall From Colorado Peak

By WALTER SULLIVAN

Dr. Heinz R. Pagels, a physicist and popularizer of science and executive director of the New York Academy of Sciences, died Sunday in Colorado in a mountaineering accident. He was 49 years old.

Dr. Pagels, the author of several books that seek to explain to the public the more strange and difficult aspects of modern physics and cosmology, was attending the summer session of the Aspen Center for Physics. During the weekend break he and Dr. Seth Lloyd, his former student at Rockefeller University, climbed Pyramid Peak, a 14,000-foot summit 10 miles to the southeast.

Dr. Pagels, a tall, slender man, stepped on a rock that proved unsteady and lost his balance. He fell and slid down a steep slope. His body was discovered at the foot of a deep gorge after a helicopter search.

Praised for His Prose

In reviewing Dr. Pagels's 1985 book "Perfect Symmetry," Dr. David N. Schramm, a cosmologist at the University of Chicago, said, "Heinz Pagels is one of less than a handful of active scientists who can write excellent prose about the scientific frontier for a general audience."

He described an earlier book by Dr. Pagels, "The Cosmic Code," published in 1982, as "a beautiful account of modern physics, of the quantum-mechanical world of particles and their interactions." Dr. Pagels had also contributed

articles to The New York Times on cosmology and other subjects.

His most recent book, published by Simon & Schuster, is entitled "The Dreams of Reason — The Computer and the Rise of the Sciences of Complexity." A discussion of complexity by Dr. Pagels and Dr. Lloyd, who received his doctorate in June under Dr. Pagels, is featured in the current issue of Scientific American.

Using a measure they called "thermodynamic depth," the article seeks to reconcile the puzzling contradictions between the seemingly universal descent into uniformity, known as entropy, and growing complexity as evolution proceeds.

Staying with Dr. Pagels in Aspen was his wife, the former Elaine Heisey, a professor of religion at Princeton University and an authority on early Christianity. Her latest book is "Adam, Eve and the Serpent."

She said yesterday that while at Aspen, she and her husband went walking almost every Saturday but that she was not on Sunday's climb.

Heinz Rudolph Pagels was born in New York City on Feb. 19, 1939. He received a Bachelor of Science degree from Princeton University and, in 1965, a doctorate in physics from Stanford University. He joined Rockefeller University the following year, leaving in 1983 as an associate professor to become executive director and chief executive officer of the New York Academy of Sciences.

As president of the International League for Human Rights, Dr. Pagels supported greater freedom for researchers in other countries. He was a fellow of the New York Institute of the Humanities at New York University, a member of the Council on Foreign Relations, a member of the Science and Law Committee of the New York Bar Association and a trustee of the New York Hall of Science.

Dreamed of Falling

Dr. Pagels ended his book "The Cosmic Code" with reflections on the dangers of mountain climbing and why the sport appealed to him. He wrote that "the rewards I wanted were of sight, of pleasure, of the thrill of pitting my body and my skills against nature."

Like many climbers, he often dreamed about falling. "Lately I dreamed I was clutching at the face of a rock but it would not hold," he wrote. "Gravel gave way. I grasped for a shrub, but it pulled loose, and in cold terror I fell into the abyss."

But in the dream, he then realized that "what I embody, the principle of life, cannot be destroyed." He continued: "It is written into the cosmic code, the order of the universe. As I continued to fall in the dark void, embraced by the vault of the heavens, I sang to the beauty of the stars and made my peace with the darkness."

In a telephone interview yesterday Dr. Lloyd said that on Sunday he and Dr. Pagels had had lunch on the summit of Pyramid Peak, then had started down at 1:30 P.M. Dr. Pagels was in the lead because "he knew the mountain," Dr. Lloyd said, having climbed it seven



Dr. Heinz R. Pagels

times. It was the first ascent of the peak for Dr. Lloyd.

Dr. Pagels was a "very careful hiker," Dr. Lloyd said, avoiding loosening any rocks, since there were many climbers on the mountain.

One scientist at the physics center session, Dr. Jeremy Bernstein, himself an experienced mountaineer, said yesterday that the outing that Dr. Pagels was on was "closer to a hike than a difficult rock climb," but "very dangerous" because of the treacherous nature of the rock.

Besides his wife, Dr. Pagels is survived by two adopted children, Sarah, 2, and David, 3 months old. A son Mark, to whom "The Dreams of Reason" is dedicated, died in April 1987 at the age of 6.

Other survivors are Dr. Pagels's mother, Marie Pagels of Wynwood, Pa., and a brother, Rolf, of Lake Oswego, Ore.

A funeral service will be held tomorrow at Christ Episcopal Church in Aspen and a memorial service in September at Rockefeller University.

SCIENTIFIC AMERICAN

AUGUST 1960

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SCIENCE AND THE CITIZEN

PHYSICAL SCIENCES

Complexity Counted?

*Physicists ponder a new way
to measure an elusive concept*

Most people would agree that a rose is more complex than a gas. But how much more complex? And is a rose more or less complex than a fruit fly? Various ways of measuring the complexity of numbers have been proposed in recent decades, but there is as yet no generally accepted measure of the complexity of a physical object.

A possible approach has been outlined by Seth Lloyd and Heinz Pagels of Rockefeller University, who have devised a measure called thermodynamic depth. The measure links complexity with thermodynamics. Lloyd explains that thermodynamic depth was formulated so that it would be zero for totally ordered states, such as the regular array of atoms in a diamond, and also for totally random states, such as the molecules in a gas. It would be high for intermediate states. Another requirement was that attaining complexity should not be easy: two bacteria should be considered less than twice as complex as a single bacterium, since bacteria can make copies of themselves easily.

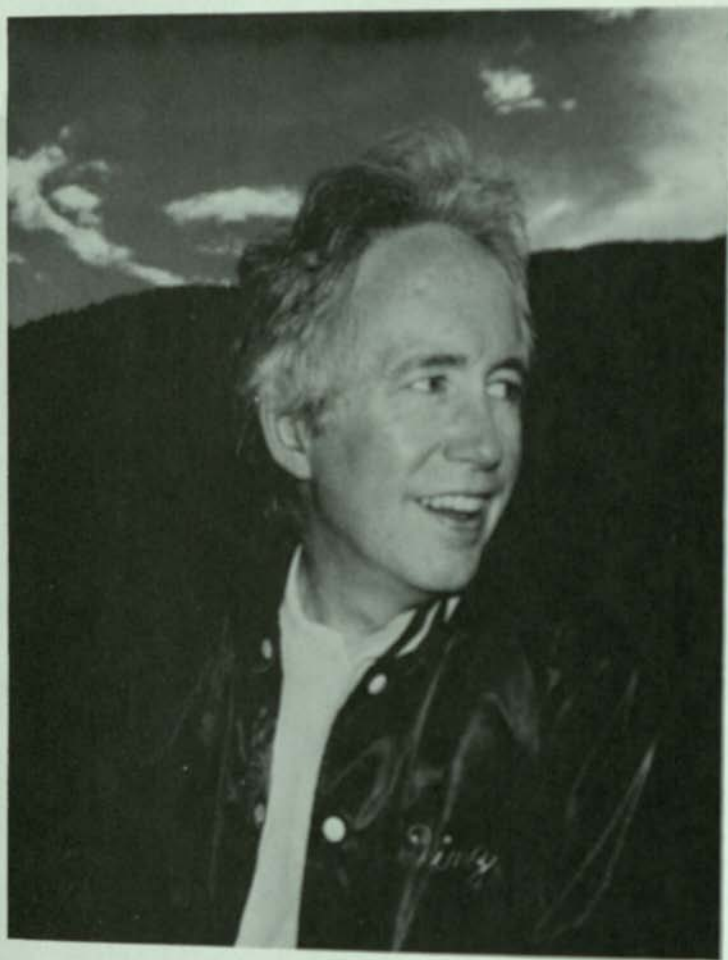
These requirements and a few other stipulations led Lloyd and Pagels to a concept based on the process by which an object is created. The thermodynamic depth of making a car from scratch, for example, is equal to the thermodynamic depth of making all the parts from scratch plus the thermodynamic depth of putting them together. Technically the present thermodynamic depth of a system is the difference between two quantities. The first is its entropy (a measure of the observer's lack of exact knowledge about the system). The value of the second quantity depends on the amount of information needed to specify all the paths by which the system might have reached its present state from its measured state at some earlier time. There are many possible paths, because the system might originally have been in any one of many different but quite indistinguishable states.

More intuitively, the thermodynamic depth of a process is a measure of how difficult it is to assemble something: the difference between the amount of information needed to describe the system now and the amount needed to describe all the states it might have been in at the start of the process. The thermodynamic depth is consequently proportional to the amount of information the process has discarded.

The measure has some satisfying features. A bacterium has a large thermodynamic depth because evolution has discarded great amounts of genetic information over the aeons in arriving at the present-day bacterium. The additional thermodynamic depth incurred when it makes a copy of itself is relatively small. The measure also encompasses earlier definitions of complexity. Lloyd says the response of physicists who have read a preliminary account of his and Pagels' work is "guardedly enthusiastic," although some people also say that the arguments have yet to be made rigorous and that the measure has some undesirable properties.

What use is a measure of complexity? Lloyd thinks that if thermodynamic depth is found to be generally applicable, it could be a tool for studying

complex systems in general, including evolution and such biological processes as the self-assembly of proteins, where the universal tendency of matter to become more disordered is locally reversed. He says thermodynamic depth might also elucidate notions that have until now only been conjectures, such as the proposition that complex systems are necessarily thermodynamically unstable. Lloyd is applying the measure to explore the idea that the evolution of complex systems might be inevitable. —T.M.B.



Heinz Rudolph Pagels

February 19, 1939—July 23, 1988

Photo taken by Elaine Pagels in
Aspen, Colorado, on July 19, 1988.



“For the essence and the end
Of his labor is beauty, for goodness and evil are two things
and yet variant, but the quality of life as of death and of light
As of darkness is one, one beauty, the rhythm of that Wheel,
and who can behold it is happy and will praise it to the
people.”

This excerpt from Robinson Jeffers' poem, "Point Pinos and Point Lobos," was selected by Heinz Pagels to conclude his book, *The Cosmic Code*.

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THE
REALITY
CLUB

June 21, 1988

TO: Reality Club Speakers

FROM: John Brockman

I am pleased to enclose a brochure announcing the first volume of our semi-annual publication, The Reality Club I. All past speakers will be receiving a copy of the book upon publication in October.

We are planning an appendix, which will list Reality Club talks over the past seven years. Included will be the speaker's name, the title of the talk, and a few biographical lines about the speaker. If this is a problem for anyone, please let me know a.s.a.p., and we will strike the individual reference.

Best regards,



John Brockman

JB:meh

Encl.

THE REALITY CLUB. AN EXTRAORDINARY CLUB.

Since 1981, The Reality Club has held meetings each month in New York. The speakers are challenged to represent an idea of reality by describing their creative work and discussing those questions they are asking themselves. Speakers have numbered over 100 and include some of the most eminent artists, scientists, writers, and scholars in the world.

The Reality Club dates back to the 60's when its founder John Brockman assembled friends, many of whom were avant garde contributors to our culture, for informal discussions. Participants

thrived on the opportunity to discuss ideas in a rigorous manner.

In 1981, Brockman formalized the club to the point of calling it The Reality Club. The name was a pun; the club's goal was to pose a challenge to contemporary ideas of reality.

In the years since its founding, The Reality Club has become New York's most vibrant intellectual salon. Now it is about to become a biannual publication. Lynx

Books will release
**THE REALITY
CLUB 1**
this October.

"The Reality Club is not just a group of people. I see it as the constant shifting of metaphors, the advancement of ideas, the agreement on, and the invention of, reality. Intellectual life is The Reality Club."

—John Brockman,
Editor

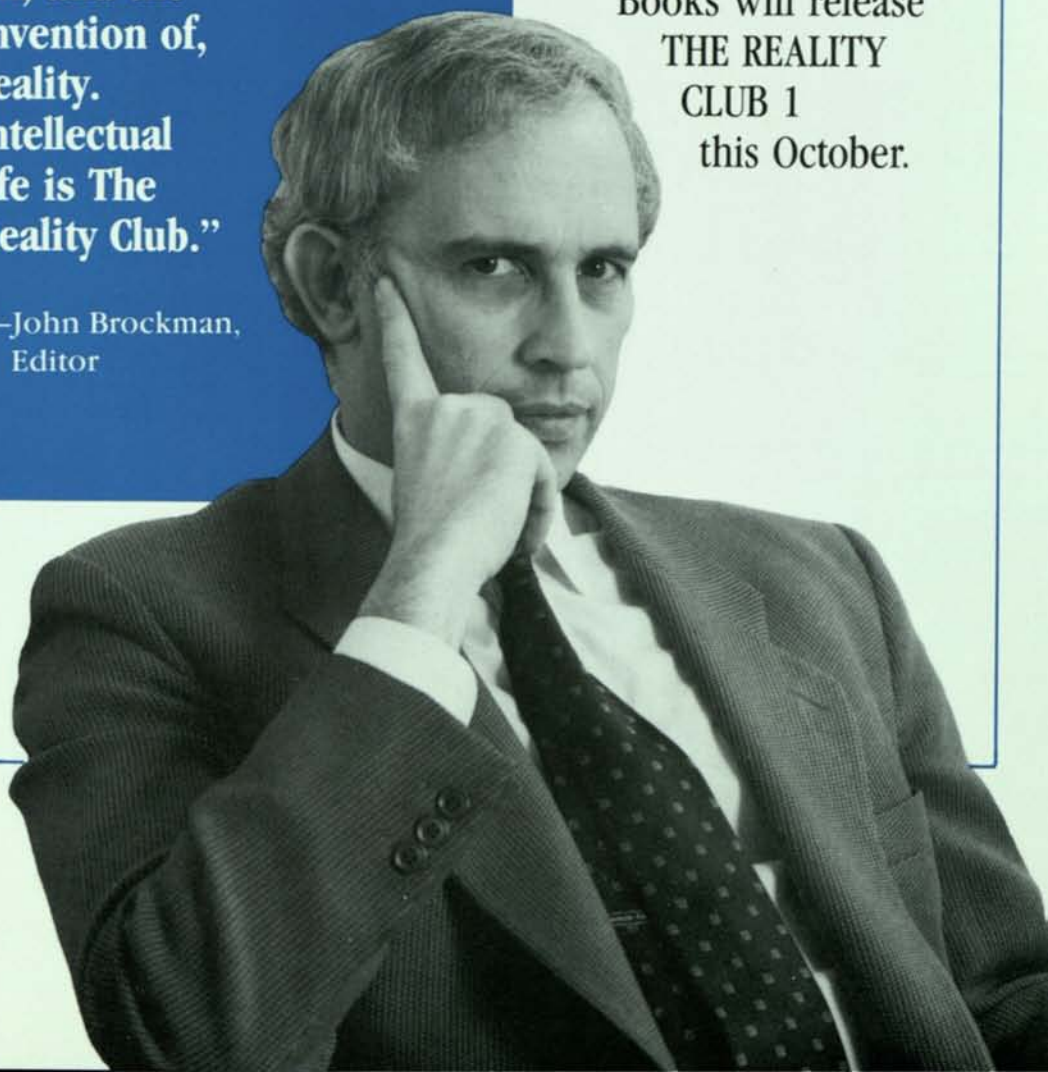


Photo credit: Joyce Ravid

THE REALITY CLUB 1. AN EXTRAORDINARY BOOK.

“The monks who developed European culture in the Middle Ages transmitted art and learning instead of genes . . . these two ways of transmitting information across time are often in conflict . . .”

Mihaly Csikszentmihalyi
*Memes vs. Genes:
Notes from the Culture Wars*

“As a virus reproduces itself by infiltrating the cell, so some notions would appear to latch on to the human imagination by being suggestive, self-contradictory, or symbolic.”

Dorion Sagan
*What Narcissus Saw:
The Oceanic ‘I’*

“With computers and robotic arms smaller than a living cell, [nanotechnology] will enable the construction of almost anything, building up structures atom by atom.”

K. Eric Drexler
Exploring Future Technologies

“The goal is not to teach reading at all. It is to teach children to be able to gather information and be critical in their understanding of that information.”

Roger Schank
Johnny Can't Read (and Neither Can His Old Man)

“Without the Reality Club prod no speculation on speculation would be possible.”

Lynn Margulis
Speculation on Speculation

“One can plausibly say that what a society holds most sacred is defined by those activities that it insists be done as well as possible.”

Gerald Feinberg
In Defense of Elitism

“Each of us has the sense of both concurring with and differing from our respective generations, and we share a tradition of elaborating self-knowledge through observation and encounters with others, for all observation of the other is also self-observation.”

Mary Catherine Bateson with
Sevanne Margaret Kassarian
A Journey of Relativities

“We must face the fact that humans have a better claim on the title ‘Homo seriaticum’ than on ‘Homo sapiens’—we’re more consistently serial than wise.”

William Calvin
*A Flowing Sentence, a Train of
Consciousness, a Rippling
Arpeggio: The Trilogy of Homo
Seriaticum*

This first edition presents 13 essays representative of Reality Club talks. . . essays that will take every reader to the cutting edge of today’s most challenging “realities.”

“Being conservative, we could estimate the onset of the life of a human being— as reflected by the organizational structure of the critical system of the brain and its incipient function—to be after twenty weeks; a person begins to emerge.”

Julius Korein, MD
*Reality and the Brain:
The Beginnings and Endings of the Human Being*

“. . . modern creative work has a strong addictive or compulsive component to it; the artist is expected to outdo himself or herself with each succeeding product.”

Morris Berman
The Two Faces of Creativity

“Each aspect of love can be viewed as generating a different side of a triangle.”

Robert Sternberg
*Counting the Ways: The Scientific
Measurement of Love*

“I understand the term [unconscious] to designate a process, whereby emotionally charged information is systematically screened out of awareness, essentially for the purpose of survival.”

Robert Langs, MD
Psychotherapy Systems and Science

“The collective purpose of the Arensberg circle was to change the way human beings saw themselves in the world. The members of the group saw their errand into the wilderness clearly: It was to create contexts, worlds within worlds. . .”

Joan Richardson
Another Reality Club

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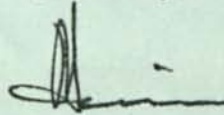
October 6, 1987

Dear Members of the Reality Club,

There have been a number of inquiries regarding the status of Reality Club members and the purpose of this note is to clarify that status.

Reality Club members are in two categories — permanent members and guest members. Permanent members are identical with the set of all individuals who have spoken or who are scheduled to speak at a Reality Club meeting. Guest members are everyone else who has been invited to attend. Guest members are invited for a one year period. The current period ends August 1, 1988.

Sincerely,



Heinz R. Pagels

HRP:bjs

Reality Club

CHARTER OF SMART-F\$

SOCIETY FOR THE MANAGEMENT OF AI RESOURCES & TECHNOLOGY IN FINANCIAL SERVICES

PURPOSE:

SMART-F\$ provides a communications vehicle to share -- in a candid and mutually beneficial manner -- ideas, experiences, and support for the implementation and management of artificial intelligence technology in the financial services industry.

OBJECTIVES:

The SMART-F\$ group is organized to meet the following objectives...

- to represent the membership's views on issues of industry-wide significance
- to open channels of communication between SMART-F\$ members and the vendor community
- to provide a forum where issues relating to implementing and supporting applications using AI technology can be openly discussed
- to assist in formulating policy regarding the use of the technology within member organizations
- to render services designed to meet the needs and interests of the membership
- to provide any (non-proprietary) form of assistance that will lead to the more efficient and effective utilization of AI technology as applied to financial services
- to provide for bi-monthly meetings to present and discuss topics that are of interest to the member organizations

GUIDELINES FOR MEMBERSHIP:

- Members will be actively engaged in AI development and management.
- There will be three types of membership:

The Executive Committee

This committee will initially consist of the founding voting members, including:

American Express
Chase Manhattan Bank
Chemical Bank
Drexel Burnham Lambert
Equitable Life
Metropolitan Life
Morgan Guaranty Trust
Prudential
SIAC

This board will act as the governing body until a formal election of officers.

Individuals who represent the organizations on the Executive Committee will remain Voting Members (though their position on the Committee may be replaced with another financial services organization), even if they no longer represent these organizations.

Voting Members

New voting members are approved by the Executive Committee. A two thirds vote is required for a membership action.

Each organization will be represented by 2 delegates with 1 vote per organization. All voting done by the organization as a whole will be on the basis of a simple majority of those organizations present for the passage of any resolutions.

Associate Members

Associate Members have no voting rights and are approved on a case by case basis by the Executive Committee. This class of membership is expected to include vendors, consultants, academics, and other interested parties involved in the financial services industry.

- Provisions for Termination

Membership of an organization or an individual may be terminated by a two thirds vote of the Executive Committee. Reasons for termination may include, but are not limited to:

- Repeated non-attendance and/or non-participation, evaluated on a case-by-case basis
- Inappropriate conduct as determined by the consensus of the Executive Committee

ORGANIZATION:

Executive Committee

- Initially composed of the 9 financial services organizations mentioned above
- Each organization will be represented by 2 delegates with 1 vote per organization. All voting will be on the basis of a two thirds majority of those organizations present for the passage of any resolutions.
- This committee will be responsible for electing the Chairman, providing high-level direction for the group, as well as:
 - Amending the charter
 - Determining any fees and dues
 - Determining membership requirements
 - Determining appropriate standards of conduct
 - Considering the exclusion of members for just cause
 - Any changes in the makeup or organization of the Executive Committee

Chairman

- Serves for a 6 month term after election by the Executive Committee
- Provides overall direction by composing and distributing meeting agendas
- Chooses Meeting Hosts and assists them in organizing the bi-monthly meetings
- Acts as primary liasion for the group to other groups, vendors and the newsmedia
- Maintains the up-to-date membership directory
- Monitors member attendance and maintains follow-up with non-participating members

Vice-Chairman

- Serves for a 6 month term after election by the Executive Committee
- Will assist the Chairman in the activities outlined above
- Will be acting-Chairman when the Chairman is unable to exercise his or her responsibilities

Meeting Host

- Chosen by the Chairman from the membership to serve for 1 bi-monthly meeting
- With the Chairman, composes the meeting agenda
- Makes all meeting arrangements for 1 half-day meeting on the first Tuesday of every other month, including arranging for space, securing speakers and distributing the agenda at least 3 weeks in advance of the next meeting to all members
- Maintains the meeting notes and distributes them to the membership

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THE REALITY CLUB

September 22, 1987

Dear Reality Club Member,

In the coming 1987-1988 season, The Reality Club will move around the city, our events conducted mostly in intimate surroundings such as members' living rooms and private spaces. For most events, a dinner will be served.

I am enclosing a tentative schedule for your convenience. You will be receiving individual invitations for each event in the mail. Since dinner arrangements have to be made, please r.s.v.p. to Bonnie Snow at 838-0230 at least one week preceding an event.

Thank you for your cooperation.

Sincerely,

Heinz R. Pagels

HRP
Attached:
List of RC Speakers & Dates
1987-1988

Thursday, December 3
Kenneth Snelson is a sculptor who is interested in the subject of sculpture.

Thursday, December 10
Eugene Schwartz, writer, publisher, and software developer, is one of America's leading art collectors.

Thursday, December 17
Albert Maysles, documentary film-maker is credited (along with his late brother, David) with the creation of "Direct Cinema" (a technique the French call "cinéma verité"). Among the Maysles Brothers' films are Home Sweet Home and Grey Gardens.

Thursday, January 7
Elaine Pagels, religious historian, is author of The Gnostic Gospels and Adam, Eve and the Serpent.

Thursday, January 21
Julius Korein is a neurobiologist who studies brain states of death, vegetation, and life.

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THE REALITY CLUB

Tentative Schedule 1987-1988

- | <u>Date</u> | <u>Speaker</u> |
|------------------------------|--|
| <u>Thursday, October 1</u> | RON COOPER
Ron Cooper, "the King of downtown," is one of the original artists in the L.A. downtown loft scene. |
| <u>Friday, October 16</u> | ROLLO MAY
Rollo May, psychologist, is the author of <u>Love and Will</u> and <u>Freedom and Destiny</u> . |
| <u>Thursday, October 29</u> | MIHALYI CSIKSZENTMIHALYI
Mike Csikszentmihalyi, research psychologist, studies "flow states" and is the author of the forthcoming <u>The Psychology of Optimal Experience</u> . |
| <u>Thursday, November 5</u> | ALAN GUTH
Alan Guth, particle physicist, is the father of "the inflationary scenario" of the beginning of the universe. |
| <u>Thursday, November 19</u> | ROBERT KUTTNER
Robert Kuttner, political and economics analyst, is the author of <u>The Revolt of the Haves</u> , <u>The Economic Illusion</u> and the forthcoming <u>the Life of the Party: Democratic Prospects in 1988 and Beyond</u> . |
| <u>Thursday, December 3</u> | KENNETH SNELSON
Kenneth Snelson is a sculptor who is interested in the subject of sculpture. |
| <u>Thursday, December 10</u> | EUGENE SCHWARTZ
Eugene Schwartz, writer, publisher, and software developer, is one of America's leading art collectors. |
| <u>Thursday, December 17</u> | ALBERT MAYSLES
Albert Maysles, documentary film-maker is credited (along with his late brother, David) with the creation of "Direct Cinema" (a technique the French call "cinema verite"). Among the Maysles Brothers' films are <u>Gimme Shelter</u> and <u>Grey Gardens</u> . |
| <u>Thursday, January 7</u> | ELAINE PAGELS
Elaine Pagels, religious historian, is author of <u>The Gnostic Gospels</u> and <u>Adam Eve and the Serpent</u> . |
| <u>Thursday, January 21</u> | JULIUS KOREIN
Julius Korein is a neurobiologist who studies brain states of death, vegetation, and life. |

- 2207 BROADWAY
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- THE
REALTY
CLUB
- Thursday, February 4 JAMES S. HENRY
Jim Henry is an economist and author of the forthcoming
Debt Hoax: Third World Loans and Where They Went.
- Thursday, February 18 RICHARD OGUST
Richard Ogust is an artist and author of IBHR, IBHR-1,
and IBHR-4.
- Thursday, March 3 HUGH DOWNS
Hugh Downs, television commentator, is the host of ABC's 20-20.
- Thursday, March 17 DAN OGILVIE
Dan Ogilvie, a psychologist who studies the human search
for security and satisfaction, is writing a book entitled
The Undesired Self.
- Thursday, March 31 HANNE TIERNEY
Hanne Tierney is a theatre artist who works with the possibility
of theatrical drama independent of human actors.
- Thursday, April 7 DONALD STRAUS
Donald Straus, decision theorist, is the former President
of the American Arbitration Association.
- Thursday, April 21 DANNY HILLIS
Danny Hillis, computer scientist, a pioneer in the field of
massive parallelism, is designing the "thinking machine".
- Thursday, May 5 WITOLD RYBCZYNSKI
Witold Rybczynski, professor of architecture, and observer of
technology, is the author of Home: A Short History of an Idea.
- Thursday, May 19 HERBERT RAPPAPORT
Herbert Rappaport, a psychologist who studies time
orientation and personality, is writing a book entitled
Marking Time.
- Thursday, June 2 MARK MIRSKY
Mark Mirsky, novelist, is founder and editor of Fiction,
and author of Tales of Blue Hill Avenue.

"To arrive at the edge of the world's knowledge, seek out the most complex and sophisticated minds, put them in a room together, and have them ask each other the questions they are asking themselves."

2307 BROADWAY
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(212) 874-0533

THE REALITY CLUB

Reality Club Meeting

Speaker: Ron Cooper
Title: "Voids & Volumes: Decision-Making in the Arts"
Date: Thursday, October 1st
Time: Dinner at 7PM
Place: Madam Rosa Night Club*

"I like voids and volumes, the most ephemeral materials, light, atmosphere, the sky, tangible and almost nonexistent simultaneously.

"The high I sustain in art comes from questioning the very image of the work I make. A work is successful if in the process of the making of it, a question is generated, the answering of which becomes the next work. This continued questioning maintains an almost ecstatic state for me."

Ron Cooper, known as "the king of downtown" was an originator of the downtown L.A. loft scene. He now divides his time between his studio in Taos and home in Santa Fe. Writing about Cooper's work in the catalog for the recent Sena Galleries West show, Peter Clothier states: "Cooper's trademark has been the almost perverse sense of mischief with which he likes to confound the expectations of his previous work, yet his constant fascination has been the shadowy, dolppleganger relationship of positive and negative image and, with it, the decomposition of form and mass into light. This preoccupation has dominated his continuing search for the 'aura' that identifies the object and, more recently - in both sculptural objects and photographic studies - people."

Members only. If you plan to attend please let us know by Friday, September 25th as we have to make dinner arrangements.

* Directions: Proceed on 7th Avenue South one and a half blocks south of Canal Street. Take left on Beach Street. Take first left on St. John's Lane. Madam Rosa is first doorway on right. Telephone: 219-2207.

R.S.V.P.: Bonnie Snow 838-0230.

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(212) 874-0533

THE
REALITY
CLUB

Reality Club Meeting

Speaker: Ron Cooper

Title: "Voids & Volumes: Decision-Making in the Arts"

Date: Thursday, October 1st

Time: Dinner at 7PM

Place: Madam Rosa Night Club/ Isabella Kirkland, Host

Done 9/28
regrets

"I like voids and volumes, the most ephemeral materials, light, atmosphere, the sky, tangible and almost nonexistent simultaneously.

"The high I sustain in art comes from questioning the very image of the work I make. A work is successful if in the process of the making of it, a question is generated, the answering of which becomes the next work. This continued questioning maintains an almost ecstatic state for me."

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THE
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CLUB

Women's Forum

all
clubs

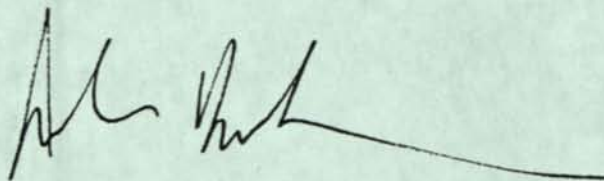
May 21, 1987

MEMORANDUM

To: REALITY CLUB MEMBERS & GUEST MEMBERS
From: JOHN BROCKMAN
RE: "REALITY CLUB ISSUE" of THE WHOLE EARTH REVIEW

I am pleased to enclose your copy of the current The Whole Earth Review which features a special Reality Club section. It is my hope and desire that this effort will serve as a pilot project for a Reality Club publication by, about, and for members. I envision an 80-100 page publication (Macintosh/laser printer), published irregularly, and distributed initially to people we know, and later, perhaps, to a wider audience.

I welcome any thoughts, comments, suggestions about this idea as well as your response to the Whole Earth Review. Please call me at the above telephone number. Thank you.



JB:dd
encl.

"To arrive at the edge of the world's knowledge, seek out the most complex and sophisticated minds, put them in a room together, and have them ask each other the questions they are asking themselves."

2 EAST 63RD STREET
NEW YORK, NEW YORK 10021
(212) 838-0230

THE
REALITY
CLUB

To: Reality Club Members
From: Heinz Pagels
Meeting
Date: Thursday, March 5, 1987
Speaker: Pamela McCorduck

The presentation at the Thursday, March 5th meeting will be given by Pamela McCorduck. As regularly scheduled, the meeting will be held at The New York Academy of Sciences, 2 E. 63rd St., New York, NY, at 7:30 PM. The presentation begins at 8 PM. ~~Please return the enclosed response card promptly.~~ If there is a last minute change in plans, call Bobbi Munsell at [212] 838-0230.

Pamela McCorduck has published five books, both fiction and non-fiction, among them The Universal Machine (McGraw-Hill, 1985), a study of the world-wide intellectual impact of computing; The Fifth Generation: Artificial Intelligence and Japan's Computer Challenge to the World (co-authored with Edward A. Feigenbaum of Stanford University; Addison-Wesley, 1983) and Machines Who Think (W.H. Freeman, 1979), a history of artificial intelligence.

She has lectured before many business, professional, and academic groups, and has appeared on radio and television (including nationally televised programs such as the CBS Evening News, Cable News Network, the MacNeil-Lehrer Report, Adam Smith's Money World, and the Group W Network) and has consulted for several organizations and firms. She has been a lecturer in the Department of English and Comparative Literature at Columbia University since 1980; serves on the executive board of the American PEN Center.

For The Reality Club, she will talk about some applications of artificial intelligence to the visual arts, the subject of a book in progress. The talk will be illustrated with slides.

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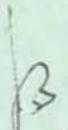
January 7, 1987

MEMORANDUM

To: Whole Earth Review "Reality Club Issue" Contributors
From: John Brockman
RE: Deadline for Articles

Thank you for agreeing to contribute to the "Reality Club Issue." I need all the contributions by February 15th. At that point, I will ship everything off to Kevin Kelly, editor of Whole Earth Review, who will then take over and deal directly with contributors regarding editorial comments, details, etc.

In general, the articles can be up to 25 typewritten pages. Any questions, please call me at the above telephone number.


John Brockman

JB/df

Esther - I look forward to your
piece. Please let me know what you
are writing about.

A

"To arrive at the edge of the world's knowledge, seek out the most complex and sophisticated minds, put them in a room together, and have them ask each other the questions they are asking themselves."

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THE REALITY CLUB

January 7, 1987

MEMORANDUM

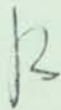
To: Reality Club Speakers
From: John Brockman
RE: WHOLE EARTH REVIEW "REALITY CLUB ISSUE"

The Whole Earth Review (formerly CoEvolution Quarterly) has asked me to guest edit their Spring-Summer issue. In this regard I have proposed, and they have accepted, the notion of a Reality Club Issue.

I have already solicited a dozen articles from among the seventy-odd Reality Club speakers who I know are at work on writing projects. If I have not contacted you, and you have something of interest that you are working on, please call me. The magazine pays about \$75 per printed page and articles can run up to 5,000 words. The deadline is February 15th.

I am also very interested in knowing what recently published books have excited you and how such a book has changed your mind. Enclosed please find a form for response along with an example of how the WER handles reviews. All I need from you is the name of the book (and other bibliographical details) and your comments. The editors of the WER will get the books and make the text selections.

Thank you in advance for your cooperation. I look forward to your response before February 15th. Any questions, please call me at the above telephone number.



John Brockman

JB/df
Encls.

Name: _____

Signature: _____

Whole Earth Review / Reality Club: Book Recommendations

Title:

Author(s):

City:

Publisher:

Copyright Date:

of Pages:

Price:

Hardcover or Paperback:

Comments:

Title:

Author(s):

City:

Publisher:

Copyright Date:

of Pages:

Price:

Hardcover or Paperback:

Comments:

Engines of Creation

The Last Technological Revolution is upon us: "nanotechnology" — the science of building molecules to order. What this might mean for good or bad is enthusiastically examined in this lively book. There is some gee-whizzing; how could there not be when the potentials include cell repair, disease reduction, and life extension? Ebullience is balanced by a serious discussion of the potential for horrifying weaponry, and the social disorder that could result from thoughtless incorporation of nanotechnology into an unprepared populace. The book is remarkably wide-*visioned* and comprehensively based: most unusual for this sort of thing. Future-reading at its best. —J. Baldwin

• Not human whims but the unchanging laws of nature draw the line between what is physically possible and what is not — no political act, no social movement can change the law of gravity one whit. So however futuristic they may seem, sound projections of technological possibilities are quite distinct from predictions.

• The simplest medical applications of nanomachines will involve not repair but selective destruction. Cancers provide one example; infectious diseases provide another. The goal is simple: one need only recognize and destroy the dangerous replicators, whether they are bacteria, cancer cells, viruses, or worms. Similarly, abnormal growths and deposits on arterial walls cause much heart disease; machines that recognize, break down, and dispose of them will clear arteries for more normal blood flow. Selective destruction will also cure diseases such as herpes in which a virus splices its genes into the DNA of a host cell. A repair device will enter the cell, read its DNA, and remove the addition that spells "herpes."

• *The Evolution of Design*
It might seem that design offers an alternative to evolution, but design involves evolution in two distinct ways. First, design practice itself evolves. Not only do engineers accumulate designs that work, they accumulate design methods that work. These range from handbook standards for choosing pipes to management systems for organizing research and development. And as Alfred North Whitehead stated, "The greatest invention of the nineteenth century was the invention of the method of invention."

• Richard Dawkins calls bits of replicating mental patterns "memes" (*meme* rhymes with *cream*). He says "examples of memes are tunes, ideas, catch-phrases, clothes fashions, ways of making pots or of building arches. Just as genes propagate themselves in the gene pool by leaping from body to body [generation to generation] via sperms or eggs, so memes propagate themselves in the meme pool by leaping from brain to brain via a process which, in the broad sense, can be called imitation."

• To visualize an advanced cell repair machine, imagine it — and a cell — enlarged until atoms are the size of small marbles. On this scale, the repair machine's smallest tools have tips about the size of your fingertips; a medium-sized protein, like hemoglobin, is the size of a typewriter; and a ribosome is the size of a washing machine. A single repair device contains a simple computer the size of a small truck, along with many sensors of protein size, several manipulators of ribosome size, and provisions for memory and motive power. A total volume ten meters across, the size of a three-story house, holds all these



Engines of Creation

K. Eric Drexler
1986; 298 pp.

\$17.95 postpaid from:
Doubleday & Co.
Direct Mail Order
501 Franklin Avenue
Garden City, NY 11530
or Whole Earth Access

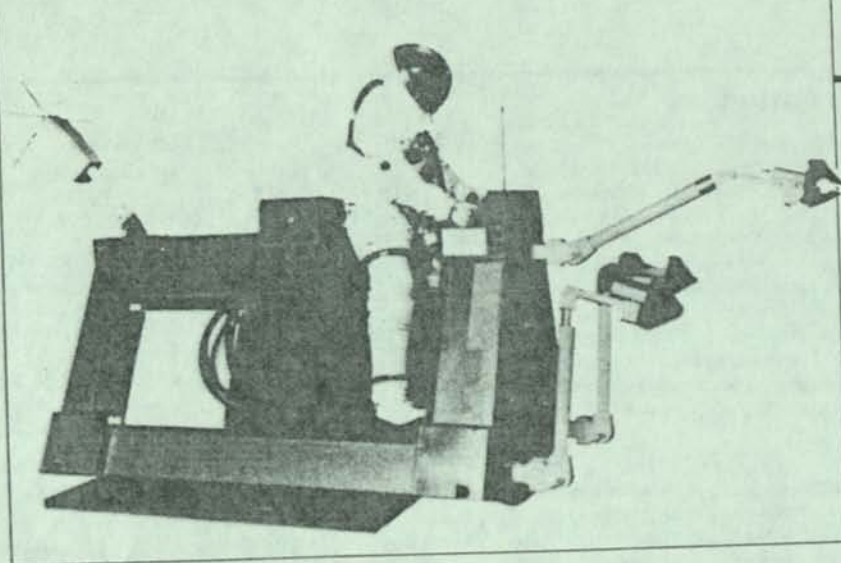
parts and more. With parts the size of marbles packing this volume, the repair machine can do complex things.

But this repair device does not work alone. It, like its many siblings, is connected to a larger computer by means of mechanical data links the diameter of your arm. On this scale, a cubic-micron computer with a large memory fills a volume thirty stories high and as wide as a football field. The repair devices pass it information, and it passes back general instructions. Objects so large and complex are still small enough: on this scale, the cell itself is a kilometer across, holding one thousand times the volume of a cubic-micron computer, or a million times the volume of a single repair device. Cells are spacious.

• Gregory Bateson once stated that "no organism can afford to be conscious of matters with which it could deal at unconscious levels." In the organism of a democracy, the conscious level roughly corresponds to debate in the mass media. The unconscious levels consist of whatever processes ordinarily work well enough without a public hue and cry. In the media, as in human consciousness, one concern tends to drive out another. This is what makes conscious attention so scarce and precious. Our society needs to identify the facts of its situation more swiftly and reliably, with fewer distracting feuds in the media. This will free public debate for its proper task — judging procedures for finding facts, deciding what we want, and helping us choose a path toward a world worth living in.

• Rabbits replicate, but they require prefabricated parts such as vitamin molecules. Getting these from food lets them survive with less molecular machinery than they would need to make everything from scratch. Similarly, a mechanical replicator using prefabricated chips could be made somewhat simpler than one that made everything it needed. Its peculiar "dietary" requirements would also tie it to a wider "ecology" of machines, helping to keep it on a firm leash. Engineers in NASA-sponsored studies have proposed using such semireplicators in space, allowing space industry to expand with only a small input of sophisticated parts from Earth.

• Human institutions are evolved artificial systems, and they can often solve problems that their individual members cannot. This makes them a sort of "artificial intelligence system." Corporations, armies, and research laboratories all are examples, as are the looser structures of the market and the scientific community. Even governments may be seen as artificial intelligence systems — gross, sluggish, and befuddled, yet superhuman in their sheer capability. And what are constitutional checks and balances but an attempt to increase a government's reliability through institutional diversity and redundancy? When we build intelligent machines, we will use them to check and balance one another.



Robotics

Marvin Minsky, Editor
1985; 317 pp.

\$19.95

postpaid from:
Doubleday and Company
Direct Mail Order
501 Franklin Avenue
Garden City, NY 11530
or Whole Earth Access

Robotics

Edited by an artificial intelligence pioneer, this anthology covers all the bases: the history of automatons, artificial common sense, sensors, human-machine partnerships (cyborgs), industrial robots, and the effects of robots on society. Here is the best starting point for a non-tinkerer who wants to know what robotics is about, and how it might change the world.
—Art Kleiner

- At some point in the future someone would go to work by slipping on a comfortable jacket lined with a myriad of sensors and musclelike motors. Each motion of his arm and fingers would then be reproduced at another place by mobile, mechanical hands. Light, dextrous, and strong, those remote mechanical hands have their own sensors, which will transmit what's happening back to the worker so that he will seem to feel whatever the remote hands may touch. The same will be done for the motions of the head and eyes, so that the operator will seem to see and sense what's happening in the other workplace. Once we can do such things, it will be another simple step to give those remote presences different strengths and scale of size. These remote bodies can have the brute capacity of a giant or the delicacy of a surgeon. And, using these information channels, an operator could be anywhere — in another room, another city, another country, even out on a space station orbiting the Earth.

- A 1980 census of robots, taken by Bache Halsey Stuart Shields, Inc., showed that the United States had 3,000 of them. . . . The entire Soviet Union had only 25, and

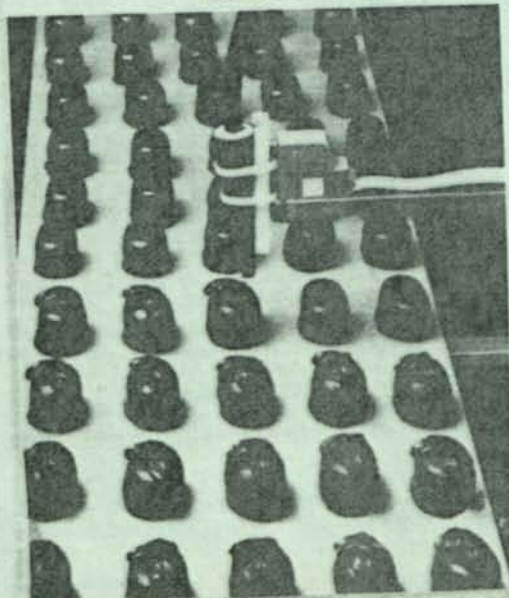
▲ Zero-g cowboys rode this three-armed, rider-controlled "space horse," one of a series of experimental vehicles built for NASA.

these were evidently experimental devices, but Poland had 360. . . . The true homeland of the robot appears to be Japan, with 10,000 in the census, more than the rest of the world combined.

- In 1942, in a story in *Galaxy Science Fiction* titled "The Caves of Steel," Isaac Asimov set forth his Three Laws of Robotics:

- A robot may not injure a human being, or through inaction allow a human being to come to harm.
- A robot must obey the orders given it by human beings except when such orders would conflict with the First Law.
- A robot must protect its own existence as long as such protection does not conflict with the First or Second Law.

- The coherence that your models of yourself, your inner workings, and your relations with others brings to your repertoire of routine patterns of behavior is called your personality. Without personality, not only would you be boring, but you'd have no interests, no direction, no reliable structure to your life. Because of this, the processes by which people develop their self-models are central to an understanding of the architecture of the mind. Robot minds aren't likely to be any different. For everyday needs, people use surprisingly simple models of themselves, revolving around a single indivisible entity, *me*. What psychiatrists speak of as the Self. The Self doesn't correspond to any particular part of the mental architecture; rather it is a general concept that one constructs just as one constructs a general concept of tigers ▶



The Robot Experimenter

The only regular source of information, besides *Radio Electronics* magazine, for people who are building their own robots. It deserves to survive and thrive.

—Richard Prather (Homebrew Robotics Club)

- Several years ago, PA Technology of Princeton, New Jersey, developed a prototype robot chocolate decorator system that could recognize different types of chocolate candies on sight.

The premise behind the machine is that although the chocolate manufacturing process is highly automated, final decoration and packing is often very labor-intensive. The goal was to develop a robot/vision system that could not only find a chocolate moving down a conveyor belt, but also recognize the particular type of chocolate (Hazelnut Slice, Rum Marzipan, Walnut Truffle, etc.) and then adorn it with an identifying pattern.

Robot Experimenter

Raymond Cote, Editor

\$24/year

(12 issues) from:
Robot Experimenter
P. O. Box 458
Peterborough, NH
03458-0458



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THE
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CLUB

new file

Dear Friend:

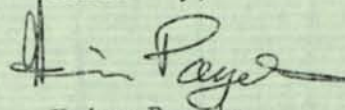
"May you live in interesting times" -- so runs an ancient Chinese curse. Perhaps it is our fortune to live in those "interesting times" when scientific, social and artistic perceptions are rapidly changing. Yet I have always thought that it is not the certainty and finality of death that most people fear but the openness and freedom of life. And it is with that openness that we explore our realities.

When John Brockman, the founder of the Reality Club, approached me with the idea of informal, free-for-all meetings with people presenting their idea of reality with the understanding that they would be challenged, I became excited. Most of my work takes place in a scientific environment among people with a shared worldview - a province of reality. But the Reality Club offers another environment, one of diverse experience, multiple realities - just look at the members and the spectrum of interests, professions and attitudes they represent. The diversity, energy and enthusiasm of the members is the major resource of the Reality Club and our future success is wholly dependent on that.

I would like to see the Reality Club meetings touch the boundaries to be at the edges where the energy is, where the rules are not yet rules and we are all explorers open to new experience. I don't know what the universe is. But here we are, enacting our lives before "the cold yet profoundly moving beauty" of the universe. What could it possibly mean? At the Reality Club we will explore our personal, scientific, artistic or poetic realities, with no other end in mind than the open joy of exploration with others who share the sense of intellectual adventure.

If you would like to find out more about the Reality Club, please write to me at the above address.

Sincerely,



Heinz Pagels
President, The Reality Club

HP:cr

THE REALITY CLUB

PROGRAMS

January 29, 1981

"THE SOCIAL HISTORY OF ADAM & EVE"
by Elaine Pagels

February 29, 1981

"THE LOGIC OF RELATIONSHIPS"
by Paul Ryan

March 2, 1981

"SHAMANIC CONCEPTS OF REALITY"
by Michael Harner

March 19, 1981

"THE COSMOLOGY OF QUANTUM MECHANICS"
by Heinz Pagels

April 2, 1981

"THE BIOREGIONAL VISION"
by Peter Berg

April 20, 1981

"THE POLITICS OF MIND CONTROL"
by John Marks

May 12, 1981

"LIFE IN THE UNIVERSE"
by Gerald Feinberg

June 3, 1981

"UNTITLED PLAY"
by Michael Andre

July 28, 1981

"MAXIMUM LIFE SPAN"
by Roy Walford

September 17, 1981

"DOING GOOD"
by Stewart Brand

October 8, 1981

"A TALK ABOUT AMERICAN HISTORY"
by Page Smith

October 20, 1981

"RETHINKING NUCLEAR ISSUES"
by Richard Baker-Roshi

November 10, 1981

"THE TURNING POINT"
by Fritjof Capra

November 17, 1981

"MEDICAL SELF-CARE"
by Tom Ferguson

November 24, 1981

"EINSTEIN'S SPACE AND VAN GOGH'S SKY"
by Lawrence LeShan

December 16, 1981

"AFTER DINNER REMARKS"
by Abbie Hoffman

January 26, 1982

"THE SECOND STAGE"
by Betty Friedan

February 9, 1982

"ANARCHY, DISCORDIANISM, AND UTOPIA"
by Douglas Casey

February 23, 1982

"BLOOD IN THE NIGHT: A PERSONAL ACCOUNT
OF THE AFGHAN WAR"
by Jere Van Dyk

March 9, 1982

"ENERGY AND HOW TO GET IT: A PORTRAIT
OF 'LIGHTNING BOB' "
by Rudolf Wurlitzer

March 23, 1982

"THE MICROCOSMOS"
by Lynn Margulis

April 13, 1982

"A PERSONAL, SUBJECTIVE, NON-SCIENTIFIC
VIEW OF REALITY"
by Ellen Burstyn

April 27, 1982

"KABALLA - THE PARADIGM SHIFT"
by Rabbi Zalman Schachter

April 24, 1982

SAN FRANCISCO DAY

"SIGNIFICANCE OF MYTHS IN PERSONALITY
INTEGRATION"
by Rollo May

SAN FRANCISCO DAY (cont.)

"AGING AND THE BIOLOGY OF MAXIMUM
LIFE SPAN"
by Roy Walford, M.D.

"POEM THINK"
by Gerd Stern

"MICROATHLETICS: VIDEO GAMES, COM-
PUTERIZED LEISURE, AND THE NATURAL
BODY"
by David Sudnow

THE
REALITY
CLUB

EXECUTIVE COMMITTEE & OFFICERS

EXECUTIVE COMMITTEE

John Brockman, Chairman

Gerald Feinberg

Betty Friedan

Michael Harner

Lawrence LeShan

Heinz R. Pagels

Richard Rabkin

Paul Ryan

Gerd Stern

OFFICERS - 1982

President	Heinz R. Pagels
Vice President	Betty Friedan
Secretary	Paul Ryan
Treasurer	Gerd Stern

THE REALITY CLUB

MISSION

THE REALITY CLUB is a group of thinkers, including epistemologists, philosophers, scientists, poets, artists, psychologists, writers, filmmakers, entrepreneurs, and intellectuals with a mutual interest in exploring new ideas reflecting perceptions and models growing out of avant-garde cinema, post-modern theater, dance and art, cybernetic, quantum mechanics and relativity theory, sociology, feminism, and psychology.

MEMBERSHIP

Membership in THE REALITY CLUB is by invitation. Applications are not accepted. The criteria for membership are a high degree of intellectual achievement, intellectual desire, and a predilection to create ideas.

DEBATES

THE REALITY CLUB holds debates for evening meetings at 8 P.M. every Tuesday. The format is represented by a moderator or invited guest speaker followed by serious discussion, impromptu arguments, and gossip. Coffee and dessert are served. There is a no-smoking policy.

GENERAL INFORMATION

MEETING PLACE

To date, we have met at The Cohen Library at Rockefeller University or The Council Room of The New York Academy of Sciences.

FINANCES

THE REALITY CLUB has a no-dues policy and runs on a zero-budget.

CLUB JACKETS

THE REALITY CLUB jacket is black with white lettering and pairs of eyes in their orbit. "REALITY CLUB" is spelled out on the back and the member's nickname is worn on the front. Jackets are now available to members at cost.

PURPOSE

THE REALITY CLUB is a group of thinkers, including epistemologists, philosophers, scientists, poets, actors, psychologists, writers, financiers, entrepreneurs, and intellectuals with a mutual interest in exploring new ideas reflecting perceptions and models growing out of avant-garde cinema, post-modern theater, dance and art, cybernetics, quantum mechanics and relativity theory, ecology, feminism, and psychology.

MEMBERSHIP

Membership in THE REALITY CLUB is by invitation. Applications are not accepted. The criteria for membership are a high degree of recognizable accomplishment, intellectual desire, and a predisposition to exalt idea.

PROGRAMS

THE REALITY CLUB convenes on an irregular basis for evening meetings at 8 p.m. sharp. The evenings are comprised of a presentation by a member or an invited guest speaker followed by serious discussion, impolite argument, good gossip. Coffee and dessert are served. There is a no-guest policy.

MEETING PLACE

To date, we have met at The Cohen Library at Rockefeller University or The Council Room of The New York Academy of Sciences.

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THE REALITY CLUB

MICHAEL ANDRE
Poet and Publisher of Unmarried Co.

RICHARD BAKER-BOSHI
Pen Master

MARY CATHERINE BATESON
Anthropologist and Author of Our Day After Tomorrow

PETER BERG
Bioregionalist and Editor of Places

STEWART BRAND
Publisher and Editor of The Whole Earth Catalog

JOHN BRUCE
Epistemologist and Editor of The Journal of Theoretical Biology

ELLEN BURTON
Actor and Designer of Open Theater

JAMES CLAYTON
Attorney

ROBERT LAY
Artist

FRANCIS WATTS
Physician and Author of Medical Self-Check

DOUGLAS CHASE
Financial Analyst and Author of Investment

SIGNEE COLLIER
Physicist

VERA FRIMMEL
Physicist and Author of What is the Future of AI?

TOM JENKINSON, M.D.
Publisher of Medical Self-Check

TIMOTHY FERRIS
Writer - Author of Galaxies

BETTY FRIEDAN
Feminist and Author of The Feminist Mystique

STANISLAV GROF, M.D.
Psychotherapist and Author of Realization of the Self

CHARLES HAMPSON-THORPE
Psychologist and Author of Self-Check

MEMBERSHIP LIST

MICHAEL ANDRE
Poet and Publisher of Unmuzzled Ox

RICHARD BAKER-ROSHI
Zen Master

MARY CATHERINE BATESON
Anthropologist and Author of Our Own Metaphor

PETER BERG
Bioregionalist and Editor of Planet/Drum

STEWART BRAND
Publisher and Editor of The Whole Earth Catalog

JOHN BROCKMAN
Epistemologist and Author of By The Late John Brockman

ELLEN BURSTYN
Actor and President of Actor's Equity

JAMES BUTLER
Attorney

JAMES LEE BYARS
Artist

FRITJOF CAPRA
Physicist and Author of The Tao of Physics

DOUGLAS CASEY
Financial Expert and Author of Crisis Investing

SIDNEY COLEMAN
Physicist

GERALD FEINBERG
Physicist and Author of What is the World Made Of?

TOM FERGUSON, M.D.
Publisher of Medical Self-Care

TIMOTHY FERRIS
Writer - Author of Galaxies

BETTY FRIEDAN
Feminist and Author of The Feminine Mystique

STANISLAV GROF, M.D.
Psychotherapist and Author of Realms of the Human Unconscious

CHARLES HAMPDEN-TURNER
Psychologist and Author of Radical Man

MICHAEL HARNER
Anthropologist and Author of The Way of the Shaman

PAUL HAWKEN
Economist and President of Smith & Hawken Tool Co.

BUCK HENRY
Actor, Director and Screenwriter

ANNE HERBERT
Writer - Author of The Rising Sun Neighborhood Newsletter

KARL HESS
Libertarian and Editor of Survival Tomorrow

ABBIE HOFFMAN
Political Activist and Author of Soon to Be a Major Motion Picture

DENNIS HOPPER
Actor and Director

AL CHUANG-LIANG HUANG
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Healer and Author of Joy's Way

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Artist

PAUL KRASSNER
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LAWRENCE LESHAN
Research Psychologist and Author of Einstein's Space and Van Gogh's Sky

JOHN C. LILLY, M.D.
Scientist and Author of Lilly on Dolphins

AMORY LOVINS
Physicist and Coauthor of Brittle Power

L. HUNER LOVINS
Attorney and Coauthor of Brittle Power

JERRY MANDER
Author of Four Arguments for the Elimination of Television

LYNN MARGULIS
Biologist and Author of Symbiosis in Cell Evolution

KATINKA MATSON
Writer - Author of The Encyclopedia of Reality

TOBY MAROTTA
Political Scientist and Author of The Politics of Homosexuality

HUMBERTO MATURANA
Cyberneticist

ROLLO MAY
Psychologist and Author of Love and Will

MICHAEL MCCLURE
Poet and Playwright

CATERINE MILINAIRE
Writer - Author of Celebrations

STEPHANIE MILLS
Coeditor of The Coevolution Quarterly

MARK MIRSKY
Novelist and Editor of Fiction

RICHARD MORRIS
Poet and Author of The Fate of the Universe

JACK NICHOLSON
Actor and Director

ELAINE PAGELS
Religious Historian and Author of The Gnostic Gospels

HEINZ PAGELS
Physicist and Author of The Cosmic Code

RICHARD RABKIN, M.D.
Psychiatrist and Author of Strategic Psychotherapy

BOB RAFELSON
Director

PAUL RYAN
Cyberneticist and Author of The Cybernetics of the Sacred

Jorge Saia
Artist and Editor of File

JONAS SALK
Biologist and Director of The Salk Institute

ZALMAN SCHACHTER
Rabbi

ROBERT SHAPIRO
Biochemist and CoAuthor of Life Beyond Earth

PAGE SMITH
Historian and Author of A People's History of the United States

GERD STERN
Poet

DONALD STRAUS
Past-President of The American Arbitration Association

DAVID SUDNOW
Sociologist and Author of Ways of the Hand

SIM VAN DER RYN
Architect and Author of Sustainable Cities

FRANCISCO VARELA
Cyberneticist

HEINZ VON FOERSTER
Cyberneticist

ROY WALFORD, M.D.
Biogerontologist and Author of Maximum Life Span

HAROLD WIT
Poet and Financier

RUDOLF WURLITZER
Novelist and Author of Nog

GARY ZUKAV
Writer - Author of The Dancing Wu Li Masters