

Starring:

Frank Gillette
Artist/Raindance Cor-
poration (NYC)

Brendan O'Regan
— Director of Research
of the Institute of
Noetic Sciences (SF)

&

Richard Chilgren (Hawaii) David Ross Curator of the University
Museum, Univ. of Cal., Berkeley (CA) Charles Frazier Sculptor
(NYC)

John G. Hanhardt — Curator of Film and Video at the Whitney
(NYC) James Harithas — former Director of the Everson Museum
in Syracuse, New York Steven Poser — writer

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I have been dreading writing a preface for this, worried about my ability to remain emotionally composed while talking about what this is and why I'm reprinting it. Yet, I feel like I could provide too much assistance to understanding these artifacts to be able to comfortably abdicate this responsibility. Let me focus on relaying some objective matters, and try to save the hysterical meltdown for the end.

On a more sinister level, the security of the entire world now rests on the controls of the just such systems, and isn't it time we explored the outer limits of this for its impact effect on communication? Such systems are integral to all security systems at the military level, and even this terminal you are all using has more sophistication than I think some of you realize, e.g., for manipulating more complex programs in larger computers ranging in use from banking to missiles.

— *Brendan O'Regan*

These conferences occurred on the first global chat systems, on ARPANET. Our first figure of cultural interest was involved in the design of these systems: Jacques Vallée. Google, the sickening fuckers, credit him as being a computer scientist and venture capitalist (and, perhaps most impressively, misspell his name), despite the fact that I imagine he's most well-known as an UFOlogist to those reading this.

The transcripts themselves are dominated by Frank Gillette and Brendan O'Regan, two figures who couldn't possibly be more of-their-time. Let me introduce them.

* * *

To call Frank Gillette simply "an artist" is reductive, but enough contemporary documents do so to suggest this is a label he desired, so, fair enough: Frank Gillette is an artist. He is also

occasionally called a *video artist*, which seems to cross the line into cruelty. I can elaborate!!

Frank Gillette's most visible output—at least in this century—is the magazine *Radical Software*, the first issue of which came out July 1970. This magazine was a product of the Raindance Corporation, named in parody of the government-advising Rand Corporation; Raindance was founded and, *de facto* if not *de jure*, masterminded by Gillette. Article titles in the first few issues include “*Cybernetic Guerilla Warfare*” by Paul Ryan, “*Expanded Education for the Paperless Society*” by Nam Jun Paik and “*A demand on the Networks: Serve the People*” a statement written anonymously(?).

It's understandable to misread all this as talking about some fledgling internet. Remember: this is from a decade before these teleconferences, and these teleconferences represent an embryonic stage of a then-hypothetical internet. No, my friend, in *Radical Software*, these folks were writing about *television*. *Radical Software* documents a strain of thought dedicated simultaneously to envisioning the incredible potential that a pro-social, humane cybernetic world offered to humanity and the brutal fight to realize this potential under an uncompromisingly cynical technocapitalist regime.

That today “television” is taken to symbolize the unidirectional medium *par excellence*, that it's difficult to understand *Radical Software* as even being *about* television, that everyone involved has had their identity compressed to “video artist”—as the sort of art they were fighting to create was never allowed to exist, as there was *money* to be made!—serves to convey just how badly Raindance and peers lost this battle.

Here, then: 1979. Gillette has found himself once again on the battleground. He is not unprepared. But, well, hey, look around you. You know how this is going to go already. Have you felt *empowered* recently?

* * *

Brendan O'Regan was the Director of Research at the Institute of Noetic Sciences. (I pause here for the reader's overblown spit-take, which I watch curdle into a disgusted grimace.) “Noetic Sciences”?? Uhh, who ordered *that*?! I'm not entirely sure—I ache to read a book or even some papers on how exactly this all came

together—but it’s not like this was so outlandish at the time. A 1977 paper “*Direct Perception of Remote Geographical Locations*” involves integrated experimentation with remote viewing aided by communications over ARPANET. It was presented at an IEEE conference, and the network communications teams probably overlapped. The screaming blue “PARAPSYCHOLOGY” label that Wikipedia hits you with on the moment of page-load re: The Institute of Noetic Sciences would not remotely have the same cultural malignment at that time that it does now. At least not to government researchers.

In anticipation of how a 2024 reader might react to this revelation, can I—humbly—suggest that this isn’t a bad or scary thing? That, in fact, this likely aligned research efforts to be more humane than they would’ve otherwise been (for whatever that was worth), and profoundly more humane than anything poised to operate under the banner of “research” today?

As Henry Flynt repeatedly observes in Ruinous Spirituality, “Needless to say, scientific materialism—what I call the contemporary prestige frame of reference—has no way to recognize dignity [or human interiority in general].”¹ “[Scientific materialism (or mechanical materialism)] arose from the fanatical mysticism of depersonalization.”²

While I know far less about Brendan O’Regan and the Institute of Noetic Sciences than I do about Gillette, and I can’t assume anything about the legitimacy of their research, would it be wrong of me to regard their inclusion as at least an effort to *disclose personness*—to use Flynt’s terminology—in the endeavor? Certainly the directions of Google, Meta et al would be recognized more readily as the epistemological catastrophes they are in a context less eager to discard any sense of human interiority, or deny any value whatsoever to it.

* * *

At any rate, of these two, it is often O’Regan who is the more grounded. Gillette is stunningly erudite—though he is holding back here from the density he operates at in Between Paradigms, his sole published text—and understandably excitable. The forces

¹ Ruinous Spirituality, p. 15.

² *ibid.*, p. 234.

of history have placed him, twice now, on the very rim of a revolutionary explosion of potential; or at least the potential of potential.

Presenting these documents would be unthinkable without the preservation efforts of Roy Skodnick, who originally presented them in *All Area* #2, then again on the Franklin Furnace website for their “In The Flow” programme. I have sought to include here the other articles in that issue referenced in the introductory material, as well as the section divisions and further introductory materials provided with the Franklin Furnace presentation. Additionally, I’ve included all the images—ranging, as they do, from highly germane to a more whimsical relationship with the text—that accompanied these writings in *All Area*. Illustrative materials for Franklin Furnace’s presentation have been lost; illustrating instead, I guess, how precarious a state this all had been existing in.

Roy Skodnick is, at the time of my writing this, unable to afford retirement. Consider donating to his GoFundMe:

<https://www.gofundme.com/f/byab7-roy-skodnick>

* * *

Anyway, as to how I feel about these transcripts: I feel an aching, overwhelming sense of disgust. If it is not clear, I am rescuing these from the trash—no institution or corporation seeming to care. For all the effort and thought put in here, Gillette lost a second battle. Massive corporations harvest far greater wealth than the human mind can fathom by foreclosing on entire modalities: employees enact a combination non-metaphorical Hell and habitrail for themselves, their children, and the entire human race to be reduced to profoundly psychically ill livestock inside of.

Corporations theatrically establish “AI Ethics Boards,” as if they care. If any of these bodies gave the smallest fragment of something even distantly resembling a shit, they would instead establish ethics boards around user interfaces, human-computer interaction—they would return to these, this square 0, after having destroyed every single thing they had ever created.

Then, ideally, the C-suites would go on CSPAN and publically broadcast themselves blowing their fucking brains out.

*Phoebe Jenkins
Providence, RI
November 2024*

Part 1: Teleconferencing, Computers and Ar

Introduction by Roy Skodnick to "Teleconferencing Computers and Art" text from PLANET and EIES teleconferences published in All Area #2, Spring 1983, NYC., pp. 66–70.

The cistern contains: the fountain overflows.

— Blake, *The Marriage of Heaven and Hell*

First, a series of benchmarks in order to situate teleconferencing:

Alfred North Whitehead once remarked that the nineteenth century was dead by the 1880s, and the 1870s was its last lush decade. One could also say that the period from 1880 to 1945 was the period in which the old Western ideologies exploded ... In 1946, the first digital computer, the ENIAC, was completed at the government proving grounds in Aberdeen, Maryland, and it was soon followed by the MANIAC, the JOHNIAC, and, within a decade, ten thousand more. Never in the history of invention has a new discovery taken hold so quickly and spread into so many areas of use as the computer ... If the atom bomb proved the power of pure physics, the combination of the computer and cybernetics has opened a way to a new "social physics"—a set of techniques, through control and communication theory, to construct a *tableau entiere* for the arrangement of decisions and choices.

— Daniel Bell, *The Coming of Post-Industrial Society* (New York: Basic Books, 1973) pp. 346–347.

In 1945, Vannevar Bush, President Roosevelt's wartime director of the Office of Scientific Research and Development, published an extremely foresighted article in which he predicted, among other things, the Xerox machine, the Polaroid camera, and FORTRAN. One of the items predicted was Memex, a writing, reading, filing, and

communication system contained in a desk and including a screen and keyboard.

— Murray Turoff and Star Roxanne Hiltz, *The Network Nation* (Reading, Massachusetts: Addison Wesley Publishing Company, 1978) p. 63.

This is the standard work on computerized conferencing. See also Art Kleiner's entry in *The New Whole Earth Catalogue*; also Jessica and Jeffrey Stamps, *On Networking* (New York: Doubleday, 1982).

Essentially, a memex is a filing system, a repository of information, and a scheme of searching and speedily finding a desired piece of information. It utilizes miniaturization, high-speed photography, memory cores such as computers embody, and provisions for the coding of items for recall, the linking of code to code to form trails, and then refinement or abandonment of trails by the machine as it learns about them. It is an extended, physical supplement for man's mind, and seeks to emulate his mind in its associative linking of items of information, and their retrieval as a result... The heart of the idea is that of associative indexing whereby a particular item is caused to select another at once and automatically. The user of the machine, as he feeds items into it, ties them together by coding to form trails.

For the usual method of retrieving an item from storage we use a process of proceeding from subclass to subclass. Thus in consulting a dictionary or an index, we follow the first letter, then the second, and so on... Practically all data retrieval in the great computers follows this method.

The brain and the memex operate on an entirely different basis. With an item in consciousness, or before one, another allied item is suggested, and the brain or the memex almost instantly jumps to the second item, which suggests a third, and so on. Thus there are built up trails of association in the memory, of brain or machine. These trails bifurcate, cross out other trails, become very complex. If not used they fade out; if much used they become emphasized... Although we cannot hope to equal the speed and flexibility with which the mind follows an associative trail, it should be possible to

beat the mind decisively in the permanence and clarity of the items resurrected from storage.

Here is where the ability of the digital computer to learn from its own experience... comes into play.

— *Vannevar Bush, Pieces of the Action* (New York: William Morrow & Co., 1979) pp. 109–110.

* * *

...the geo-political tensions behind the allocation of Hertzian waves to different uses are as political as they are technical and often even the most experienced telecommunications technicians find themselves unconsciously indulging in politics.

The spectrum is the resource upon which exploitation of all the information resources (or almost all) depends. It is based upon the facility which exists in nature (and which has been explored since the last years of the last century) by which electro-magnetic energy can be made to oscillate, to move in waves, at different rates; the spectrum itself consists of the total range of possible rates of oscillation. If you stand at a particular point and a long skipping-rope is waved before you there is constant distance between the 'crest' of each wave; this is called the 'wavelength.' But since all electro-magnetic waves travel at the same speed—186,000 miles per second—the wave peaks and troughs will occur at a higher frequency the shorter the distance between them. The longer the wavelength the lower the frequency. One cycle per second is the basic unit of measurement known as one hertz; one thousand cycles is a kilohertz, one million is a megahertz and one thousand million one gigahertz. At the smallest end of the spectrum the waves cannot be heard or seen and for the purposes of radio communication the available frequencies range from 10 kilohertz to 300 gigahertz.

For eighty years now it has been possible for man to use more and more of the spectrum for sending information and entertainment, either from point to point or in broadcast mode to general audiences. Each information device which has been developed during the twentieth century uses up more of the available frequencies and careful international organization—through the International Telecommu-

nication Union (ITU), the world's oldest international organization, dating back to 1865—is necessary to avoid the squandering of spectrum space. Unlike other international agencies, the ITU exists only through its members, who make unanimous decisions from decade to decade on how to govern the use of this flexible resource of nature. Different devices, from radio and television to computer data sent via satellite, utilize different quantities of the spectrum, or different amounts of 'bandwidth': one colour television channel, for example, uses as much bandwidth as 2,000 ordinary telephone circuits or 40 FM radio channels. The members of the ITU have gradually over the decades divided the total spectrum into bands within which specific services may be transmitted: there are twenty of these in all, including radio and television broadcasting, radio astronomy, mobile radio, point to point communications, etc.

One further world resource is interconnected with the spectrum and that is the orbit around the globe at a distance of 22,000 miles within which satellites may be 'parked' in such a way as to enable three of them to send signals to the entire world. There are already many 'sets' of satellites of this kind, known as geo-stationary satellites because at their particular height they move at the same speed as the earth. Even in the few years since space communication became possible, so many satellites have been sent up to use that particular orbit around the earth that it is in danger of becoming cluttered. Only a handful of nations have hitherto acquired the expertise to launch satellites of their own and these and their client nations today require ever more parking spaces within this very convenient orbit. The geo-stationary orbit and the electro-magnetic spectrum are both different from earth resources such as oil, coal or gas, in that they never run out. They are different from crops because no amount of effort on the part of mankind can increase them. In some ways they are comparable to water resources, in that mischievous or uncooperative exploitation can make them useless but they will always regenerate their usefulness if the mischief or excessive use is removed.

— Anthony Smith, *The Geopolitics of Information* (New York: Oxford University Press, 1980) pp. 118–119.

See B. Menon's review in this issue. This book is an essential summary.

During manned space flight, there is data transmission of the rate of 52 kilobits per second, the equivalent of an Encyclopedia Britannica every minute. Between 1961 and February 1974, there were 318 days of manned space flights. How many encyclopedias does that make?

One of the greatest data collections in history to date is the 1974 Global Atmospheric Research Project (GARP) Atlantic Tropical Experiment. Sponsored by the United Nations, 4,000 persons from 72 countries used 38 ships, 13 planes, 6 satellites, 63 buoys, 1,000 land stations, and 500,000 balloons to examine an area of 29 million square miles from 1,500 meters below the ocean to the top of the atmosphere, in an area west from the Eastern Pacific to the Indian Ocean. The objective was to improve weather forecasting and to discover the sources of hurricanes, monsoons, floods, and droughts. The project collected 7,000 reels of tape and 14 billion bits of data. It will take several years to analyze the collected material. ... the jargon of information technology itself (being relatively new) is so extensive that a special English-German dictionary of 10,000 words was published in 1968 and recently updated to 15,000 items.

— Daniel Bell, “Teletext and Technology”, *The Winding Passage* (New York: Basic Books, 1977) p. 57.

...the image of the Alexandrian Library—the single building like the Bibliothèque National, the British Museum, or the Library of Congress—where all the world’s recorded knowledge is housed in one building, may become a sad monument of the printed past.

— Bell, *op. cit.* p. 58

It is very likely that in years to come an information ring main system will be used in homes and offices rather like the electricity ring main system of today. A single circuit could supply all of the information modes which a household of the present or the future could require...

— Smith, *op. cit.* p. 114.

In the broadest sense, the explosive upsurge of new technologies is breaking down all the older conceptions of signals, carriers, modes, and systems, and this “fusion” of information media sets the stage for a major set of social upheavals in the next several decades. These become central issues for the postindustrial society. The major one is the social organization of the new “communications” technology.

— *Bell, op. cit. p. 55.*

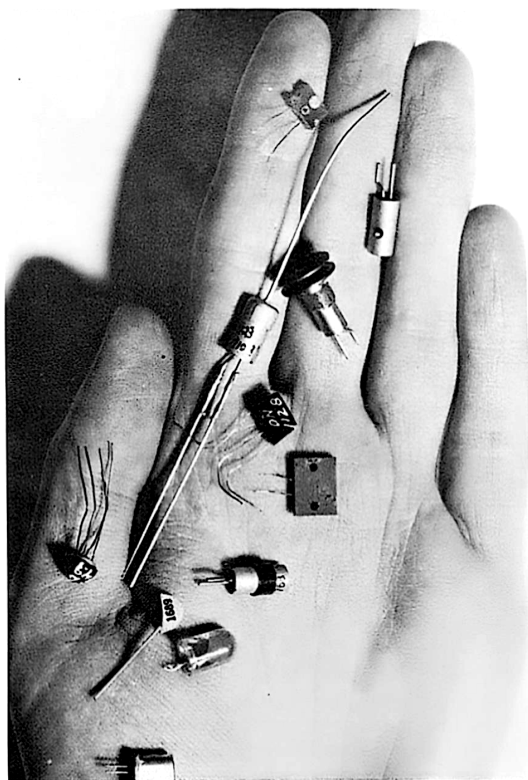
* * *

Are there any limits to miniaturization? Anyone making predictions in 1944 would have extrapolated existing technology—that is, improving the vacuum tube—and he would have been wrong. The invention of the transistor in 1948 completely changed the entire basis of electronics. One reason why the transistor was “unforeseen” at the time was that in 1944 there was as yet no such thing as “materials science.” The invention of the transistor required the refinement of a technique for preparing materials of less than a few parts per billion harmful impurities, and the utilization of special techniques to prepare highly perfect crystals.

If there is next to be a major change it may come with “integrated optics.” Integrated optical circuits can be laid down in thin films in much the same way as integrated electronic circuits. These thin films, however, use miniature lasers, lenses, prisms, light switches, and light modulators. Since the frequency of light is some 10,000 times higher than the highest frequency of an electronic device, the amount of information that can be carried by a light signal is correspondingly greater. Moreover, optical circuits are in principal considerably faster than electronic circuits.

— *Ibid., p. 37.*

The clock, with its sixty pulsed seconds to the minute and the sixty phased minutes to the hour, is the symbol of the industrial economy. The computer, equally, is the time symbol of the postindustrial world. Computer time is a conceit; it is called, oddly, real time, which means virtually “instantaneously.” Nanoseconds are the minutest portion of computer time. Electric signals go through computer wiring almost



at the speed of light, about a thousand feet per nanosecond. A thousand million nanoseconds make a clock second, or about the same number of clock seconds as there are in thirty years. In the present large-size computers, it takes about fifty nanoseconds to process one “bit” of information. In that context, what is the meaning of the division of time—or of Zeno’s paradox?

It is possible that we are reaching another limit of scale in technological terms. But all exponential growth reaches an asymptote, the ceiling limit, where it levels off. In communication around the world, we have already approached, in telephonic, radio, and television communication, real time, and the technological problems are primarily those of expanding the number of bands of communication to permit more and more people to enjoy that use.

In that fundamental sense, the space-time framework of the world oikoumene is now almost set.

— *Ibid.*, p.64.

* * *

These texts were edited from the terminal print-outs of two teleconferences generated on two different computer conferencing systems. The first (from November, 1978 to February, 1979) was conducted on PLANET, the second (from January to May, 1981) on EIES. Both conferences were intended as forums to consider the possible uses of emerging electronic technologies in the production, interpretation and distribution of art. They were expected to develop texts as well as implement design and construction of museum-related events. Although each conference involved several “players”; in different parts of the country, discussion was principally between artist Frank Gillette in New York and Brendan O’Regan (Director of Research of the Institute of Noetic Sciences) in San Francisco. The PLANET conference also included physician Richard Chilgren in Hawaii, David Ross (then Curator of the University Museum, Univ. of Cal., Berkeley) and the sculptor Charles Frazier. The EIES conference was sponsored by The Film and Video Department of the Whitney Museum of American Art and the Institute of Noetic Sciences, and included John G. Hanhardt (Curator of Film and Video at the Whitney), James Harithas (former Director of the Everson Museum in Syracuse, New York), and Steven Poser (a writer trained in philosophy) who assisted Hanhardt in coordinating and evaluating the conference.

Each participant used a Texas Instruments Portable Memory Terminal (Silent 700 series) Model 765 which has a 20K memory capacity, i.e., it can store 20,000 bits of information in the memory element of the terminal itself, independent of the memory capacity of the teleconferencing system to which the terminal is linked by telephone through the Telenet system. The terminal allows for composition off-line, followed by rapid transmission from the magnetic “bubble memory” of the terminal through the phone link to the computer for dissemination.

As with most advanced technology, computerized conferencing is a spin-off from developments first used by the government for military and strategic purposes:

“Packet switching” is the use of minicomputers to break data into packets, send them by the fastest available circuits (satellites, microwave, or cable) and then reassemble the packets for the user. The system was developed by ARPA, the Advance Research Projects Agency of the Defense Department which developed a nationwide network of government and research oriented computers from places like MIT and Stanford, and is now available for public commercial use.

— Daniel Bell “Teletext and Technology,” *The Winding Passage Basic Books*, 1977, p. 41.

ARPANET was de-classified in 1967. The actual design implementation of computerized conferences originates in the Office of Emergency Preparedness (OEP) of the President of the United States. The first computerized system harnessed instantaneous transfer of information to conventional methods of data gathering through questionnaires, a further development of the Delphi system which soon led to “a highly innovative technique for using a computer to structure human communication for information exchange and collective effort to solve a problem.”¹ EMISARI (The Emergency Management Information System and Reference Index) was the first such system; PLANET (developed at the Institute for the Future in Palo Alto, Calif.) and EIES (Electronic Information Exchange System developed by Murray Turoff at the New Jersey Institute of Technology in Newark, New Jersey) are two of the more sophisticated, flexible systems that exist today among several. PLANET and EIES structure communication into several options and modes presented as a “menu.” The EIES system

...supports electronic messaging, conferencing, personal notebooks, text editing, and document preparation. It includes a multitude of specialized features such as voting, automated questionnaires, and data-gathering ... EIES has five alternative human machine interfaces,

¹ Murray Turoff and Star Hiltz, *The Network Nation*, Addison Wesley, 1978., p.49.

from simple menus for the beginning and casual user to self-defined user commands and procedures for customized tailoring of the interface.

— *from EIES access statement*

PLANET allows participants in public conferences to exchange private one-to-one messages at the same time. Despite elimination of face-to-face cues and other kinds of kinesic context and contact, the “space” of computerized conferencing generates a complex social world with its own evolving norms, another realm of micro-sociology Gillette observes.

The history of these systems is subtly more fugitive than this summary indicates. Murray Turoff was “system designer and programming manager” in the System Evaluation Division (SED) of OEP

Over its six years of existence, SED’s accomplishments included:

1. The first non-linear network optimization algorithms and programs for the construction of gas pipelines;
2. The first nonlinear network optimization of the Federal Telephone System;
3. The OEP Energy Conservation Study in 1972.
4. A major Delphi forecast of the steel and ferroalloy industry;
5. The first policy Delphi;
6. Delphi conferencing, computerized conferencing, and the EMISARI development.

Turoff began to collaborate, outside of channels, with Language Systems Development (LSD), a group hired to design software for OEP’s computer laboratory:

In 1968 I held a number of meetings with the Language and Systems Development people who were developing a higher-level language for the [UNIVAC] 1108 called XBASIC. Without any formal arrangements between LSD and OEP, I suggested a number of requirements and modifications to their language that would allow for the programming of communication structures, and LSD incorporated this

into their design. As a result in late 1969, there was a software capability available to automate a Delphi Process.

— *Turoff and Hilts, op.cit.. p.47.*

Turoff continued to develop more complex systems:

Problems still existed with the 1108 software, one of which was that they [the OEP computer shop] could not tell who was doing what from any of their remote terminals. This was their problem, our advantage.

— *ibid. p.47*

Eventually the palace guard began to notice:

...the rest of OEP became aware that something was going on. This occurred because the computer console operators began to talk about people from all over the country who would occasionally phone to find out some piece of information about hours and such things. This gradually filtered up the ladder until someone decided to ask what was going on...they discovered that there were a lot of people accessing its computer from outside the organization and doing something with it that had not been programmed by them. They got a bit upset and conducted a complete investigation to see if government resources were being misused.

— *ibid. p. 48.*

At one point Turoff's computer terminal was taken away, but he and his co-workers had allies, including the head of OEP, General Lincoln who was "one of the five statutory members of the National Security Council."² Turoff and Robert Kupperman, the supervisory head of SED had helped Lincoln in an interesting way which Kupperman describes:

There was a memorandum that made an impression on Kissinger. The details are classified but it dealt with the question of should we or should we not have an ABM system. We had rather strong opinions. We had come from defense, and we know as much as anybody. We

² *Ibid.*, p. 50.

were able to put Lincoln in a useful intellectual position. Kissinger, commenting on Lincoln's memorandum, said that was foresighted.

— *Ibid.*, p. 50.

Turoff and Hiltz conclude:

This is the organizational setting that provides the context for the emergence of EMISARI: jealousy, power struggles, rival camps in the bureaucracy engaged in internal warfare.

— *Ibid.*, p. 51.

The system proved itself useful and became part of the steering capacity in crisis management and intervention although OEP ceased to exist:

EMISARI... is used as the weekly reporting mechanism from the ten regions of the Federal Preparedness Agency (FPA) of the General Services Administration (GSA), a successor to OEP. Whenever the GSA has a crisis to monitor, RIMS³ is revved up to full operational status.

— *Ibid.*, p. 58.

The democratic nature of entry and participation in these systems tends to shake up formal hierarchies of management and decision-making. Turoff and Hiltz speculate on the effects computerized conferencing will have on the normative set-ups and paradigm structures of research science. Planning and advocacy groups will no doubt accelerate democratic applications, complicate the steering process, alter research goals, as well as reconfigure access to information. Turoff is committed to the design of non-monopoly systems which allow any sender to be an originator of information.

Commercial applications have been quickly operationalized by banks and corporations. Two examples from Smith:

The Hewlett-Packard Corporation has already created its own electronic mail system which has, according to the company's own calculations, enabled it to take on orders at a far higher rate than would

³ Resource Interruption Monitor System

have been possible if it had remained totally dependent on US and other postal services. Its plants are distributed in several continents; it has 4,000 different products and hundreds of thousands of parts on its order books at any given moment. It has reduced its internal invoicing and ordering to a series of standardized sheets and an enormous volume (hundreds of thousands per day) of messages are being transferred from postal services to electronic mode.

— *Smith, op. cit. p. 135.*

SWIFT (Society for World Financial Information Transactions) operates daily bank clearing work in a single worldwide market and has begun to transform money flow. It means that cash can be moved around the world with extreme speed and without any hindrance being placed through physical or legal obstacles. It holds 300,000 transactions at a time, some of considerable size, beyond all national supervision. The entire “bank” is run on a computer which generates a kind of stateless currency, rocketing around the globe, potentially creating international currency instability as it moves.

— *Ibid., p. 142.*

The most sophisticated transmission-links remain classified. But two corporations and one government agency are collaborating in design and construction of a planetary system:

The most important single aid to this evolution now being planned is SBS—Satellite Business Systems—a company formed by IBM, Comsat (the US communications satellite company) and Aetna Life Insurance Company. Its plans have been shrouded in discreet corporate public relations for several year, perhaps awaiting the outcome of the 1979 WARC,⁴ since its life depends upon the allocation of a suitable set of frequencies in the 12-14 gigahertz band which has been set aside for ground to satellite data links, both for direct broadcasting and fixed satellites. SBS has been ‘grandfathering’ a frequency in this band (squatting on it prior to allocation, in the hope that its right to continue using the frequency will be eventually conceded) since 1978... At this point SBS, firmly seated on the spectrum and capable of generating and processing a much greater volume of traffic than

⁴ World Administrative Radio Conference

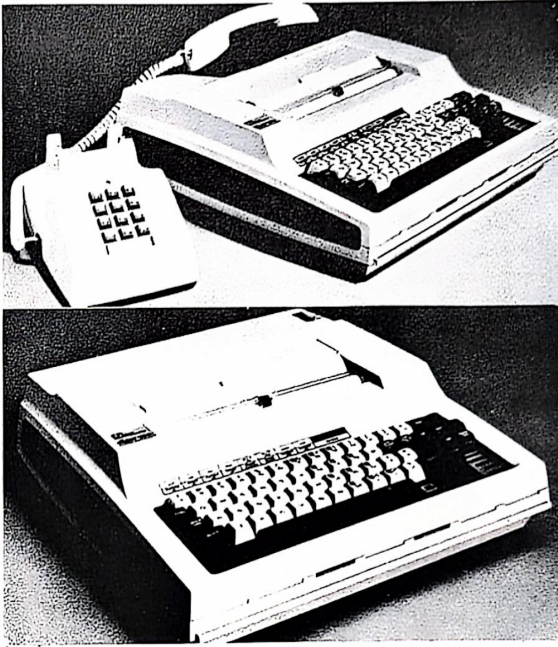


Figure 1.1 Courtesy of Texas Instruments.

that afforded by US intra-corporate business will be able to move into the field of international mail and telephone connection, replacing the cumbersome unreliable services of many countries with instant and reliable communication, both on paper and in sound. The whole of filing systems of corporations around the world could be stored in IBM computers situated anywhere in the world. Where data links are presently costly and clogged with traffic between continents and across oceans they will become ridiculously cheap, by traditional standards, and plentiful.

— *Ibid.*, p. 136.

There have been remarkable applications in the realm of human services, in the sharing of medical and other specialized knowledge, and in the development of alternative learning modes. But how will artists, writers, and researchers, as well as the now problematic “general public,” begin to explore the uses of these systems? How will they be marketed, institutionalized, and maintained? Bell points out there is still no national information policy.

We are only beginning to explore the nature of this kind of communication. Johansen, Vallee, and Collins (the designers of PLANET) write:

Computer-based teleconferencing is a highly cognitive medium that, in addition to providing technological advantages, promotes rationality by providing essential discipline and by filtering out affective components of communications. That is, computer-based teleconferencing acts as a filter, filtering out irrelevant and irrational interpersonal “noise” and enhances the communication of highly-informed “pure reason”—a quest of philosophers since ancient times.

— Johansen, Vallee, and Collins, “*Learning the Limits of Teleconferencing: Design of a Teleconference Tutorial*,” quoted in Turoff and Hiltz, *op. cit.* p. 28.

“Pure reason” is imprecise and needlessly invokes Kant who meant not axiomatic method, as these writers seem to, but the a priori structures of consciousness which constitute the sensible world as immediately given. If teleconferencing is one more step in the accelerating “retreat of the word” (George Steiner’s phrase that describes the erosion of natural language use by denotative, and increasingly artificial, languages), then (following Jürgen Habermas) I would place this kind of communication within the horizon of *instrumental* reason. But these writers immediately qualify their statement and observe

Yet, whether computer-based conferencing actually does act as a filter, even in the majority of situations, is open to question. And where it does, some may object.

— Turoff and Hiltz, *op. cit.* p.28.

Turoff and Hiltz refer to Simmel’s category of “the stranger” to account for the confusion of realms engendered by teleconferencing:

The stranger is close to us, insofar as we feel between him and ourselves common features of a national, social, occupational, or generally human, nature. He is far from us, insofar as these common features extend beyond him or us... Objectivity...is a particular structure composed of distance and nearness, indifference and involvement.

— quoted in Turoff and Hiltz, *op. cit.* p. 28.

In the EIES conference Gillette explores this contradiction further by employing (via Talcott Parsons) Weber's polar concepts: *gemeinschaft* vs. *gesellschaft*. *Gemeinschaft* designates the affective dimensions of traditional societies, and *gesellschaft* designates the institutional, bureaucratic forms of industrial society. Habermas, reformulating Weber, distinguishes between purposive-rational action (associated with technical rules, context-free language and productive forces) and communicative action or symbolic interaction (associated with social norms, intersubjectively shared ordinary language, and emancipation).⁵ Purposive-rational action is the determining form of modernization which has led to the possible transition to a "post-industrial society." Daniel Bell writes:

The concept "post-industrial society" emphasizes the centrality of theoretical knowledge as the axis around which new technology, economic growth and the stratification of society will be organized...

[It] suggests...that there is a common core of problems, hinging largely on the relation of science to public policy, which will have to be solved by these societies.

— Daniel Bell, *The Coming of Post-Industrial Society* (New York: Basic Books, 1973).

Habermas argues that the growth of theoretical knowledge itself collapses all previous forms of political and social decision-making into the routines of purposive-rational action, and he concludes that public policy debate must be returned to a re-awakened sphere of unobstructed communicative action. Teleconferencing does seem to occupy a middle ground and may become an important evolutionary tool.

The original research group that worked on the associated problems which became later known as cybernetics included two doctors, a mathematician, an electrical engineer, and a statistician. The mathematician Norbert Wiener delighted in interdisciplinary

⁵ Jürgen Habermas, "Technology and Science as 'Ideology'" in *Toward a Rational Society* (Boston: Beacon Press, 1970). See also *Knowledge and Human Interests* (Boston: Beacon Press, 1971). Trent Schroyer's essay in this issue (Page 111.) develops arguments based on Habermas; Schroyer's essay is a distinct American development, however, with formation of specific advocacy strategies.

effort to explore what he called the “no-man’s land between established fields.”⁶ Sitting in on a class at Black Mountain College that was studying Wiener’s book when it first appeared in 1948, the poet Charles Olson insisted that the only necessary investigator missing in that group was an artist. Brendan O’Regan’s work in cybernetics and neuro-physiology leads him to consider the aesthetic dimensions of information, and Frank Gillette is an artist whose work in video has combined tactical use of cybernetics with acute powers of individual observation. Their dialogue explores another kind of “no-man’s land”—where knowledge-bearing interests must initiate the uses of exchange in the *tableau entiere*.

⁶ Norbert Wiener, *Cybernetics* (Cambridge: MIT Press, 1948). Wiener too was sensitive to this issue, and invited anthropologists Gregory Bateson and Margaret Mead to participate in the Macy Conference on cybernetics. Bateson was particularly attentive to aesthetics, and it is no accident that his work is used by O’Regan.

Preface to PLANET and EIES texts by John G. Hanhardt also published in All Area #2, Spring 1983, p.71.

By saying everything as one would write it one no longer does anything but read by speaking.

— *Jean-Jacques Rousseau, Essays on the Origin of Language*

You are the one who writes and the one who is written.

— *Edmond Jabès, The Book of Questions*

The deeper one probes into its elements, the more unexplored the language seems.

— *F.D.E. Schliermacher, Hermeneutics: The Handwritten Manuscripts* ■

Computer teleconferencing is a recent technological development which establishes both a new form and means of producing and distributing a written text. In this system, keyboard terminals are joined by telephone to computers, creating teleconferencing networks. The terminal, rather than operating within the mechanical technology of the traditional typewriter or oral dimension of the telephone, embodies a post-industrial, electronic technology that generates both real time communication, and texts which can be stored in the computer, edited, retrieved, and transmitted. Teleconferencing, when operating at full potential, is a conceptual tool that may significantly alter our habits of communication. The intellectual and social “working through” of capabilities first developed within the military and scientific sectors is only now beginning. The museum is one traditionally determined place for selection, display storage, and analysis of objects. Writing is a complex cognitive process creating a material discourse of infinite possibilities. Joining the museum context to the production of

writing through teleconferencing affords radically new means of cultural exchange and documentation.

The Film and Video Department of the Whitney Museum of American Art turned to teleconferencing in order to engage these possibilities in planning for a future project that addresses the impact of the new technologies on art making and distribution. Rather than only initiating a symposium, with presentation of formal papers, we wanted to develop a preliminary telecommunications procedure for on-going work that would combine familiar and more novel elements in the production, interpretation, and display of art. This model would begin by inviting participants to explore the design of a teleconference for a specified period of time. Their experience and the information gathered would only then be incorporated into formal presentations. A third stage would have the conferees develop their exchanges further by re-engaging the teleconference network.

In discussions on how the implications of a post-industrial culture and an emerging epistemology of information might be explored by the Film and Video Department, Frank Gillette suggested we conduct an initial teleconference as a conceptual workshop. Arranged by Brendan O'Regan, a specific conference "New Technologies and the Arts" was set up on the EIES system, and O'Regan, also provided a position paper "On the Responsive Environment" to which we could respond. James Harithas and Steven Poser joined us later on. The plan was to communicate among ourselves and also possibly contact others within the total EIES system.

The capabilities of teleconferencing as a communications tool became immediately apparent in its daily operation. It is a lightweight and portable system with the terminal's access to the network as simple as dialing an access number on the phone and attaching a receiver to the terminal. The first step was to check in to see if there were any messages waiting sent by fellow conferees and then to check if anyone was currently on line using the system. After overcoming the practical problems of learning to use the terminal and the proper procedure for access codes, and coping with "down time" when the entire system was not operational, the most immediate and profoundly engaging issue was the role time played in one's perception of teleconferencing. The teleconference was always available; it never turned off.

Its presence, therefore, began to manifest tangible temporal qualities. One could always send a message; there was always someone on line no matter what time of day, since participants were working within all time zones. Whenever one wanted to work on a text, one was accessible to others, to new messages, new dialogue, new questions. Thus time became material, shaping the discussion, however subtly, as the roll of the paper provided a potentially infinite text. One changed in relation to individuals as questions went unanswered, or answered, and the linear sequence of reasoning became enmeshed in three dimensional coordinates of space and time as the printed text fused present and past (stored) times.

The body of text we have here takes more the form of a monologue than a whole multi-layered discourse. It is an expressive performance, with critical asides, within the teleconferencing system. My first hope was realized, for although we did not approach the completeness teleconferencing promises, it was an engaging learning experience. What is needed is to establish more interactive discourse that seeks in its growth a harmony of purpose, a desire to make the presence of the layered text a factor in dialogic exchange that would not only be the means for contact, but for the construction of discourse. In teleconferencing, time materializes in a series of feed-back relationships, mediated by the terminal and the total system. The dynamic of exchange in time offers the possibility of creating whole communities that may contribute a rich new layer in the archeology and history of knowledge.

I foresee as the next step in this project the establishment of a number of conferences that would be, to use a biologic metaphor, cultures of individuals linked by common interests, allowing time for small groups to understand the teleconferencing process and to realize together the potential for the development of thought. In order to create such a community of discourse, the teleconferencing text must become a multi-dimensional semiotic of communication and information processing. The infinite teleconferencing text becomes like Freud's 'mystic writing pad,' a cultural and archeological site of a future individual, and collective, memory. As in Freud's semiotic question to a patient speaking in fragmentary

phrases, “who is speaking to whom?”¹ the full potential of the semiotics of teleconferencing demands not the Levi-Straussian bricoleur, or a one-dimensional session of monologues, but a dialogic intercourse of narratives postulating the ground for a new community of texts.

¹ Dean MacConnell and Janet Flower MacConnell, The Time of the Sign (Bloomington, Indiana: Indiana University Press, 1982) p. 11.

(November 1978–February 1979)

I ————— messages between 1 and 211

[I./1.1] Frank Gillette-----

Metabasis eis allo genos

To begin with, a few propositions-definitions as to what we're up to. What follows is essentially a prologue to a "systems architecture" for the free-play of metaphor and trope. How wide a swath of collective unconscious can be cut into and re-assessed/re-stated/re-valued in re-appreciated light? All this is analogous to adaptive behavior between differing biological niches. Thus I would first distinguish *following instructions* from *obeying rules*.

Rules are formulated with regard to typical, and shared situations, since their purpose is to order and codify shared ongoing exchange activity.

Instructions are employed to prescribe certain definite performances and thus can be reformulated and communicated with relative unconcern about the context within which the activity is to take place.

My experience—frustrating as it originally was—with the "instructions" for operating the computer terminal, for instance is a *prima facie* case for the instructions to become unconscious in order for conscious rules to naturally emerge.

[199] Brendan O'Regan-----

Group communications among artists has never been systematically explored. Teleconferencing creates an extended space net that crosses time zones as well as cultural boundaries.

Two examples of the several forms this kind of communication could take:

- 1) **Artist-Artist Networks:** groups connected on the basis of common aesthetic interests.
- 2) **Mentor Networks:** an extension of the open-university concept wherein the possibility of “students” apprenticing to artists could be facilitated without regard to limitations of time and space. Not only would it “educate.” but would also allow artists to be anywhere they choose.

[210] Gillette-----

Re: the open university analogy, I can conceive of some kind of subscription which would permit the subscribing individual or institution (art institute, museum, think tank, university, gallery, etc.) to tap into the active exchange of participant signal traffic and receive summaries and update reports on the state of the game.

[211] Gillette-----

How effective or appropriate is the analogy drawn from Hesse’s *glasperlenspiel* (the bead game)?

The meta-space of the computer exchange (the pausing, phasing, the rhythm of the waiting, the receiving, the sending, the waiting again) is formidable in part because the terminal itself is so self-unassuming—all one’s perceptual habits are somehow affected by the “typewriter” look, e.g., all this meta-spatial exchange finally comes out on a single flow of two dimensions (in the strictest sense, three dimensions since paper has width) which is enough, mind you. But what it does require then is a set of constraints (contingency rules) that can be optimized in two dimensions but compatible with more dimensions and/or other flows of three or two dimensions.

Terms for description: (The work of Kenneth Burke, Michel Foucault, Ross Ashby are the resources that immediately come to mind.) A new kind of kinematic graph is what we’re groping for here—a mapping of the exchange of flow—to indicate its experiential novelty.

A modal unit is what is necessary, a unit of measure, of criteria analogous to the octave for the musician, the arithmetician's *double*, the geometer's *circle*.

In classical aesthetics the quest is for the elementary forms of intuition. How would such equivalence of the "elementary forms of intuition" be engaged as a common pool of criteria serving the tissue of contingencies that is *play*?

The scale of a thing/process refers to the number of distinctions within the system described.

Scale: The *distinctions* between identical parts is numerical. The distinction between non-identical parts is the degree, or measure, of difference.

There are parallels here to the laws of combination in geometry. The attributes of geometric space according to Poincare are: (1) It is continuous; (2) It is infinite; (3) It has three dimensions; (4) It is homogeneous, that is to say that all its points are identical to one another; (5) It is isotropic.

How analogous are these attributes to the meta-space or the epistemological playing field of this exchange? In a sense, these first primitive exchanges (about exchanges) are the beginnings of a natural history—complete with a future archaeology.

How do we arrive at common terms of description? For a start I would suggest distinguishing art from science. A definition of objective evidence in science is equal to evolution of a private sensibility in art. A new mythopoetic strategy would flux between the hard ("in the metal") evidence of the world's constituted parts and the "soft" private sensibilities of individual expressions of that world.

"The substance of man is obscure to himself" —Jacques Maritain

I think the first part of this three way metalogue could be an introduction of terms. To begin to restate the sentiment and mythic-key of Genesis at the next pass in the trajecting spiral.

Much of this, I *think*, has to do with a primal sense of play and conceptual alchemy. To rearticulate the mystery and terror of "being" at all, in the belief that anything exists at all, is the first realization of difference. As existence (in the character of human consciousness) posits non-existence, existence posits art and eternal search.

I take it that the kind of aptitude for what is called “verbal behavior” (which includes the acquiring of symbol-systems generally, such as music, painting, sculpture, dance, etc.) can be posited as the differentia that defines us empirically as our specific kind of animal. Such “arbitrary, conventional” symbol-systems have come and gone since the days of pre-history when our kind began developing these aptitudes, the ability to do so being grounded in the body as a physiological organism. This minimum equivalent of what in metaphysics or theology would be called “mind” or “spirit” would involve a social or collective medium. Anthropologists would assign it to the real of “culture” as distinct from “nature,” though in its primitive states the two realms might not look much different from each other, as adjoining things seen from a distance seem to merge.

As our terms for images, concepts, ideas, properties, attitudes, paradigms, perspectives, situations, processes, relationships, etc. took form, they became in effect a universe of their own. Also, the mediums using these purely symbolic devices made possible the kinds of attention and communication that gradually led to the invention and distribution of tools (with corresponding methods and attitudes). And thus we now confront the gradual accumulation of man-made new-things that constitute what we call the institutions of “technology.”

— *Kenneth Burke, Variations on “Providence”*

Certainly, as a proposition, the division between true and false is neither arbitrary, nor modifiable, nor institutional, nor violent. Putting the question in different terms, however—asking what has been, what still is, throughout our discourse, this will to truth which has survived throughout so many centuries of our history; or if we ask what is, in its very general form, the kind of division governing our will to knowledge—then we may well discern something like a system of exclusion (historical, modifiable, institutionally constraining) in the process of development.

It is undoubtedly, a historically constituted division. For, even with the sixth century Greek poets, true discourse—in the meaningful sense—inspiring respect and terror, to which all were obliged to submit, because it held sway over all and was pronounced by men who spoke as of right, according to ritual, meted out justice and

attributed to each his rightful share; it prophesied the future, not merely announcing what was going to occur, but contributing to its actual event, carrying men along with it and thus weaving itself into the fabric of fate. And yet, a century later, the highest truth no longer resided in what discourse was, nor in what it did: it lay in what was said. The day dawned when truth moved over from the ritualized act—potent and just—of enumeration to settle on what was enunciated itself: its meaning, its form, its object and its relation to what it referred to. A division emerged between Hesiod and Plato, separating true discourse from false; it was a new division for, henceforth, true discourse was no longer considered precious and desirable, since it had ceased to be discourse linked to the exercise of power. And so the Sophists were routed.

— Michel Foucault, *The Discourse on Language*

It is also clear that many of the tests used for measuring “intelligence” are scored essentially according to the candidate’s power of appropriate selection. Thus one test shows the child a common object and asks its name: out of all words the child must select the proper one. Another test asks the child how it would find a ball in a field; out of all the possible paths the child must select one of the suitable few. Thus it is not impossible that what is commonly referred to as “intellectual power” may be equivalent to “power of appropriate selection.” Indeed, if a talking Black Box were to show high power of appropriate selection in such matters—so that, when given difficult problems it persistently gave correct answers—we could hardly deny that it was showing the behavioral equivalent of “high intelligence.” If this is so, and as we know that power of selection can be amplified, it seems to follow that intellectual power, like physical power, can be amplified. Let no one say that it cannot be done, for the gene-patterns do it every time they form a brain that grows up to be something better than the gene—pattern could have specified in detail. What is new is that we can now do it synthetically, consciously, deliberately.

— W. Ross Ashby, *An Introduction to Cybernetics*

the problem, especially as it is by no means hopeless to expect to make a machine for really very difficult mathematical problems. But you would have to proceed step by step. I think electricity would be the best thing to rely on.

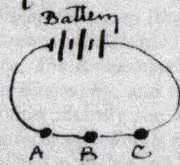


Fig 1.

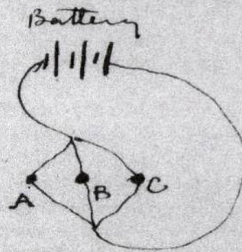


Fig 2.

Let A, B, C be three Keys or other points where the circuit may be open or closed. As in Fig 1, there is a circuit only if all are closed; in Fig. 2. There is a circuit if any one is closed. This is like multiplication & addition in logic.

Yours faithfully C.S. Peirce

Figure 3.1.1 A letter from Charles S. Peirce to his former student Allan Marquand contains the first known description of a switching circuit designed to perform logic.

[383] Gillette-----Notes on generating computer argot

1. This “aesthetic” activity is fundamentally no different from any other form of problem-solving. The question now is discovering and identifying the problems to be solved.
2. One of the resources of poetic license is to liken a thing to any other thing, or to “speak” of it as another thing. In simile and metaphor a thing is assigned to a class, allotted character, and likened to things other than those implied by the system of classification built into its private logic and argot. This is the case in all language. There are no a priori limits on what or how many metaphors can be made. Players may initiate *beginnings* of an infinitely complex, integrated web of multiplying analogy, metaphor, and trope. Each is directly related to its immediate and adjacent “neighbors” but uniquely different and etiologically separate from more distant paradigms. How to make this system aesthetically tangible and coherent to an observer outside the system is the first responsibility of its players.

The *raison d’etre* is a coherent, systematic structure directed at expanding the aesthetic-ideational range in this medium. Any attempt to impose a spurious unity (or clarity) on the parameters of interaction will elicit instead a pseudo-clarity at the expense of cutting into the marrow. At this stage of sophistication with the medium, this is the pre-dawn.

[387] O’Regan----- Re: 383-Cybernetics

What metaphors can there possibly be for such an activity? *Cybernetics* is an appropriate metaphor in that it distinguishes from *cybernetician* and from *cybernetics*. The activity is possessed of temporal and multi-channel qualities that seem to have parallels in Wagnerian counterpoint. Is it possible metaphors are capable of imparting richness to the referred? Here, all metaphors seem weaker than the thing itself.

[391] David Ross-----

Introduction of any new medium necessarily results in a new field of metaphors. Here we have to deal with dialogue woven into participants' lives, not as with the hated telephone intruding into consciousness. This presents a radically new way of communicating that is genuinely novel. Our primary task is to elicit the quiddity of the medium at hand.

[396] O'Regan----- Re: 383

The beast is the on-going issue and its capacity to bend all areas of discourse. We are not bombarded into the familiar landscape of full blown presence. We are deprived and enriched at the same time, hence the discovery of unfamiliar capacities.

[397] Gillette-----

Kenneth Burke introduced the idea of "perspectives by incongruity." The unity of incongruity, I think, is "in the metal" of this system.

[401] -----

The simplest structure in any cybernetic/cybernautic loop is the "kinematic" flow between three variables which are invariables in their permanence:

1. living systems
2. machine systems
3. theoretical systems.

This is the *first* division.

[405] O'Regan-----

Postulate a tracking process wherein participants pursue all related lines of thought and their respective logics.

[410] Gillette-----

I think it's something like this. Each player functions as heuristic filter generating transforms in tandem with others in identical conditions. Radially structured and non-linear, we are as collagists with the ideational debris of Western culture, engaged in *pattern*

creation with the natural parameters of *this* technology read as a set of contingencies and constraints. In other words, *nature*.

[416] O'Regan-----

No one has anything but cute analogies for why synchronicity actually occurs. In truth, it does, bound by rules we rarely get the opportunity to explore. This tool provides a time-series method for generating and analyzing such phenomena. I suspect such concurrences are more mediated by the right hemisphere than by the left.

[423] Ross-----

The implied narrative that follows the randomized sequencing of our thoughts reads as a topology of a *shared thinking experience* more like a group of dreams edited by another dreamer than anything I can reference.

[453] Gillette-----

This is in some ways like Eliot's concept of "difficult poetry." "First, there may be personal causes which make it impossible for a poet to express himself in any but an obscure way... or difficulty may be due to novelty."

[469] O'Regan-----

Deprivation/enrichment is that process which deprives us of normal cues. It activates the new one that we must pick up in order to get in tune with what the *others* are doing/thinking/about to type. This is the essence of the way in which the medium can serve to extend our normal capacities.

[528] Richard Chilgren-----

Glossary Index:

- pre-dawn
- unity of incongruity
- kinematic
- cybernautic
- tracking

- transformation/order of transforms
- heuristic filter
- pattern creation
- difficult poetry
- baby talk
- Finnegan's Wake

[547] Gillette-----

The beginnings of a lexicon: towards the implicit identification and regulation of time-space sequences. This spirals toward transforms unanticipated. This system, in its generalized effects, equals in scale introduction of the clock in village cultures of late Medieval Europe.

[599] -----

This capability (linking, say, a half dozen museums in the United States and Europe) introduces a potential for simultaneous "shows" in a meta-sensory "space." It extends the participating museum's exhibition space without acquiring a single square inch of additional real estate. The means are generated, coded and sorted in the meta-sensory system; then rendered "sensory" in "showing" space, therefore existing in *infrastructural suspension*. Possible tableaux are suspended among museums with each terminal in conformance to the players' affects. *How* this space is programmed is the issue.

I'm dubious of linking art to education, despite the justifiable implications. Their respective motivations are distinct. They are connected ceremonially, but educational benefits and evolutionary adjustments should be a consequence of this species of activity.

[877] Ross-----

It is interesting that one has to objectify parts of our face to face communication that we receive via body language of one sort or another, into the realm of the private message. When a dialogue is ongoing, I continually feel the need to contextualize my public statements with particularizing private messages, like facing a

group and continually changing one's attention while speaking and listening.

III ————— messages numbered between 879
and 965

[879] Gillette-----

I think new manifestations of each of our kinesics will eventually emerge: verbal constructs replacing eye-contact, for instance.

[893] Ross-----

To quote the great Ray Johnson: "Collage or perish!"

[940] Gillette-----

The following "random" points are intended to serve as a radical-traditional prolegomenon for cybernautics:

1. The teleconference is characterized as meta-theater (theater in the sense of a place of action; a field of operations) in which various methodologies employ paradox and inversion *in seriatim*.
2. What is necessary is that, in a natural variety of ways, the work embody, accord with, and represent the precise experience upon which it depends. Its "communicative" efficacy is not a separate concern, and if treated as such it would risk a fatal effect upon serious work.
3. Each player (or conference) represents a private "world" or perceptual/cognitive activity, the activity is displayed and demonstrated in the process, not reported. Two central questions are: How does this technological system generate its own distinct aesthetic milieu? What is the common particularity novel to the experience?
4. The teleconference can be defined as a network of multiple connections, involving complexity, order, and hierarchy. Any private world of perceptual/cognitive activity depends upon self-defined comprehension of the whole. It can function as the theater for establishing root metaphors and analogies introduced by the unique conceptual pressures encountered in the teleconference itself. For instance, adapting ordinary language, in addition to various specialist lexicons and argots, to

the novel purposes of this activity. For instance, translating certain mythical forces from their lost redemptive power to a redefined descriptive power.

5. Taking off from the physicist Margenau's concept of the "Requirement of Multiple Connections" the premise is that through their definitions, constructs enter into relations with each other. The interest here leaves aside, at least for the moment, the origin and focuses on the character of the connections which constructs may enter (each conferencee represents a constellation of such constructs). These may be of two types, *formal* and *epistemic*.
 1. A formal connection is one which sets a construct in a purely logical relation with another construct (construct can be read here as any message which defines a distinct point of view). They are in a sense hypothetical judgments. Classic examples of formal connections: a) the relations between geometric quantities and their axiomatic sources, or b) between the golden mean and its expression in a particular set of angles in a picture plane. One peculiarity of formal connections is that their formal character becomes less obvious (even transparent) when and if they are empirically verified.
 2. An epistemic connection is equivalent to and arises from a rule of correspondence which links the construct with data or evidence. Examples of epistemic connection: a) the relation between a tree and the perception of it b) between a force and an awareness of muscular exertion. One of the terms is a construct, the other is in nature. Connections are also both formal and epistemic in equal degree, as in any graduated experience, from empirical to ideational and back.
6. The divisions of formal and epistemic can be applied to the ordering of messages exchanged in this system. In some sense a new distinction between art and science may be defined when each is considered as a mental domain in the search of descriptive modes. To do so also raises questions as to the validity of the standard distinction of objective and subjective. For example, absorption in the immediacy of perception/

cognition is generally recognized as an essential characteristic of art, whereas the instrumental use of perceptions to infer and confirm theories is the typical mark of science. This system of exchange and hypothesis has the potential of synthesizing these two distinguishing attitudes.

7. The teleconference can be said to have a metabolism of its own. A sort of optimum harmony of process in exchange and synthesis achieving possible tiers of novelty with discontinuous "quantum" shifts establishing essential internal divisions.

[963] O'Regan----- Re: 940

1. Yes, teleconference as meta-theater. Any methodology is employed so that communication occurs in this medium. How do the terms "paradox" and "inversion" attach to specific modes of operation?
2. Where is the tautology here? We only go so far with the problem of a system describing itself. I am reminded of an old question in brain research: what are the limits of a system in terms of understanding itself? This point of view pre-supposes identity of mind and brain.
3. This is differently *distributed kind of intelligence*, different from almost any found in nature. One of the most novel particularities of this system is the existence of exponential channels of simultaneously operating dialogues. Our task will be to use, characterize, stimulate and display parallel-processing modes.
4. *Complexity, order, and hierarchy*: These three terms are minimal coordinates by which one defines simultaneity in the system. All three become involved, as the "themes" of any conference emerge, in addition to layers of sub-themes, some of which recur as others disappear. In the piece to date, the initial theme has been/is the piece itself, with the house-keeping theme of how to support it institutionally and financially. Various sub-themes have emerged and would be interesting to analyze, particularly time-lapse events. Multiple participation on several channels is a necessary threshold through which to pass in order to properly use the system.

5. The system abounds in formal connections, which are mostly transparent. Hence the difficulty in describing them or in not simply obliterating their significance by succession. I submit that this terrain is virtually devoid of metaphor.
6. *Immediate and/or remote perception*: This is one of the keys to the system. All the things we can think of applying the system to at this stage have probably already been done by conventional means. Depending on the order of complexity generated, we may arrive at new forms by linking this system for a new purpose.

[965] O'Regan On Being Formal-The Virtues of the Opaque in Times of Imm

In discerning the nature of inter-communicational forms in the medium of teleconferencing, it is necessary to distinguish three basic modes. These are:

The Formal Communication Mode:

The tortuous path, referenced and annotated, serves to stimulate the indigestibility of the formal mode. It is, nevertheless, the mode of considered substance, no matter how stilted it may seem upon recall. It is also the stuff of legend and synthesis, all of which matter to the *modus operandi* of genius at work. We have all been victims of this delicious infection. Even now I can hardly resist a reference or two myself!

The Live Communication Mode:

It is serially exhilarating to a degree unexpected in advance of the experience. There is the sense of quadrophonic logic, stage whispers, asides (!) not in the script—the excitement of interchange, the challenge of response, the *threat* of real time.

The Polite Interim Response Mode:

But what to do when called to the cry of the hunt? Etc. Or at the arrival of ten feet of Wittgensteinian condensation? The polite—interim response mode allows the receiver to punctuate the sender's demand with a holding pattern and absorb the urgent message.

IV ————— messages numbered between 970
and 1128

[970] Gillette-----

In regard to Brendan's trinity of modes (with its implicit critique of certain Wittgensteinian techniques)—a re-working of standard "living" descriptive vocabularies (aesthetic, scientific, mystical, logico-mathematic, etc.) can do more for a fresh comprehension of the "curious impending overall synthesis." *This* is in the core of the matter. The exchange activity itself is either an activity resistant to definition or an activity extremely tolerant of definition, absorbing and transferring these into its own substance. The specter of failing at maintaining this inverse and paradoxical harmony of resistance to definition and wild tolerance of definition is in a line from Wallace Stevens: "Sentimentality is a failure of feeling."

As for Brendan's "delicious infection"—I would (driven as it drives me) draw on, in full flush of reference, my very last Kierkegaard:

The individual becomes conscious of himself as being this particular individual with particular gifts, tendencies, impulses, passions, under the influence of a particular environment, as a particular product of his milieu. He who becomes thus conscious of himself assumes all this as part of his own responsibility. At the moment of choice he is thus in complete isolation, for he withdraws from his surroundings; and yet he is in complete continuity, for he chooses himself as product; and this choice is a free choice, so that we might even say, when he chooses himself as product, he is producing himself.

I submit the following as entries in the glossary for this exchange. The connections between these words stem from intuitive contagion, and not necessarily a strict adherence to formal definition. They are essentials (in the cybernetic sense) as transferable to cybernautic activity.

- *message*: composed of various ratios of information and noise.

of my cacophony will lead away from chaos and incoherence/triviality and toward the great goddess of proto-responsibility.

[978] Gillette-----Re: Brendan on 940

—As to the appropriateness of “paradox” and “inversion” (from as classic a source as the Bible no less) is the correlation between two distinct remarks. Genesis: “...In the beginning was the word.” and the apostle John: “...and the word was made flesh.” This is the stuff of paradox and inversion, especially when you consider the ration of letters in most alphabets (22–26) and the chromosome ration in genes (21–26). This may be an extreme range and may include fictional documentation, but it is appropriate enough.

[981] O'Regan-----

On language/inversion/paradox: in the Hawaiian vocabulary there are 33 different ways to indicate a cloud, 179 terms about sweet potato alone, 225 words about the taro plant from which poi is made!

[991] -----

Issue alert! Message 1000 is approaching, a first time with me on this system.

[1000] Gillette-----

This is the millenium message, in pursuit of the millenial, poised with dispatch and referential clarity to resist all attenuation of mystery resulting from the shibbolith of our epoch: the drive toward the cosmic “quick fix.”

Energy is eternal delight

[1001] O'Regan-----

As 1001, I am glad the computer does count beyond 999. We never went this high on any conference before. Thus we didn't know what it was programmed to actually do: play Beethoven, a Mexican Samba, or an Irish jig.

[1005] -----

I'm here in Honolulu with Jim Dator, head of the Alternative Futures Project at the University of Hawaii. Jim is involved with many computer networks and is presently organizing a conference on science, technology and the future in Berlin. Jim wants to pose the following questions: Is science only a Western mode of knowledge? How does science as an activity change in response to new cultural pressures? What work is being done to articulate new needs and modes of inquiry in the sciences?

[1128] -----

On a more sinister level, the security of the entire world now rests on the controls of the just such systems, and isn't it time we explored the outer limits of this for its impact effect on communication? Such systems are integral to all security systems at the military level, and even this terminal you are all using has more sophistication than I think some of you realize, e.g., for manipulating more complex programs in larger computers ranging in use from banking to missiles.

D
 (1) A complex: $\mathbb{X}^{(n)} = (x^0; x^1, \dots, x^{n-1})$ consists of the main number: x^0 , and the satellites: x^1, \dots, x^{n-1} .
 Throughout what follows $n=4$ will be fixed.
 A complex $\mathbb{X}^{(n)}$ precedes a complex $\mathbb{Y}^{(n)}$, $\mathbb{X}^{(n)} \preceq \mathbb{Y}^{(n)}$, if their main numbers are in this order: $x^0 \leq y^0$.
 An n-sequence of complexes: $\{\mathbb{X}_0^{(n)}, \dots, \mathbb{X}_{n-1}^{(n)}\}$.
 If $0', \dots, (n-1)'$ is a permutation of $0, \dots, (n-1)$, then the sequence $\{\mathbb{X}_{0'}^{(n)}, \dots, \mathbb{X}_{(n-1)'}^{(n)}\}$ is a permutation of the sequence $\{\mathbb{X}_0^{(n)}, \dots, \mathbb{X}_{n-1}^{(n)}\}$.
 A sequence $\{\mathbb{X}_0^{(n)}, \dots, \mathbb{X}_{n-1}^{(n)}\}$ is monotone if its elements appear in their order of precedence: $\mathbb{X}_0^{(n)} \preceq \mathbb{X}_{1'}^{(n)} \preceq \dots \preceq \mathbb{X}_{n-1}^{(n)}$, i.e. $x_0^0 \leq x_{1'}^0 \leq \dots \leq x_{n-1}^0$.
 Every sequence ~~possesses~~ $\{\mathbb{X}_0^{(n)}, \dots, \mathbb{X}_{n-1}^{(n)}\}$ possesses ~~at least one~~ a monotone permutation: $\{\mathbb{X}_{0'}^{(n)}, \dots, \mathbb{X}_{(n-1)'}^{(n)}\}$ (at least one).
 Obtaining this monotone permutation is the operation of sorting the original sequence.
 Given two (separately) monotone sequences $\{\mathbb{X}_0^{(n)}, \dots, \mathbb{X}_{n-1}^{(n)}\}$ and $\{\mathbb{Y}_0^{(n)}, \dots, \mathbb{Y}_{n-1}^{(n)}\}$, sorting the composite sequence $\{\mathbb{X}_0^{(n)}, \dots, \mathbb{X}_{n-1}^{(n)}, \mathbb{Y}_0^{(n)}, \dots, \mathbb{Y}_{n-1}^{(n)}\}$ is the operation of meshing.
 1580 We wish to formulate code instructions for sorting and for meshing, and to see how much control-capacity they need and how much time they require.
 It is convenient to consider meshing first and sorting afterwards.

Figure 3.5.1 The first page of the first program written for a modern computer. Von Neumann illustrated versatility of the new machine by coding an operation central to business applications—sorting. He illustrated that program step by step in an appendix to his June 30, 1945, report on the design of Edvac.

[1187] Gillette-----

Art said Zola is a "corner of Nature seen through a temperament." We have a "field" of temperaments (variously

programmed) defining a spread of association and lateral inter-connection. Each temperament is amply supplied with its own endemic assumptions and intellectual habits bred by unique and peculiar methods and requirements.

Among them, in this case, is a susceptibility to a kind of meta-physical pathos, but all this is self-conscious prologue to what follows (in part a response to Dator's remarks on the status of Western science and the role of synthesis in actively generating unexpected paradigms from ancient traditions, art, science, technology, poetic speculation, fiction, politics).

1. Randomly the premise begins with the concept of *resonance* in form and in information. In *art* it is grounded in the quality of objective replica of the subjective (the privately felt). In *science*, the activity of replication equates with access to the structure of the thing itself, regardless of its division between subjective (privately validated) and objective (consensually validated) associations.
2. Science is associated with repeatable abstract operations and their consequent logical reasoning, while art is the articulation—the perennial restatement—of experience through *sensory* observation. The issue is to further distinguish these separate ways of knowing, with their respective attributes keying the opposing essentials towards the evolution of heterogeneity.
3. Paraphrasing Darwin—from an incoherent homogeneity to a coherent (paradoxically integrated) heterogeneity.
4. *Providing freedom from blind instinct.*
5. Paraphrasing the classical criteria of evolutionary change—descent with adaptive modification and origination of new types. *Type* is employed as the strategic pattern of *individuals*.
6. The pressure of constant modification effect differently the choice of “mode” and its subsequent methods. For example, in art: the evolution in sculpture through modification from Myron to Praxiteles. In painting, from Giotto through Raphael to Veronese. You cannot discuss these respective lines of development without, consciously or otherwise, commenting on certain aspects and attributes of, respectively, the Greek

and Italian cultures of their times. The pressures of modification emerge from the outside to effect the eternal interior of subjective *form*. In science, there is, significantly, much less of this in the truths it articulates, they being somewhat immune to the context of specific cultures (Lysenko notwithstanding), i.e., they are in some sense meta-cultural truths. Art (and its evolutions, senses, processes) is always imbedded deeply in its cultural conditions as it is effected and directed by specific individuals. Think of Galileo's problem of coaxing the Vatican to peer into his scope and observe the "impure" moons of Jupiter.

7. Art lives off the presence of paradox, and science tries to eradicate it. But paradox is illusive and subtle and moves elsewhere, like the writing finger, showing up in the most unexpected places without an alibi or sense of restraint. Hence the eternal dynamic of science.
8. In the highest expression of *art* the paradox is converted into a quality of mystery or awe or even enthusiastic wonderment (as in Blake, Rousseau, Rimbaud, Whitman). From the opposite side (according to Aldous Huxley) all art begins "with each artist" while science is externally dependent upon the evolution of evidence. Quantum changes in *art* are of a different internal character than science.
9. From the perspective of the Nominalist, an art (or Art) can have no existence apart from its concrete embodiments drawn from the receptacle of traits by which it is defined.

[1201] -----

Science, concerned with processes and "processing" is not properly concerned with substance (that is, it is not concerned with "being" as poetics and certain strains of art are). Hence, it need not be concerned with motivation. All I need know is *correlation*. The limits of science, *qua science*, do not go beyond the statement that, when certain conditions are met, certain new conditions may be expected to follow. In art, motivation is imbedded in discontinuity—conditions be damned.

[1207] -----

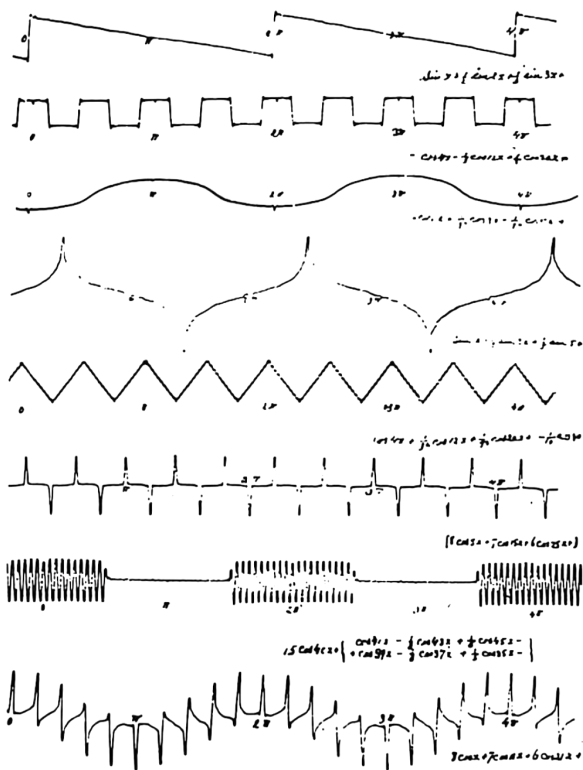


Figure 3.5.2 Curves drawn by the eighty element harmonic analyzer designed by A.A. Michelson and S.W. Stratton. This is an application of Fourier's principle of harmonic analysis. Roughly speaking, he proved that any continuous curve, no matter how irregular, can be approximated by adding together a number of simple regular curves.

To quote the indomitable Marianne Moore: "The power of the visible is the invisible." This is crucial to the art/science distinction. To quote her again: "dramatize a meaning always missed by the externalist." Too often weak "science" has to do exclusively with the external, while weak art has to do with the invisible having no apparent connection with the visible.

[1225] -----

More on the art/science dichotomy: scientific explanation of phenomena does not necessarily diminish the *mystery* in the universe, but it does not actively promote it either. That is the domain of art. Religion cultivates respect for it, but only art revels in it, taking it on in all its grittiness.

[1330] Charles Frazier-----The Paper Museum

Two images from Herman Hesse's *Magister Ludi* form the substructure of the following thoughts: the undefined physical structure of the game itself and the picture of the central character, Joseph Knecht, slipping beneath the glacial waters of the lake.

In a forward to the translation by Richard and Clara Winston, Theodore Ziolkowski described the glass bead game as "an act of mental synthesis through which the spiritual values of all ages are perceived as simultaneously present and vitally alive."

For Hesse the bead game was a symbol of the human imagination, not requiring a specific physical form, the game is the focal point of a province of the spirit called Castalia (the Parnasian spring sacred to the muses). Castalia is set apart from society. Culture is isolated from "reality" to develop in untainted isolation.

The fall of the Weimar Republic and the rise of Nazism caused Hesse to reject the separation of culture from the existing social reality.

Joseph Knecht, central figure in the novel and living *Magister Ludi*—Master of the Bead Game, eventually rejects the game as overly linear. Tragically this decision came too late. His ignorant body was not prepared for nature. He leaves Castalia to find work as a tutor and, following his pupil, dives into a glacial lake, realizing too late that a life of meditation has not prepared his body for survival in the simple element of cold water.

The older schools of thought that developed in China and Central Asia were balances between linear and holistic thought. This balance was expressed within the landscape through crafts and architecture. I am particularly drawn to China and Persia. Their arts express an extraordinary unity that is yet unformed in the society that I live in. There is a language of surface older than written or oral language. It is spoken by the body.

Jalaluddin Rumi told of man evolving from the crystal, plant, fish, bird, animal, man to angel: storing within the flesh memories

of all levels of life. In support of this holistic family tree is a basic proposition from Sufism:

In the realm of phenomena there are only connections without cause: no phenomenon is the cause of another. All causality is in the divine names, in the incessant renewal of their epiphanies. Thus identity of a being does not stem from any empirical continuity of his eternal hexeity. In the realm of the manifest there is only a succession of likes from instant to instant.

— Henry Corbin, *The Creative Imagination of Ibn ‘Arabī*

Islamic cosmological doctrine is structured on a profound understanding of the psychological behavior of man. This sense of unity is a manifold of conscious patterns constructed to correspond to the physiology and internal geography of the body.

[1581] Gillette-----

The teleconference seems to possess all the seeds for an authentically new species of *semiotic freedom*. This stage represents (in its first primitive forms) the invention of “terms” for another kind of conceptual diversity. The oscillation from metaphor to metonymy and back creates the beginning of *syntactics* (intuitions of possible links and permutations) and *synecdochic* thinking (the mapping of transforms into motives of search which translate “objects” into “events”).

[1658] Gillette-----Summing up cybernautics

1. In one fundamental sense the conference skirted with a dangerous mistake (made elsewhere often enough)—that is, to adopt or “take-over” a vocabulary from cybernetics or information theory and then apply it to problems and descriptive models derived from “mechanistic” sources and pre-existing motives. To adopt such argots and vocabularies is to adopt a different set of epistemological premises. If the “problem” itself were rephrased in cybernetic terms (and constraints) it may not exist (to be addressed) at all. Its mechanistic essence is resolved in the transition from one descriptive mode to another. It is a question of the relation between vernacular choice and a given perceptual belief, of disregarding assump-

into a given cryptogram E is equal to that of all keys transforming M_j into the same E , for all M_i, M_j and E .

Now there must be as many E 's as there are M 's since, for a fixed i, T_i gives a one-to-one correspondence between all the M 's and some of the E 's. For perfect secrecy $P_M(E) = P(E) \neq 0$ for any of these E 's and any M . Hence there is at least one key transforming any M into any of these E 's. But all the keys from a fixed M to different E 's must be different, and therefore the number of different keys is at least as great as the number of M 's. It is possible to obtain perfect secrecy with only this number of keys, as

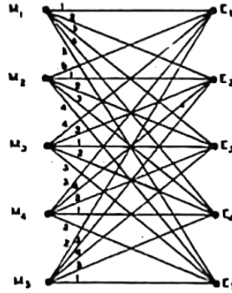


Fig. 5—Perfect system.

one shows by the following example: Let the M_i be numbered 1 to n and the E_i the same, and using n keys let

$$T_i M_j = E_s$$

where $s = i + j \pmod{n}$. In this case we see that $P_M(E) = \frac{1}{n} = P(E)$ and we have perfect secrecy. An example is shown in Fig. 5 with $s = i + j - 1 \pmod{5}$.

Perfect systems in which the number of cryptograms, the number of messages, and the number of keys are all equal are characterized by the properties that (1) each M is connected to each E by exactly one line, (2) all keys are equally likely. Thus the matrix representation of the system is a "Latin square."

In MTC it was shown that information may be conveniently measured by means of entropy. If we have a set of possibilities with probabilities p_1, p_2, \dots, p_n , the entropy H is given by:

$$H = - \sum p_i \log p_i$$

Figure 3.5.3 A page of C.E. Shannon, "Communication Theory of Secrecy Systems," Bell Systems Technical Journal (Oct. 1949).

tion in the shift, of not clogging the transition with immiscible entities.

2. We "players" have glimpsed the potential for a transcontextual resource "bank." Everything comes into play toward synthesis without stop (metaphysical, informational, epistemological). All is mulch, any given recapitulation, in turn, also mulch for

the next round of synthesis—paradigm, myth and symbolic system connected, disconnected, reconnected in permutating equilibrium. All is “post-ideological.” No single set of conceptual boundaries is considered unalterable, or immune from the second-order change.

3. “A poem is the dance of an attitude,” wrote Kenneth Burke, and the “players” are the chorus line.
4. Compared to Hesse’s monks and their bead-computer, this system represents the advance of *homo ludens* over *australopithecus*. The curve is asymptotic. It ranges from Duns Scotus to the “cut-ups” of William Burroughs. From occult grammars (Kabbalah, I Ching) to particle physics (quarks, quasars), yarrow sticks and Tarot in one sentient ball of wax. From the fundamental Vedantic notion of Sat, Chit, and Ananda (Being, Consciousness, Bliss) to schemes for paying teleconference rent.
5. It is germane to note that the linguistic root of the word *religion* derives from “reconnect,” i.e., from the Latin *ligare* and *religare*. We have barely scratched the surface on the issue of the contradistinct attributes of art and science. Their respective traditions, methods, and truths serve as a fecund nexus with which to begin again and fin again along the riverrun, whence it all begins again.

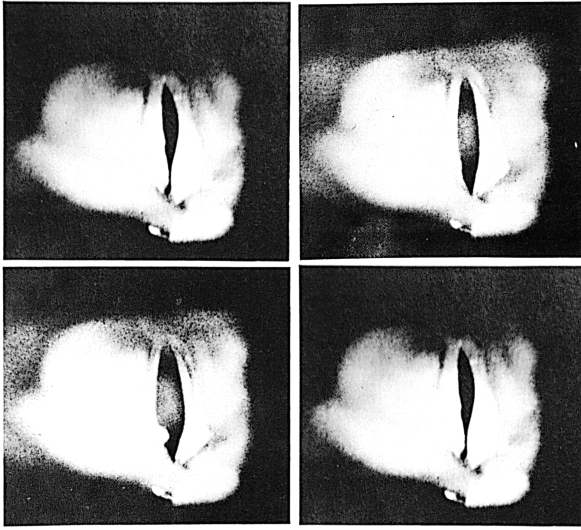


Figure 3.5.4 One cycle of vocal cord movement at low frequency.

I ————— 1/31/81 (Position Paper)

[1/31/81] Brendan O'Regan The Responsive Environment—An Expanded Concept

The majority view of the museum environment is that it is a “place” for art to be viewed by an audience. The majority view of the art work is that, whatever the medium or process involved, it is something “made” by the artist in some other location which is then brought to the museum environment to be viewed by others. Various attempts to break away from these accepted norms, whether in terms of the “happenings” of the Sixties, the “performance pieces” of the Seventies, or other departures from tradition in music and painting, are well known and documented. Only a few of these efforts can be said to have even attempted to embrace some of the possibilities inherent in some of the new technologies of the last two decades: The efforts of the Experiments in Art and Technology group and the Cybernetic Serendipity Exhibition are possibly the most well known here.

However, none of these projects or “movements” have ever specifically embraced the nature of some of the emerging technologies for their own special properties. Rather they “added them on” as an additional set of options for the artist, for reasons which emanated from the aesthetic text *before* the advent of these possibilities. There has yet to be any direct expansion of the aesthetic text that both stems from and embraces these new possibilities. Until this happens, it is unlikely that the level of “technological effect” will be transcended.

The present project both stems from, *and* is set directly in, the milieu of a special selection of the new communications technologies. Indeed, the grounds on which the selection itself is being made (which will be an inherent and on-going part of the various phases of the project) is itself part of a decision as to how the aesthetic text can be meaningfully expanded. Specifically, the

selection of technologies to date has been made from those which collapse the process of time, space and information.

At the outset, the capacities of each may appear familiar:

- The “instant” transmission of personal text across global communications networks, accessible now to everyone possessing a telephone and simple computer terminal.
- The immediate and semi-immediate two-way exchange of graphic imagery—from slow-scan still images to full-colour two-way video linkages, also global in extent.
- The expanded “augmented human intellect” of individuals or self-selecting groups that form the membership of the expanding global computer data and communications networks.

Each of these systems has its current *raison d'être*, both financial and functional. Separately, they each could have “application” to art in forms that are familiar to us. Few groups however have concerned themselves with implications and possibilities inherent in the emerging *synergies* of such systems operating in linkage between themselves, a multi-disciplinary group of artists, scientists and scholars and a specially designed environment capable of displaying and responding to the products of all three interacting on a global, real, *and* delayed-time basis.

Perhaps the only precedent for this set of possibilities comes to us from several disparate, though symbiotically linked, groups. One major group is the Defense Department in the form of the Advanced Research Projects Agency (ARPA) of the U.S. Army. Historically, it has been this group that has almost single-handedly stimulated and funded the development and creation of the first global computer network appropriately called ARPANET. This same search for expanded military options today is providing the thrust toward discovering the possible advantages inherent in linking high technologies with their:

- Capacity for memories with random-access to image and text, both moving and still.
- Capacity to provide “infinite” choice to the viewer/learner thereby allowing the ultimate in individualized learning of the operation/maintenance of complex classified weapons, or the terrain of foreign power’s secret bases.

- Ability to rapidly assimilate, cross-correlate, and abstract salient data from the works literature on any subject, in any language, at a speed which functionally collapses the research task from a decade of work to a day of retrieval time.

What kinds of characteristics do these uses have in common that differ significantly from how these expanded options may be applied to art?

1. The first and most obvious difference is that these uses are rooted in *teleological* concerns. The differences in capability between the various technologies are subdued to the achievement of specific purposes, deemed valuable to ARPA. This is in stark contrast to the attitude of “adding in” these capabilities for the artist.
2. The teleological goal produces the need for synthesis of the technological options. This leads to a *modus operandi* grounded in the idea of *experiential simulation* for the learner/interactors of complex situations that are otherwise unavailable. The simulation basis of these uses then serves as the context which attempts to draw forth a synthesis of integrated output from the technologies that smoothly interfaces with the needs of the human perception in the learning mode. (There is another aspect to this which we will deal with later: What is the impact on the human nervous system of this special kind of information environment?)
3. These uses have built into them an inherent sensibility to the highly individual nature of each potential user. They achieve this by attempting to provide a menu of options for entry/exploration of the system designed to interface with the anticipated need of the user. The sophistication of our ability to divine the proper structure of these options is only at its beginning stages—this relates back to the point made at the end of 2. In effect this is technological simulation of experience “in the hands of the user” as opposed to the “eye of the beholder.”

With slight changes in language, all three of these points could be statements about art, and yet these options have never been used for making art. It is true that small steps toward this have been taken from time to time by artists using various combinations

of video/assemblage technologies and media as well as art with primitive viewer-interaction built into it, thus moving, slightly beyond the “beholder paradigm” in art. However, the combinatorial power of the complex mix envisaged as the goal of this project has never been assembled to date.

As with the advent of almost any new technology, there are some new characteristics of these media-in-combination which must be given special consideration. Since these are new phenomena, they are hard to characterize; at first, they appear to be “invisible” but eventually they have the power to “make or break” the whole process.

Now we must explore something of the structural landscape of this cluster of disciplines, with the aim of outlining the elements of an epistemology of the aesthetic text that both stems from and includes the new possibilities in technologies that collapse space, time and information.

We shall see very shortly that any attempt to articulate an image of the operations—actual or potential, of what we shall from now on refer to as “Space-Time-Information Collapse” (STIC) technologies—will require some use of terms from disciplines that concern themselves with complex phenomena, network and systems phenomena, neuro- and psycholinguistics, and artificial intelligence. In addition, we will need contributions from philosophy, logic, and aesthetics. To some this may provoke a raised eyebrow as it would appear to be a list that is spread over a terrain where the ice is very thin and the water terribly deep. However, this has always been both the curse and the strength of the field of cybernetics and the many other disciplines it has either spawned or influenced.

[1/31/81] Brendan O'ReganTeleconferencing User Characteristics: Usage

As with any system of communication, there are procedures to be followed if effective communication is to take place. Computer teleconferencing is no exception. There have been enough people on sufficiently diverse groups of systems at this point so that some rather general observations can be made about their behavior, this difference between “good” and “bad” uses of these systems, and most important the kinds of conditions that need to be established if effective use is to A) occur, B) continue for a reasonable length

of time and C) reach a level where it is possible to achieve specific goals beyond the task of “mastering the system.”

In our case, all of these aspects need to be addressed with an even greater degree of discernment than usual because unlike other types of groups, who remain largely as message/data users, our specific need is to evolve uses beyond this level, to include the aesthetic, artistic, philosophical and even spiritual realms. This will require facility beyond the norm—for at least all of the organizers, if not indeed for a significant portion of those ultimately chosen to become part of the Whitney Communications Project.

To begin to grasp what these distinctions may mean, let’s look at some of what is now known about the “norms” of teleconferencing. The following statements are abstracted from the book: The Network Nation: Human Communication Via Computer, Chapter 3, “Social and Psychological Processes in Computerized Conferencing.” Summarizing findings about social/psychological processes on computer networks, Hiltz and Turoff write:

1. Users evolve specialized norms with respect to the use of the facilities, communications and writing style. The acquisition of these norms by individuals/groups appears to be an important learning process on such systems.
2. User participation in conferencing in an active sense of contributing items seems to require some degree of usage above the basic level of learning the mechanics. This may be a second-level learning plateau related to established norms.
3. Users will gain facility as time passes, so that their input rates become higher than usual typing rates. For large groups, the time required to send and receive communications will drop below that required for other media, such as telephone or face-to-face meetings.
4. The user’s short term memory may be a factor in conditioning frequency of interaction with the system, Users tend to become conditioned so that, on the average, they have about 7 items to send or receive per interaction.
5. In accordance with social exchange theory, no participant will continue to use a conferencing system unless “rewards” are greater than “costs.” Among factors that increase reward for users are:

- a) Ratio of items received to items sent. This increases with
1) size of active group, 2) throughout rate of the system.
- b) Observable increase in skill and speed in using the system.
This improvement is related to the richness of the design
in terms of advanced features available to user once they
have mastered the basic mechanics.
- c) Importance of communication with system members in
comparison with communication with persons not on the
system; relative cost in time and money of other modes
for communicating with people on the system.

[2/6/81] Frank Gillette-----Re: System and Identity

We begin with practice. With the terminal, its keyboard, attendant software and ancillary systems. The first question: How does a method originating in art engage the full range of possibilities concealed and emergent in this technology? It is now clear, even a commonplace, that art has not confronted this kind of pragmatic palette in its entire history. The second question: What is the continuous "spindle of necessity" streaming through and connecting art's ways-and-means *and* the teleconference system, irrespective of discontinuity in technical means?

Tacitly, each *player* in the teleconference is immediately faced with the task of establishing/developing an identity, or characteristic signature, reflecting his interaction with the terminal and its extensions. To this end I choose to adopt Levi-Strauss' *bricoleur*, the attitude of mind it represents being somehow oddly suited to the initial conditions of teleconferencing. Levi-Strauss' *bricoleur* is preliterate, this exercise in *bricoleur*ity is *postliterate*. This position is introduced in response to the swelling aggregate of perspectives, hypothesis, and sheer data that is infinitely expressed and embodied in various spectrums of dissimilar media across dissimilar times. It implies a new integrative stance towards all "texts" which regards them singularly as mulch, fragments, partial views, specialties, trapped within the contexts that instigated their respective existences and affects.

The *bricoleur* intuitively seeks out a *totemic* logic with which to counterstate the world in new terms of description, i.e., the *bricolage*. He assumes the primitive nature of the teleconference system in a reflexive exchange with its numerous modalities and contents. He perceives the network of players to be a collective "savage mind" evolving a new "science of the concrete." The *bricoleur* endeavors to precisely order, classify and arrange the peculiar minutiae of the immediate experience of teleconferencing.

The compelling feature of the *bricolage*, as a distinct way of knowing, is the apparent ease with which it enables a preliterate (or non-computer literate) *bricoleur* to create and establish satisfactory analogical connections between his personal (emotionally-

centered) life and the life of nature (or teleconferencing) instantaneously, without hesitation. A *bricoleur's* totemic logic weaves its *myth* in order to move effortlessly from one conceptual territory to another, in order to contain and transvalue the helter-skelter of alternative explanations and an expanding inventory of *fuzzy sets*.

We begin with testing “concretely” the potential range of metaphor and metonymy the system can bear...We move from the “item-centered” (or *phonetic*) world (in art: the *object*) into the “relational” (or *phonemic*) one (in art: the *process*).

[2/7/81] O'Regan-----

The notion of bricolage from Levi-Strauss is apt here in many ways, and it could be particularly appropriate if we were confining ourselves in this project to the teleconferencing process only. For now we are concerned with a shift from product to process—the process of arranging into structure the odd minutiae of the immediate experience, but also the process whereby the nature of these expanded media, via their very special interaction with human neurological process, serve as filter and amplifier of our output/input.

Picture this as a primitive but multi-headed Turing machine in which the distinctions between minds creating input are blurred by the manipulations of software. This is akin to the new functionalist school in philosophy, whereby analysis proceeds from a consideration of how the hardware (biological, micro-processor, what have you) is organized and not the nature of the hardware itself. This school attempts analysis of the world on the basis of how information in the world is organized, and attempts equation between similarly organized systems—whether animate or inanimate. This strikes home with the vitalist in any of us, but it also raises the ghost of Turing and even the spectre of Godel, Escher, Bach with its reductionist preferences.

Frank, would you please enter the etymology and genealogy of the word aesthetic? My memory is that it comes from *esthetikos* meaning “sense perception.” Could we break it down further? Another point: it is typical of philosophies of aesthetics to articulate terms and systems considered independent of the brain/mind system. Usually, the mind=brain identity is heavily embedded and then forgotten. I will argue throughout that there are real dis-

inctions of process between variously accessible conscious states, and that these systems induce significant alterations of state, the process nature of which we should attempt to elucidate as we proceed.

I am not certain how the phonetic/phonemic distinction which follows Jakobson et al applies in identifying a conference as a language. Shouldn't we be referring to "discourse" rather than using linguistic and specific semiotic systems references? I am not sure how the process of teleconferencing establishes this high order of "cosmicity" and "ambiguity." Eco's limitation is to have such a rule dominated semiotic system (model) which is unable to deal with ambiguity and "non-narrative" art (read: outside of an established code). I am not certain, to follow your references, how "the rule breaking roles of ambiguity and self reference are organized into an aesthetic ideolect." Since ideolect presumes a language, what's the language, and what do you mean by aesthetic?

[2/8/81] Gillette---Re: On the Mnemonics of the Beautiful

As players in the evolution of this medium we are its pre-computer literates. This is a natural setting, however, for the application of art's totemic-logic system of reciprocal connection, which exists in direct opposition to the secular, positivistic and scientific employment of the present technology. The problem introduced to teleconferencing (and its extensions) when it is treated as an aesthetic medium can be located "historically" as the current manifestation of the eternally returning interrelationship between *art* and *techné*. The essential question is: What will it take for teleconferencing to evolve its own peculiar vital character and nuance?

Positioned within the aesthetic domain, teleconferencing becomes a medium of extreme potentiality. This is the immediate *lex eterna* governing a beginning discourse on the subject. Teleconferencing's present technical configuration is exclusively textual. But it is potentially *textual*, *imagistic*, and *diagrammatic*.

[]----- Re: Phonetic and Phonemic

The digital aspect of the *phonetic* and analog aspect of the *phonemic*: the matrix of players are like points in a pattern. Each point in the pattern is an ever growing/changing assembly of

statements, some shared by other points in the matrix and some unique. *Phonetic* differences between two sounds only become actively meaningful to the native speaker when they coincide with the *phonemic* structure (points in a pattern) of the language in which it occurs. The players will assemble a shared (common) “language” as points in the pattern intersect. Meaning in this instance stems from the contrasting or oppositional patterns of its phonemes. The potential in teleconferencing is to develop new (regained) meaning from the contrasting or oppositional (totemic) pattern of its players.

[]-----Re: Difference and Resemblance

...the operative value of the systems of meaning and classifying commonly called totemic derives from their formal character: they are codes suitable for conveying messages which can be transposed into other codes and for expressing messages received by means of different codes in terms of their own system.

— *Levi-Strauss*

No one can observe the difference, say, between a Cimabue and a Massaccio and fail to perceive, and to feel, what *freedom* must have meant to artists in the Cinquecento. Likewise, at some undetermined future point, an observer may perceive and feel the novel freedom resulting from the quantum paradigmatic shift in the balance of forces and dynamics governing the engagement of *art* and *techne*. A body-of-work in the domain of art is actually the successful introduction of a class of private objects or processes as archetypes of general laws, i.e., private encoding of the general. The *techne* of our current epoch complicates the issue of a “class of private objects” and their aesthetic encoding. This new technical complexity is the semiosis, the aesthetic function of the process nominally experienced.

...introversive semiosis, a message which signifies itself, is indissolubly linked with the aesthetic function of sign-systems.

— *Jakobson*

As “introversive semiosis,” art appears as a means for inter-connecting messages in order to produce “texts” (private objects/processes) in which the rule-breaking roles of ambiguity and self-referencing are organized into an aesthetic idiolect. Semiotically, ambiguity is defined as a mode of violating the rules of the code—to paraphrase Eco. Thus the fecund realm of *paradox*: an aesthetic idiolect peculiar to the work of art, which induces in its audience a sense of cosmicity—of endlessly moving beyond each established level of meaning the moment it is established, of continuously transforming “its denotations into connotations.” (Jakobson) (This also relates to Barthes’ account of connotation as a second order system of signification based upon denotation, involution, self-reference, discontinuity, ambiguity, transcendence, paradox: the stuff of art.)

[2/10/81] []-----Re: Aesthetics

Aesthetics is a loaded term. But none-the-less it is a critical issue in the teleconference discourse. It lost currency when it became exclusively associated with the formalist view of art developed by the students and followers of Croce. I have employed it deliberately with a view to igniting it in its original axiological sense. The origin of the more commonly held (and narrow) conception of aesthetics is Baumgarten’s Aesthetica (circa 1750). Here (in Baumgarten and most modern aesthetics) it is defined as a logic of imagination, a science of the “dark ideas” known by the senses, in order to supplement logic, the science of clear and “distinct” ideas known by the mind. From a contemporary (and ancient for that matter) point of view, this distinction (between dark and clear ideas) is quaint and a trifle unworkable; but by limiting the study of aesthetics to art and by defining it in so normatively narrow a fashion, it did succeed in developing a body of criticism of taste.

It is against the inertia of this conception of aesthetics that any re-introduction of the term must compare. Kant was probably the first to object to the emasculation of the term. He protested against Baumgarten’s use of the word and applied it in accordance with its Greek etymology (perception by the senses, especially by feeling, seeing, hearing, etc.) to the “science which treats of the conditions of sensuous perception.” (Baumgarten’s narrow application of the term established itself nevertheless and both meanings have

persisted sort of independently. A third independent meaning, at once more narrow and more wide than Baumgarten and Kant, was introduced by Schiller in his Letters on the Aesthetic Education of Man (circa 1795–80). It is narrower because it refers not to perception in general but to one distinctive mode of it in particular. It is wider because the field of operation is not confined to art; this mode of perception can assert itself in response to anything whatsoever; art is a special case within the general field, though it is peculiarly and specifically designed “to call forth” this response. Schiller’s meaning is wider in another way too. It implies that aesthetic perception involves the whole personality. Sense-activity it certainly is, but its distinctiveness lies in the brief harmony of all the functions of the mind, feeling and thinking both, plus the fusion of both with transition states. Schiller further defined it as a state of precarious but infinitely fruitful equipoise, and as the way things dispose themselves when they are *contemplated for their own sake*, without reference to purposes, ends, causes, etc. Schopenhauer evolves Schiller’s conception further as the aesthetic in the world’s will: i.e., the aesthetic is one way among others of being related to things. What results from an aesthetic encounter, so defined, is knowledge, not mere pleasurable sensation. It is at once a detailed and intensely clear grasp of intuitive knowledge of the object/process nexus in its stark uniqueness.

[2/11/81] O'Regan----- The Responsive Environment

...Time and space are modes by which we think and not conditions in which we live...

— *Einstein*

A prologue to this medium must inevitably be drenched in all its possibilities if it is to achieve significance beyond the selection of one strategy. (E.g., “*bricoleur*ity”—as with much of Levi-Strauss, it is more his method than his data that attract attention. This method here may sometimes compensate for less than nonserial immersion in the perceived distortions [relative to literate norms] imposed by consent to signal each other via the media of space-time-information-collapse technologies. What is the signal, and where is the analogue? How do we differentiate phonemic units, and how do they combine to form the “phonetic”?)

Recall Weiner’s cybernetic injunction that the most sophisticated intelligent machine would allow digital process to be controlled by the softness of an analogue overlay—that higher form of “fuzzy set” which in its plasticity allows the hard edges of precision to be directed toward non-zero set of possibilities. Herein sleeps the slumbering giant of teleonomy’s analogue targets. Add too the movement toward invisibility of “causes” throughout these complex, interacting networks, whose “drivers” should all fool Alan Turing into thinking their desire for lunch was more than a clever program.

Here we begin work with the hierarchy, structure, and difference between *autopoiesis* structure/organization maintaining homeostasis and *allopoiesis* (homoeostatic operations leading to products other than the system itself) and apply our distinctions to how first-order cybernetics/aesthetics [of observed systems] lead to and impose order on second-order cybernetics/aesthetics [of observing systems].

[2/11/81] [] First and Second-Order Aesthetics: Perception and Process

Adopting Von Foerster's distinction between first and second-order cybernetics, it could be argued that there is truly first-order aesthetics, distinct from second-order process in relation to observed systems. The distinction, however, is worth maintaining since it precisely delineates differences between traditional "abstract" definitions of aesthetics as objective order "out there" and more recent, complex traditions, e.g., Schiller/Schopenhauer who express themselves in terms of a balance between the senses, intellect, and cognition of the world via the axis of *auto/allopoietic* poise of mind and object. This Romantic restoration of perceptual process is necessary for any analysis of consciousness and aesthetics and only makes it more apparent how philosophers ignored this territory which now invents data on instinct, variations on form and process of unconscious and preconscious states, as well as matters of poise between cognitive awareness and interactive acceleration possible with this technology. The terrain is less and less suitable for "objective" examination with the recognition that this interaction makes possible novel process states, continually modified by the self-referential capacities of the technology: a Nietzschean dilemma transposed. All is less forbidden, because *even* more is permitted with higher frequency before. This dilemma was foretold by the poets and prophets of the 19th century, but these forms represent a discontinuity in kind only now operational.

[]----- Procedures on Assembling a Glossary

Glossary entries will be assembled throughout the conference in small groups of messages which will facilitate subsequent use via electronic editing. Thus they can be selectively deleted, modified, and added to by others. Later entries out of alphabetical order will be re-arranged to fit in sequence so that in the future (for display/demonstration purposes) the glossary printout can be recalled as an up-to-date document.

What follows is the first series of entries. The source is Mind and Nature by Gregory Bateson with additional information from The Cybernetics of Cybernetics by Heinz Von Forester. The terms entered here are chose on the basis of their relevance for the description of natural systems as a class which *includes* the existence of mind. Hence the base-value of Bateson's work. This choice relates to the nature of present systems as a special form of group

mind, now capable operating nature. Some members of the “artificial intelligensia” would, of course, argue from the functionalist view point that this system may not represent a conceptually distinct form but simply a different physical manifestation of an organizational form which already exists in intra- or inter-personal/ brain interaction/communication.

- *co-evolution*: a stochastic of evolutionary change in which two or more systems interact in such a way that changes in system *A* set the stage for the natural selection of changes in system *B*. Later changes in system *B*, in turn, set the stage for the selecting of more similar changes in system *A*.
- *homology*: a formal resemblance between two organisms (systems) such that the relations between certain parts of *A* are similar to the relations between corresponding parts of *B*. Such formal resemblance is considered to be evidence of evolutionary relatedness.
- *idea*: In Bateson’s epistemology, the smallest unit of mental process is a difference or distinction or news of a difference. What is called an “idea” in popular speech seems to be a complex of such units. But popular speech will hesitate to call, say, the bilateral symmetry of a frog or the message of a single neural impulse an “idea.”
- *information*: any difference that makes a difference.
- *stochastic*: (Greek, *stochazein*, to shoot with a bow at a target; that is to scatter events in a partially random manner, some of which achieve a preferred outcome.) If a sequence of events combines a random component with a selective process so that only certain outcomes of the random are allowed to endure, that sequence is said to be stochastic.
- *cybernetics*: (Greek, *kybernetes*, steersman; Latin, *gubernator*, governor.)

Cybernetics is a word invented to define a new field of science. It combines under one heading the study of what in a human context is sometimes loosely described as thinking and in engineering is known as control and communication. In other words, cybernetics attempts to find common elements in the functioning of automatic

machines and of the human nervous system, and to develop and a theory which will cover the entire field of control and communication in machines and living organisms.

— Norbert Wiener, *Scientific American*, November, 1948.

- *first order cybernetics*: the cybernetics of observed systems. second order cybernetics: the cybernetics of observing systems. (Cf. Heinz Von Foerster, The Cybernetics of Cybernetics, University of Illinois Press, 1974.)
- *teleology*: the notion in evolutionary theory that purposive behavior can act as a causal agent in the structuring of systems. The term generally refers to goal-seeking behaviors.
- *teleonomy*: A more recent view of teleological process which suggests the goal-seeking may occur via a systemic network of possible processes, rather than “naive teleology”—aiming straight at a recognized goal.
- *autopoiesis*: In cybernetics, this is a special case of homeostasis in which the critical variable held constant is the system’s own organization.

[]----- Responsive Environmental Technology

There is an interesting group of people already on EIES whom we can tap for useful information on new technologies that can be added to create the basic module for artists to engage at a sophisticated level. I have been conducting my own search with these people, identifying new ones, following leads and so forth. I can continue to do this individually and transfer particularly appropriate messages, or we could initiate a technology conference of our own to tap this network directly and achieve a much faster precis of what is known. I gather that there is a public conference on “Telecommunications and the Future” which I have not had time to check out yet.

[2/12/81] Gillette-----Re: The Miraculous Multiplex

If the player’s indulgence prevents his advancement to a significance beyond his *bricoleur*ity (or one derived from the medium’s “drenching possibilities” (O’Regan 2/11)) then it is a failure of

the particular player that is up to question. This perceptual/cognitive approach is one of several methodologies to simultaneously generate and negotiate a great stewpot of conceptual systems, metaphors, analogies, lexicons, paradigms, mystic symbols, ancient hunches, jargons, worldviews, other methodologies and classifications that are the sub-structural mulch for a more refined methodology in the future. A refined methodology is akin to the "miraculous multiplex," (Wallace Stevens) i.e., a set of shaping principles of generation and cohesion to process and order all the vectors of depictive/descriptive proliferations flying in every direction.

[]----- Re: On the Teleconference as a Special Case

There is a general law of systems which when paraphrased states that increases in a system's complexity brings about step-wise, discontinuous increments in its functioning. The essential fact to grasp is this: these increases are not predictable. To stay alive the given must point beyond itself. Language is like the river: You can't step into the same word twice. The very idea of intellectual discipline itself is subject to the Roshomon effect. Teleconferencing addresses this mobility, variability and discontinuity as a haptic maneuvering about the "miraculous multiplex" continuously re-adjusting itself. "...rooted uselessness...makes imagination live," says Barthes meditating on the Eiffel Tower. Cassirer asserts that "the building of intuitive reality begins when the continuous flow of sensuous phenomena begins to divide."

[]----- Three pairs of epistemic division:

1. Heidegger's distinction between *calculative* and *mediative* thinking (or language).
2. Jakobson's distinction between *referential* and *aesthetic* use of language.
3. Kenneth Burke's distinction between *symbolic action* and *non-symbolic motion*.

All three are separate ways of applying strategy within teleconferencing. (Brendan's message: its "drenching possibilities.") A central axis in the developing motif index is the arch-notion of a division of experience into fundamentals and/or irreducible

grounds designed to distinguish one kind of thing (sensation, experience) from another. The “symbolic act” of division: of introducing dualities, turbulence, difficulties in the form of a tableau (tableau is the actual adaptive variable of depiction/description(s) within the motif index).

[2/16/81] GilletteRe: To Invoke the Authority of the Ineffable ■

Northrop Frye, inveterate inventor of categories, speaks of classifications within the *iconography of the imagination*: these proto-categories in which the aesthetic imagination seeks to *prehend* experience. A particular player's method of prehension reduces to an actual subset of all possible iconographies within the encodable descriptive/depictive repertoire. From this vantage-point the teleconferencing system invites one to accommodate a less conventionally "disciplined" operating bias: one that chooses to accept the system's contrastive and oppositional potential (especially at the beginning). The player goes on to discover a novel form of "dialogue" (one that optimizes the parallel, co-equal novelty of the embodying technology). Heidigger, in fact, correlates excesses in the *calculative* method with the general state of technology (techne) itself. That is: They are inseparably intertwined. Following Heidigger, the *meditative* method can be employed as an antidote, or "counter-statement," to calculatively over-corrected techne. This is an expression of a way in which art *contains* science.

[2/17/81] []-----Re: Epistemorphic Difference

"The contour escapes me..." —Cezanne

Following the scholastic adage that whenever you encounter a contradiction you must make a distinction, the *bricoleur* submits Peirce's idea that beliefs are really rules-for-action. (The old chestnut *substance/attribute* distinction suggests itself as an initial division.)

William James (one hell of a pioneer in haptic maneuvering, if there ever was one) judges the truth of an idea by a measure of its "cash value." "True ideas are those that we can assimilate, validate, corroborate and verify. False ideas are those that we can not." What is the "cash value" of these teleconferencing methods?

Adopting James' notion of up-to-snuff "cash value" as a necessary criterion of index-acceptance with Nabokov's definition of art paraphrased as *the reality we extract from reality*: It comes down to yet another division combining the attributes of *universality* and *necessity*. *Teleconference-value* of an entry must perforce be subject

to a kind of natural selection based (in part) upon the pragmatic fascination it selects as "a reality."

Each "reality" opens upon the realm of the semi-factual, bringing into bas relief the epiphenomena of "factual" experience. "Meaning" (including desired "cash-value" ends) changes from the *first order pattern* "take" to subsequent *second order pattern* "expansions" generating an analogue of what the logician calls *factual conditions* (viz: one of the jointly *sufficient conditions* for a certain state or even *necessitates* that state of event. That is, what is *necessary* will have a way of meeting its *sufficient* conditions.)

[]----- Re: On the Making of Epistemorphs

The following originates with paradigm-fragments that have remained with the *bricoleur*, that have impressed themselves upon his intuition, having passed through the private filters of subjective validation. For example, from something as crusty as Hobbes' Leviathan this strange rhyme: "Words are wise men's counters; they do but reckon by them; but they are the money of fools." Here is another chard, another refracting "mind-facta" to rub against the Hobbesian assessment: "The words remained in his heart like a burning fire" and "because ye speak this word, behold, I will make my words in thy mouth fire, and his people wood, and it shall devour them." (Jeremiah 10:9, 5:14). Metaphors enfolding back on language are in a class by themselves because they speak with what they point at. This is especially acute when the messaging system is exclusively textual. Jeremiah and Hobbes both suggest a *cor irrequietem* hovering around the capacity for language, for words. They imply a restless discontent growing into anxiety over their apparent power.

[]----- Re: "The eye believes and its communion takes"¹

Problematically, art fluctuates between the optical and haptic. To receive a tactile sensation by simply seeing something vs. the haptic reconversion of the sensation: the felt is seen. Haptic is that element in the aesthetic experience that is grasped independently of optical-formal considerations (interpretations). Teleconferencing (as a network of bricoleurs) is haptic-simply incapable, as yet to seriously address the optical dimension. The felt in this case

is a mode of discourse: a collective text building up from initial definitions.

[2/17/81] James Harithas-----

I would be more at home in the agrarian, mytho-poetic thought of Ancient Greece which leads to the *Iliad* and the proto-philosophical speculations of Hesiod. I agree, however, that the *bricoleur* is an initial and, simultaneously, initiatory process, a means of entering the technology at the most elementary level. Greek thought and language provide a more sophisticated layering. *Bricolage* concentrates on use of the basic codes of duality, identity, analogy, and comparison; and in addition, the creative process of stream of consciousness, collage, other forms of relativism, and by extension, catastrophe models, puns, etc.

The question of how to use *bricolage* effectively as a machine language is still moot. I assume Frank means that any poetic analogy assumes a factual or philosophical reality within the discourse he constructs, where objects or objective statements function as metaphors. I'm confident there is no difference between our illusive aesthetic and our pure, haptic sense of reality.

[2/17/81] John G. Hanhardt-----

I have some questions on the use of linguistic and semiotic terminology which seems to define something other than what the textual production of teleconferencing suggests. If we are talking about the relation between communication structure of a text and its grammatical structure, there is no one-to-one relation between the two. We must establish a more general mode of textual analysis than that proposed by strict linguistic and semiotic models. The function which determines the textual process is its communicative function. Perhaps we should interpret texts as systems? Thus if we suggest that each system is a process directed through its function, then by extension the communicative function determines the textual constituents. Different types of texts differ through different types of textual function—not as dialects in relation to each other but as different processes which share in a network of interrelated components. The different components, manifestations, of this structure are correlated by the communicative purpose of different texts. It seems that telecon-

ferencing networks are engaged in this type of interrelatedness, and analysis is not based on particular linguistic properties but on more abstract features such as dynamics and cohesiveness.

[2/22/81] Gillette----- Re: On Similarity

...in their games, dreams or wild imaginings...individuals never create absolutely, but merely choose certain combinations from an ideal repertoire that it should be possible to define.

— *Levi-Strauss*

(James refers to association by *similarity* as the “electric aptitude for analogy.”) The act of linking together with the principle of “assonance” is in effect a grounding in an optimum density of reference where the processes of allusion arising from each referent intersect. Allusive economy evolves as the density of reference builds-up.

[2/22/81] []----- Re: Terms for Conference Glossary

Metaphor:

Metaphora consists in giving the thing a name that belongs to something else: the transference (*epi-phora*) being either from genus to species, or from species to genus, or from species to species, or on the grounds of analogy.

— *Aristotle*

[Metaphor consists in] the presentation of the facts of one category in the idioms appropriate to another.

— *Gilbert Ryle*

Metaphor is a device for seeing something in terms of something else...a metaphor tells us something about one character considered from the point of view of another character. And to consider *A* from the point of view of *B* is, of course, to use *B* as a *perspective* upon *A*.

— *Kenneth Burke*

However appropriate in one sense a good metaphor may be, in another sense there is something inappropriate about it. This inappropriateness results from the use of a sign in a sense of different from the usual, which use (is called) *sort-crossing*. Such sort-crossing is the first defining feature of metaphor.

— Colin Turbane

Metaphor is the genus in which the following are species:

- analogy
- trope
- metonymy
- synecdoche
- catachresis

[2/23/81] Harithas-----

I understand the *bricoleur* as one possessing a method of abstraction based on the use of psycho-social cultural debris, that is, on fragmentary experience from any information which by itself may be random or incoherent, as long as it is interesting to the *bricoleur*. The *bricoleur* reorganizes this information into myth, ritual, art, or medicine according to his specialization and purpose. This approach not only acknowledges as its own the medium of collage, but it defines the techniques used by the Surrealist. It explains the Surrealist use of signs culled from psychological processes and juxtapositions. Bricolage is the base method of Surrealist inquiry and later of Pop Art which deals with subliminal content more particularly.

This method seems too conveniently and literally dependent on memory, on totemic (i.e., atavistic and intuitive) forms of classification which in turn establish their need for inventories of various kinds. This is a limitation of sorts. I see art as being in essence virtually free from the strictures of memory (as for example the Abstract Expressionists) and as involved in a process which leads to creating through access to an expanded consciousness, one which occurs through the recognition or revelation of "something out of nothing." The artist may elaborate this "something" by transform-

ing it after the fact into a cultural artifact through the appropriate *stylistic* language or, alternatively, through some kind of figuration.

In other words, the artist does not simply have to establish formal systems which address social or mythological longings and aspirations; rather he develops a visual language based on his experience with categories of feeling which are untouched, unknown and "out there" beyond the reaches of memory but innate to some mysterious potential of the mind. This may be just a definition of expanded memory, but I prefer to think it is some biological source of the freedom necessary to the creative act. On the other hand, I do see virtue in experimenting with the memory systems of the computer, together with ideas about ideas, about art and various forms of teleconferencing. This may lead to astonishing results. It is obvious to me that the final work of art may be a collage which does not simply document an exchange of ideas, but one in which the information kindles the *spirit* through its expression of deep feeling and shades of feeling which are new to the human mindscape.

[2/23/81] O'Regan-----

I have recently been engaged in communication with Robert Heinmiller who is at MIT. There he manages the electronic mail communications system for the US Oceanographic Survey. This is a system of teleconferencing operations to approximately 900 ships all over the world. Apparently they make use of an unused NASA satellite. I asked him for information on their recently developed technique for sending imagery and graphics over EIES-like systems.

I think this information is of the greatest interest both for its conceptual implications for this project and as some source of ideas for the actual responsive environment technologies that might ultimately be part of assembling the museum of the future.

[2/23/81] Gillette----- Re: Sort-Crossing and Bricolage

Every message is made of signs: correspondingly, the science of signs termed *semiotic* deals with those general principles which underlie the structure of all.

— *Jakobson*

...Human beings communicate by non-verbal means which must consequently be said to be either non-linguistic (although the mode of language remains formative and dominant) or which must have the effect of “stretching” our concept of language until it includes non-verbal areas, in fact such “stretching” is precisely the great achievement of semiotics.

— *Terence Hawkes*

...in every society various techniques are developed intended to fix the floating chains of signified in such a way to counter the terror of uncertain signs.

— *Barthes*

What semiotics has discovered is that the law governing or, if one prefers, the major constraint affecting any social practice lies in the fact that it signifies; i.e., that it is articulated like a language.

— *Julia Kristeva*

[]----- Teleconference as Small Group

An aside: Thus far Brendan's text assumes the characteristic identity of the cybernetic adept. It has pointed out and defined the cybernetic controls lodged in the value system created by this exchange. The bricoleur accepts and adopts these definitions, in the main; where he feels an urge to add or (presumes to) modify a definition he will enter into the glossary of terms next to the existing definition(s).



Figure 4.5.1 Léon Bollée with his multiplier. Only a few of the massive machines were sold, one of them to the Belgium Ministry of Railroads. Bollée's long career as an inventor began at the age of thirteen when he patented an unsinkable aquatic bicycle. (An Englishman named Rigby rode it across the English Channel.) He followed this success with others, among them a cash register and a machine which distributed railway tickets. When Wilbur Wright came to France in 1908 to demonstrate his airplane, Bollée placed his automobile factory at Wright's disposal.

Bollée

Taking the cue from Kristeva's "major constraints affecting any social practice," teleconferencing is a novel social practice. It is, for that matter, creating artifacts and clues to its own branch of micro-sociology. As social practice, teleconferencing seems unique in its wobbly balance of oppositional dynamics. It is as if perched between *gemeinschaft* (the primary face-to-face community of "home" and "family") and *gesellschaft* (the impersonal, bureaucratic society, or socio-technological order). The *gemeinschaft-gesellschaft* divide is a logical type of social relationship designed to embrace any society from the tiniest village to post-industrial society. Teleconferencing (in this sense) is anomalous and unique in that it *involutes* the primary face-to-face sense of community through the medium of an impersonal (remote) technology (a small group defined as not more than 15 in this instance). The very fact that

the product is text printed on a scroll only adds to and encodes the sense of social anomaly. The social engagement is prototypical in its combination of *intimacy* and *opacity of digital remove*.

Accordingly, Parsons fits all social relations into the following (paraphrased) categories:

1. *norms* or standards which may be “universalistic” or “particularistic”.
2. *statuses* which can be achieved via work or education, ascribed or assigned.
3. *roles* which may be specified, like that of teacher (or moderator), or diffuse, like that of father (or adept).
4. *emotions* which are neutral or impartial, affective or partial.

[2/25/81] Harithas-----

I must confess to having certain expectations about the teleconferencing process itself, involving its potential to enhance and expand whatever input. Before I get into this, we need to understand its potential for making art. Is “computer space,” for example, analogous to that of the primed and gessoed canvas which symbolizes the essential coherence and purity of consciousness. Is it like the space of the cathode ray tube read as sanctified ground. In forms as secular as Pop and video, the obvious commercialism notwithstanding, the context is procedural. The results may be different from their commercial counterparts, revealing themselves through symbolic forms and/or rituals unique to art.

[3/4/81] O'Regan----- A Scroll to the Scholar

Twixt cathode and canvas lies an invisible rub, a roomy space with great delusion, deluge, delinquent derivations of mindscape removed from skeletal coordinates—a floating place where too much may seem unforbidden but not all permitted. The output is structured, but the interior free for the wandering. Some fear to wander, others suspect the wanderer! Imagine it axonally, synaptic flash and all! Consider it neuronally, blind alleys appall! Behold Akasha! More words than brains can hold. The empirical residue has evaporated.

[3/15/81] Harithas-----

I would like to begin my formal relationship with the teleconference with a statement about what I shall attempt to contribute to it. Following my last entry, I wish to further clarify my ideas about the relation between the computer process and art. I wish to isolate and explore the mental process and images which belong to such aesthetic formats as Surrealism, Expressionism, Pop, the media-derived forms of the past 10 years, in order to see if and how they can be communicated through the teleconferencing process. For example, a "Surrealist" analysis may involve a factual description of a particular location derived from a geographical survey, a textual account of a mythological event, and a synthetic or unrelated sound tract. This may be conveyed as pure narrative, also as random collage such that all elements are present in discontinuous relationships.

[3/16/81] Steven Poser-----

The mixed quality of participation and observation of communication in teleconference suggests the analogy of a field of particles (as units of display, transmission, retrieval) that expand in density and elongate in time with instantaneous access to the past, a self-correcting universe moving from chaos to order.

In real time, the conference occurs to me as another place to be—contemporaneous and parallel, but allowing for travel back in time, thus historical as well. *Question* What is special about teleconferencing, and why is that interesting? I would adopt this provisional policy: a natural bias against unmotivated jargon, "unearned" theoretical machinery, the appearance of meaning. My first problem was discovering how to talk, how to establish an implicit etiquette of discourse. I have more sympathy now for what Frank is up to. But that doesn't eliminate the need for consensus about unifying issues.

At this stage it would forfeit any possible outcome to be seduced by surrealist practice which would allow the conference to take on the figure of an exquisite corpse. Perhaps collaboration on the glossary will become the dominant subtext or repository for some emergent definitions.

[3/24/81] []-----

I would like to test some hunches and make explicit my own interests in our exchange. I put them in the form of two substantive theses:

1. That there are very strong conceptual ties between a philosophy of mind and a philosophy of art and thus between the questions of “what is thinking?” and “what is art making?”
2. That insofar as cybernetic concepts and models bear on the recasting of old problems toward the development of a new philosophy of mind (and/or epistemology of the organism, e.g., suggesting a direction or the evolution of consciousness), they are inherently and immediately relevant to the question of what art is, ought to be, and can be. And thus go to the heart of what aesthetics is supposed to be about. (Cf. Frank’s glossary entry on *aesthetics*)

I believe that in some refined version of their intended meaning all these things are true and near the collective heart of the matter.

Is our subject the means of communication and how the conference is to be conducted? Then we are courting reflexivity, recursiveness and self-scrutiny which may deter more than help our purposes. We may get fixated on the idea that the conference is immediately an embodiment of a collective mental process, made possible by a new instrument of communication technology.

Are we engaged in creation of a collective artwork or not? If the conference proceeds on the level of ideas, it is a collective inquiry, not a collective artwork. If the resulting document is a kind of literature, that’s fine; but how do we proceed as participants? The problem is this: We are using a new means of communication which allows for unprecedented modes of interaction and exchange, accelerated by speed of access and retrieval, unbound by constraints of time and space. Are we to take *that* as our subject and develop its epistemology and pragmatics; or do we take the technology directly into the context of art, art-making practice, and the nature of the museum?

Perhaps it is only a matter of emphasis. I don’t propose to make hard distinctions, but we must discriminate between two descriptions of what we’re doing:

- A) talking about the aesthetic implications of these kinds of systems, and
- B) talking about the implications of these kinds of systems for aesthetic theory.

Our agenda is at stake here. By the first description, we ought to talk about the formal, technical, and conceptual nature of the medium of the teleconference as well as telecommunications and “systems theory” along with associated pragmatic dimensions (political, psychological, etc.) in this domain.

By the second description, we should be immediately interested in the question of whether such systems give shape and access to information in ways that are relevant to thinking about *art, the creative process, the nature of the museum*. My feeling is that we are shooting for the second, and picking up whatever we need from the first, almost by necessity. The sense of a collective manifold of input and response (the manner in which we have chosen to conduct the conference) guarantees that the medium will be an aspect of its own subject.

[4/6/81] O'Regan-----

Steven's last message asks legitimate questions but sets up curious circularities of argument. It is legitimate to ask: Is our subject the means of communication? This translates to: Is the only thing we are trying to do is engage in discourse about the process of teleconferencing and the conduct of a “electronic discourse” about the nature of electronically mediated communication?

I hope not. It is one of our problems to get beyond being hypnotized by the details and fascination of the process in order to create collective understanding and agreement about how it can impact on or be a part of the art-making process. For those who have a high level of independent familiarity with the uses of these systems, for the purpose of communication and interaction designed to achieve other goals, such discourse would rapidly take the form of discussion on the construction of appropriate means for turning this medium into a tool suitable for the creation of art—either in forms familiar to us or unknown.

Since we are at this learning stage with the present participants, there has to be a period for the mutual creation of metaphors to guide use of this system. Given the present level of familiarity

with these kinds of systems, it seems inevitable that there must be a period of Type (A) which must precede a period of Type (B).

For me, however, the goal leads toward the following:

The initiation of a collective, electronically mediated mental process to explore the aesthetic implications of this form of communication. This activity should be conducted *simultaneously* with several different inter-disciplinary groups, with carefully defined overlap among them. This process stands or falls on the ability of different groups to participate in the collective nature of the medium past the point of initiation.

[4/8/81] GilletteRe: Toward a Circulus Methodicus of Interconnection

From the player's vantage, the teleconference process derives from the engagement of metaphor and metonymy. The present juncture should be firmly grasped as a shift from a wealth of sources (often referred to as resources) to a redeployment of such sources in such manner as to recirculate their initial dissonance, or freshness in discontinuous context. The activity itself is a sufficient metaphor for summing up all the recorded dialogues and "texts" within the multiple purviews of the cultures within the particular reach of teleconferencing itself. From here the system of keyboard, phone link, phantom satellite, shared time network, et al, is a proto-medium for cerebral savagery.

[]-----Teleconferencing as Neologic

Neological theory holds that there is an interrelatedness about the world which means that almost anything may turn out to be relevant to something else, if looked at in a different light.

— Paul Cheney

Neologic contemplates the preverbal *milieux* of thought in which any particular experience was stored as a memory of what it sounded like, how old it was, in what season it happened, how hairy, how soft, how hard, etc.

When confronted with a conventional or traditional logical impasse, operational neologic advocates judgement-suspension, silence and soliloquy, distraction, and irrelevance. One uses peripheral reading, environmental scanning, metaphorical play and accidents.

...the essence of aesthetic transposition, let us say of aesthetic promotion, is to introduce onto the plane of the *significant* something which does not exist under this mode or under this aspect in its uncultured state...

— Levi-Strauss

...the individual observation assumes the character of a fact only when it can be related to other, analogous observations in such a way that the whole series 'makes sense'. This sense is, therefore, fully capable of being applied, as a control, to the interpretation of a new individual observation within the same range of phenomena...if, however, this new individual observation definitely refuses to be interpreted according to the 'sense' of the series...the 'sense' of the series will have to be reformulated to include the new individual observation.

— Panofsky

Kuhn speaks of a *normal science* as any discourse which embodies agreed-upon criteria for reaching agreement; *abnormal discourse* is any which lacks such criteria. This teleconference is a manifestation of *abnormal discourse*. The "problematics" of each teleconference "message" tends to deflect the attention from the actual information in the entries themselves. The accumulated effects of the total entries of all the players would yield more than a circular wandering simply in search of explanations of the experience of experience.

There is the crude proto-beginnings of the *motif index*. There is the actual *cash value* of the "content" of each of the entries taken individually or within particular patterns of context. There is primary data on the micro-sociology of this "abnormal discourse." There is the whole hairy issue (apparently an upsetting one) of defining an operational identity "on the line" so to speak.

Bergson's "emergent evolution" says essentially: When two or more simple (basic) entities come (fall) together they may add up in unexpected ways. This simple notion is an operating assumption of bricoleurship.

More operating assumptions: This medium (including its network aspect) is the vehicle for linkages between coincidence, chance, seriality and synchronicity (and potentially the syncopation of models, concepts, methods and epistemes). The first stage, *linkages*, is still in progress and is characterized by fragmentary tactics of *bricolage*. The next stage, *syncopation*, will probably be characterized less by *bricolage* and will be neological in its formal

arrangements and refinements (including results from the kind of contingencies that now seem useless).

All this rests on the deeper assumption that art is the chief agency of *discontinuity* in human affairs, and that *discontinuity* has a vital function in the very existence of the species and is central to its survival. Art, from this perch, is the carrier of periodic, or cyclic, interventions in the equilibrium of things.

[]----- Re: Conventions in the Techno-Public Domain

How do we navigate the flow of definitions and divisions, the sort-crossings emerging from the ground of textual exchange? What kinds of “filters” are possible for elevating the “chance” couplings of context/meaning into formal expressions in their own right, independent of the *chance* nature of their genesis?

A central feature of teleconferencing formalism is that, in part, it is a species of “inner space” and, in part, “techno-public domain.” (A natural meeting ground for solipsistic imperialism of every stripe.) How does this feature, the singular synthesis of public and private, determine the “shape” of its information?

When each player in the network defines a distinct operational bias and embodies a set of individual working methods, how will a successful consensus emerge and evolve? How do we design a way to achieve consensus?

[]----- Re: The Double Axis

“...a throw of dice will never abolish chance...” said our precursor Mallarmé. I am pulled to linguistics again in search of metaphors of the “sensed” structure emerging in the content of this exchange. Jakobson’s distinction between “aesthetic” and “referential” language seems apt and naturally fits in the following way: “Poetic” language projects relationships or equivalence on the *paradigmatic* axis (the axis of *selection* and *substitution*) and the *syntagmatic* axis (the axis of *combination*) simultaneously.

Teleconferencing, as a “command” activity, is double-axial in the same way. Players can operate within the distinct axial domains separately and linearly in Jakobson’s referential sense. Or they can operate within and between the axis in random or stochastic ways, Jakobson’s aesthetic sense.

If one calls *bricolage* the necessity of borrowing one's concepts from the text or a heritage which is more or less coherent or ruined, it must be said that every discourse is *bricoleur*.

— *Derrida*

The blurring of boundaries is not good in itself... promiscuous or hybrid... forms can easily degenerate, yet such forms are the crucible from which new and discriminating achievements have traditionally come.

— *Geoffrey Hartman*

It would appear as if Wittgenstein's "language is a way of picturing" were subject to inversion: How is the picture a way of making language or "linguaging?"

[4/15/81] []----Re: Epistemorphs and Dramatistic Tension

In the phrase of another idiom, the total discourse so far is a search for a systems architecture—a method, once stable and efficient for scanning, selecting, and integrating the combinatorial elements entered into the teleconference "space" by other players, and preoccupied with different methods, other bias, separately defined needs, et al.

Epistemorph is defined as any entry into the teleconference discourse that although altered or qualified by other methods, enters the motif index of innumerable such entries (points) in a set of unequal, shifting interrelations. Thus the *epistemorph* is understood as the minimal meaningful unit of information (formalized or raw). At this juncture in the teleconference the *epistemorph* is restricted to the textual statement, but an *epistemorph* is potentially a diagram, an image, a text, a combination of the three.

An *epistemorph* is a conceptual tableau directed toward synesthesia.

Entries are described as *epistemorphic* when they are assertions about *knowing* as it bears on the conceptual-intersecting taking place at any point in the discourse. Thus the "natural selection" of *epistemorphs* by some inclusive (and/or transcending) contingencies measuring survival (or "cash-value").

View "A"

The actual and potential structure of teleconferencing is an opportune extension and enhancement of the pre-existing ways and means (methods) employed by various special cases: weather forecasting, psycholinguistics, mathematics, cybernetics, semiotic "practice"—whatever. This makes better specialists by organizing data, bringing their respective clans new senses of unity or infrastructure, thereby making their progress more swift and sure. That is, from this vantage point, teleconferencing is a technological advancement which accelerates processes already in place. It will help mathematicians calculate, cyberneticians cybernate, managers manage.

View "B"

This view concedes the compelling necessity of view "A." Yet it prefers to understand teleconferencing and related technologies in terms suggested by the inherent and open nature of the experience: to view the process heuristically; to see it as a tabula rasa; to develop procedures of wandering and play; to see it in its own right, for its own sake, but to see it askance as well.

[]----- Re: The Redundancy of Potential Command

Levi-Strauss defines a code as a means of "fixing signification by transposing them into terms of other significations."

After this much hands-on experience, I can imagine each player as a code-maker, or codifier, developing multiple lines of conceptual and paradigmatic counterpoint evolving simultaneously with no single line predominating. "Goaded by the spirit of hierarchy," (Kenneth Burke) the players (each with a distinct operational style) would fulfill to the analogous "letter" Warren McCulloch's *redundancy of potential command*.

Structurally, a player's *theater-of-operation* (the relation between differences) states and demonstrates complex and unpredictable analogies of experience. There is no a priori "command" structure. Command becomes a function of selection. All players in the teleconference have an equal dose of potential command. At any

given point in the actual discourse itself command will reside with one or a grouping of players, depending on ground rules, pragmatics, and the random unknown.

From this interplay of sensory barbs an index of *epistemorphs* results, as if by “secretion.”

[]----- Re: Metaphor and Metonymy

A return to analogies of binary opposition, contrastive exchange, and dialectical (or dramatistic) tension in order to approximate actual and potential processes experienced in teleconferencing: The computer network generates associations by sensed likenesses (metaphors) and associations of juxtaposed unlikenesses (metonymies). This division underlies any substitution set in language, but it also is the logical prerequisite for the formation of any system out of any elements. With metaphor the justification for a connection is the similarity (or resemblance) that is sensed to exist between things, while metonymy is a means of connecting things by the notion of their temporal and spatial dissonance, by their juxtaposition. Metaphor is equated with “sensed identity.” Metonymy is equated with a conceived (or perceived) difference *plus* “necessary interrelationship.” Combinations and permutations generated by “entry” choices exercised by the players constitute another, separate level of metaphor and metonymy which is independent of the players’ intentions. Another bifurcation: the metaphors and metonymies designed, articulated and entered by the players, *and* the metaphors and metonymies resulting from (derived from) the separate entries as they rub up against or interlock with each other without prior intention.

The second tier of metaphor and metonymy within the discourse will multiply asymptotically as the structure of the “entries” expands to include the diagram and the image with its text.

[4/16/81] Frank Gillette----Re: Proliferation of Sources

The point at which the process [proliferation] begins, or rather at which growth begins, is the point at which ambiguity has been reached. The ambiguity that is so favorable to the poetic mind is precisely the ambiguity favorable to resemblance.

— *Wallace Stevens*

— *Let us record the atoms as they fall upon the mind in the order in which they fall, let us trace upon the pattern, however disconnected and incoherent in appearance, which each sight or incident scores upon the consciousness.*

— *Virginia Woolf*

The existing monuments form an ideal order among themselves, which is modified by the introduction of the new (the really new) work of art among them. The existing order is complete before the new work arrives; for order to persist after the supervention of novelty, the *whole* existing order must be, if ever so slightly, altered; and so the relations proportions, values of each work of art toward the whole are readjusted.

— *T.S. Eliot*

Every image is a restatement of the subject of the image in the terms of an attitude.

— *Wallace Stevens*

[4/20/81] []---- Re: Teleconferencing and Binary Analogs

Among other things there is a potential for a sub-discourse in the relative methodological peculiarities of science and art (and/or science versus art).

Kierkegaard answered Hegel by opposing the impersonal rationality of history with the irrational reality of the individual. The dynamics initiated by these antipodes (complete with the "personality traits" of each) continues to exist in the present. The teleconference "space" is the theater-of-operations in which these antipodal orientations engage each other's "texts."

"Text" is understood as a body of "data" in any sort of units or elements: sounds played, phones uttered, acts effected, colors applied, sentences written, stars contemplated, geographical features surveyed, which smack of systematization, given an observer. From such units or elements, systematically apprehended, are derived music, speech, actions, paintings, paragraphs, constellations, maps, respectively. (Re: Levi-Strauss, Boon, et al)

[]--Re: Parallels between Teleconferencing et al and Video

If our "reality" is merely a subset of possibilities, then, in Barthes' words "techniques are developed and intended to fix the floating chain of signified in such a way as to counter the terror of uncertain signs." Video can be appreciated as the means to a radical naturalism grounded in observational method and ways of viewing. It fixes (records) specific events which are basically undifferentiated from the unrecorded (unfixed) specific events around them. By juxtaposing sets of observed events in "real time," a novel range of intentional and non-intentional associations and meanings emerges. How or why one image is "selected" over another, or how and why one image is recontextualized with another, is a matter of subjective codes and ciphers employed by the observer. The "observer" in video and the player in teleconferencing are parallel.

The "teleframe," the monitor's convex and sinusoidal screen, delivers a phenomenalist paradox with every image, whatever its content. There is an impacted spacial immediacy accompanied by a temporal anteriority (or temporal remoteness) with every synchronized duration of images. *Spacial immediacy* and *temporal anteriority*, experienced simultaneously, is the equivalent to having the sense of *being there* with the sense of *having-been-there*.

Barthes calls the photograph (and by extension: cinema and video) a "decisive mutation" of the "informational economies." "The denoted image naturalizes the symbolic message..." In video

the symbolic or connotative message unfolds in real time (heard as well as seen) via subjectively chosen signs composed of angle-of-vision, focal length, orientation to horizon, frame composition. It is possible therefore to speak of the density of connotation in a given video composition. The complexity of symbolic (or connoted) elements is reflected in the flow of natural (or factual) denoted events. What is represented becomes transformed by virtue of the method or strategy of representation.

[]---Re: Transformations Across Systems of Sensory Orders

...their inscription in networks of generalities infinitely articulated in the genealogies of a structure of whose crossweaving, coupling, switching, detouring, branching can never be derived merely by a semantic or formal rule...

— *Derrida*

Premise: Art and science possess radically distinct epistemic affiliations. Practices within the domain of one or the other establish a different *kind* of knowledge. Art and science represent competing epistemologies. This terminal—Texas Instruments model 765 with bubble memory (hard and soft network) is an instrument of science. It is imbued with the perceptual bias and cognitive habits of the normally practiced “scientific method.” The hunch is that art’s ways and means are sufficiently protean to complement the paradox of *terminal adaptation*. “Understanding a thing is to arrive at a metaphor of that thing by substituting something more familiar to us. And the feeling of familiarity is the feeling of understanding.” (Julian Jaynes)

[]-----Re: The Core of the Matter

In all human things, necessity is the principle of impurity.

— *Simone Weil*

Teleconferencing, as currently constituted, has produced its own kind of conceptual metric. Its chief characteristics lie in the vagaries of ambivalent ebb and flow. What’s going in is uncertain, and the rules for uncertainty are found in the powers of irrelevant

thinking. An increase in certainty (explicit goals, minimum contingency) will be accompanied by an increase in coherent relevance. Until this threshold is established and/or synchronized, play is atomized among players and, when present, reflects a player's own particulars which the uncertainty of the situation has drawn. This condition rubs up against what is central to the process, the issue of identity, or a defined and expressed *modus operandi* evident in the actual text of the teleconference.

Thus far two distinct positions have emerged: the *Cybernetic Adept* and the *Bricoleur*.

The *Cybernetic Adept's* position is clear:

It associates the descriptive principles of cybernetics with ideal operational methods in teleconferencing. The shift to a more complex and inclusive procedure is seen as the result of a more expanded and efficient utilization of already available alternatives or as a result of the introduction of new hardware. The *Cybernetic Adept* is alert to the nuances of change in computer and allied technologies, possessing a most sophisticated grasp of what is practicable and when. Naturally, this provides for a quick and sure grasp of what is potentially possible, given the circumstances.

The *Bricoleur's* position is less clear:

Whereas the *Cybernetic Adept* is direct, the *Bricoleur* throws curves, beginning with an intuition of necessity that originates in the actual experience of the terminal sending/receiving entries. Its working hypothesis is that the "network" creates a field of metaphoric interconnections apprehended as an intangible theater-of-operations whose limits and boundaries are unknown, but knowable.

[4/21/81] Poser-----

Brendan's phrase "the expansion of the aesthetic text" sticks in my mind. My best guess is that this "text" is the constellation of sensibilities, concepts of what constitutes the work of art, ideas about its syntax, its mode of address to the audience, how it means, the conceptual shape and poetics of objects that would link them to a particular historical sensibility. It would include a sense of strategy, of conviction as to its formal shape and sufficiency, the sense of wholeness and meaningfulness that prompts its being put forward as a work.

Then he says that there has been no “direct expansion of the aesthetic text that both stems from and embraces the new technologies”—that efforts to date have simply “added them on as effects for reasons which emanated from the aesthetic text before the advent of these possibilities.”

I take this to mean that, as a matter of historical fact, the uses of new technologies have been basically ornamental or pressed into the service of an extrinsic or preconceived aesthetic. The contrast is to an immanent aesthetic, one that is discovered within the medium as a consequence of investigating its specific nature and special properties. I am wary of the idea that significant advances in sensibility, in scientific model-making, and creative work generally are best thought of in terms of the medium they are expressed in. Yet acquisition of a new instrument can be catalytic in the formation of new ideas. Brendan writes that what we’re doing stems from and is directly within some of the newest technology available which makes possible a conscious expansion of the aesthetic text.

Specifically, we are involved with the means of collapsing the processes of time, space, and information. But what is the nature of the expansion inherent in that collapse?

I am interested in Bateson, for example, because within his work are the rudiments of a new picture of the psyche. If anything in history gives us a new idea of what art is, it is a new model of the nature of the mind. If epistemology can be understood as part of the natural history of the human species, then we are at the access points to new ideas about art, thinking, and creative activity. Cybernetic modes will influence aesthetics, but only a new brain can make new art.

One recent example of “expansion of the aesthetic text” is the appropriation of the context of sculpture which allowed artists to see sculptural form in processes, activities, and events extended and disembodied in time and space. This clear conceptual leap brings into existence a new object and creates a new ontology by which to “frame” new objects.

The questions we are addressing here (and I take many of Frank’s entries this way) are procedural: How do we formulate, by our participation in a teleconference, a poetics of thought and interaction that gives content to new concepts of shapeliness? Are these concepts immanent in the technology or do they rather ad-

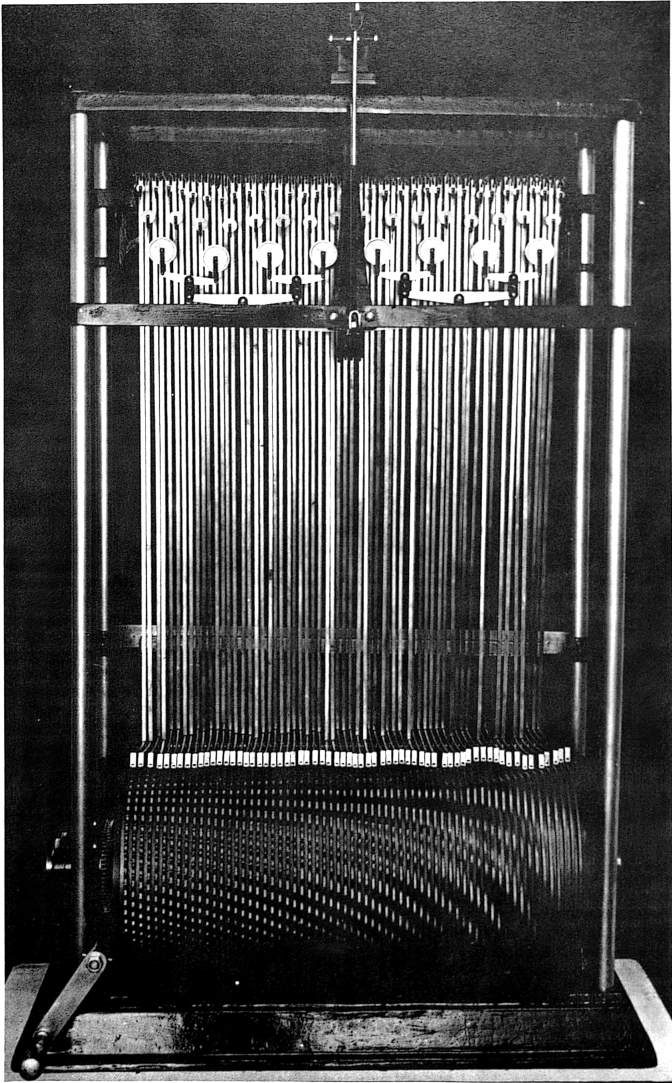


Figure 4.7.1 A precursor of the modern digital computer: replica of the Michelson-Stratton harmonic analyzer. Developed in 1989, the machine was capable of handling Fourier series of 80 terms. Fed the Fourier coefficients of a trigonometric series, it could produce a graph of the sum function and also perform the reverse process. (IBM)

Part 2: Additional Materials

*Book Review: John von Neumann and
Norbert Wiener: From Mathematics to the
Technologies of Life and Death* (Steve J. Heims,
The MIT Press)

by David Finkelstein

Childlike, greedy, flowering with mathematical beauty, they are heroic figures of twentieth century mathematics. This major dual biography treats of their mathematics, their Jewish roots, and the influence they exerted through the applications of their work, ranging widely through mathematics, physics, armaments, neuroscience, and philosophy.

Why a dual biography? Perhaps because the crossings and partings of their lifelines show their individualities better than a single biography would. And certainly because Heims wants to contrast the two men to make his point. The book has an agenda. His narrative and his quotations from their works and conversations work towards that agenda. Again and again, to be blunt, Heims tells us that Wiener keeps the faith, von Neumann sells out.

This view comes as a shock to me. I too have made choices between Wiener and von Neumann, and when matters of science were involved I usually chose von Neumann.

The first such decision occurred in my first year or two of college. The texts I found on quantum mechanics were sheer walls without fingerholds for my understanding, even after I learned from them how to solve elementary problems. After weeks of frustration I was overjoyed when I chanced on von Neumann's paper with Garrett Birkhoff, "*The Logic of Quantum Mechanics*," where quantum evolution is ascribed—reduced, some would say; elevated, I felt—to an evolution in the laws of logic. Einstein drops one of Euclid's postulates. Bohr, says von Neumann, drops one of Boole's. Sitting in the high-ceilinged college library—long since razed and replaced—I formed a joyous surmise: perhaps my job was to explore the physics of these new logics. I resolved I would

emulate Einstein's exploration of the physics of the new geometries. Armed with Langenscheidt's German-English dictionary, I fought slowly through the dense German of von Neumann's book on quantum mechanics, rejoicing whenever I arrived at a comprehensible paragraph.

I saw Wiener at a distance and met his thinking more closely when I reached graduate school. Walter Harry Pius, his research associate and protégé, a figure in this book, lightened those heavy years for me more than any other faculty member. I met Pitts when I took his course in the mathematics of quantum theory. When he hit a snag on the blackboard, he would reach over the top of his head with his right hand and scratch his left temple as he puzzled. We walked miles along the Atlantic shore, he sampling the shellfish and explaining their functioning as we walked. Sometimes he cooked a dish for my wife and me in our one-room apartment on Beacon Street. Years later, not long before his death, I tracked him down to a dim cafe he frequented in Harvard Square, to thank him and re-establish contact. He sat alone reading, frail and withdrawn. Pitts did not remember me, and when I said my piece and left him to his book, he seemed relieved. I have not studied his neural nets in years but I still use his recipe for fried spinach. I wish Heims had captured his engaging personality.

Wiener thought differently about quantum theory than von Neumann. For Wiener, quantum jumps were like the dance of shining dust motes in a sunbeam that, I recall, held me for hours when I was a child, as I tried to catch a scintillation between thumb and slowly, slowly descending forefinger, always in vain. This dance is called Brownian motion. His probability methods worked for Brownian motion, and Wiener felt they would work for quantum jumps. The seeming randomness of Brownian motion is not basic but results from many variables hidden from our perception, particularly the atoms surrounding the dancers. Wiener was convinced the randomness of quantum theory too would result from hidden variables.

Wiener's conviction must have been only strengthened by the viciously circular but widely quoted proof of von Neumann, that hidden variables could not account for quantum incompleteness. This famous proof is given in von Neumann's book on quantum theory, and shows that knowing as much as quantum theory allows about the past always leaves some (in fact most) questions

about the future unanswered. It does not address the question that interested Wiener. What if one knew more than quantum theory allows?

Acting on his conviction, Wiener buttonholed prominent physicists at MIT and forced them to consider hypothetical transgressions of the laws of quantum theory. They took these laws for granted, in the way a shoemaker takes his awl for granted, and Wiener kept them from their proper work. Desperate, they decided to sacrifice a maiden to the Minotaur. A physics graduate student might sate Wiener's appetite for physics and buy them peace. Clearly the transaction would benefit all involved, especially the graduate student.

The possibility of working with the celebrated Wiener was tempting but I did not apply. Today I can say why more clearly. My inaction might be called a choice between Wiener and von Neumann, and has to do with quantum theory and the celebrated Einstein-Bohr dialogue.

In their dialogue, Einstein and Bohr agree at the outset that quantum theory does not predict our future experiences from our past ones, and in that sense is *incomplete*, but disagree about whether such an incomplete theory may be the most informative that is possible, and in that sense may be *maximal*. Einstein, here playing the role of classical thinker, laments that the theory is poorer than nature. Bohr, the modern existentialist, is content that nature is richer than our theories. Einstein repeatedly attacks, Bohr successfully defends, the internal consistency of quantum theory.

I felt with Einstein and Wiener that quantum theory had to be replaced, but also that first, one had to grasp the new thing it brought into physics, and preserve that. Now the new thing about quantum theory is not incompleteness, its failure to make exact predictions. Classical Brownian motion shares that as Wiener noted. It is that while previous theories, including Einstein's relativity, dealt with uninvolved objectivity, quantum theory dealt with involvement. Incompleteness is only one aspect, a negative one, of involvement. This was expressed in various forms by Bohr (for whom the observation of a quantum phenomenon was part of the phenomenon observed), by Dirac (who formulated mathematically a generalized relativity principle for quantum theory, his transformation theory), and by von Neumann (whose expression

was the most abstract and mathematically complete). Involvement leads to an extension of relativity from the categories of time and space to those of logic. The descriptors meaningful for a quantum system depend on its context in a way that is explicitly denied in classical Aristotelian logic. Einstein allowed for changes in our description of facts with changes in our relation to the system observed, but Bohr allowed for changes in the very totality of accessible facts.

An artist walks around a model, tries one perspective, another, then returns to the first. Nothing seems to have changed. With each relation between artist and model goes a portrayal of the model. As soon as one artist leaves a perspective another can assume it. Many artists can use the same model, with little interference. Einstein's theory deals with this kind of objective relation between observer and observed.

The next day the artist comes nearer, perhaps to study sheen and texture. One thing leads to another. In brief, the artist seduces and is seduced by the model. If we insist, we may say the artist has a new perspective, but it is better to say the two have become involved. This change of relation is not undone or shared as easily as a change in perspective. Quantum theory is a theory of involvement.

Einstein never bought this extension of Einstein relativity by Bohr, from time and space to logic itself. Einstein never considered quantum jumps basic; he thought they were determined by a nonlinear unitary field theory, like catastrophes in the sense of mathematician Rene Thom. Wiener did not think quantum jumps were basic; he thought they were determined by hidden variables.

But Heims sees it otherwise: He notes that Wiener described quantum theory dialectically, as a Hegelian synthesis of particle thesis and wave antithesis. He points out that von Neumann regarded the interface between the observer and his instruments as classical in its nature, so that the readings by the observer could be regarded as objective.

Heims is accurate on both points and both are irrelevant. Dialectical materialism, curiously, is often linked with uncritical faith in absolutist theories like Newton's mechanics and Aristotle's logic. (See Engels on Newton's mechanics.) The philosopher who will pit his philosophy against the current physics is rare and rarely right. (But see Blake and Bergson on Newton's mechanics.)

And the critical interface is not that between observer and instrument mentioned by Heims, who has misleadingly isolated part of von Neumann's discussion of measurement in terms of a tripartite observer + instrument + atom system. It is not *that* interface, which had better be classical, but the one between instrument and atom where quantum effects control. Von Neumann treated both interfaces correctly enough.

We may prefer Wiener's ethics, but we should respect von Neumann's quantum theory. With all its defects (and Heims mentions the greatest: the assumed simultaneity of the measurement process, a discord with relativity) it has worked best for over half of a dynamic century, without any change at all. The latest speculations on the color and flavor of quarks still trim themselves to the Procrustean bed of von Neumann. It seems to me that Heims actually interchanges the attitudes to quantum theory of Wiener and von Neumann, when he finds Wiener radical and von Neumann conservative on that subject.

Heims also considers von Neumann formalistic. He finds von Neumann cared less about the meaning of his axioms than about their mathematical form. This does not make sense to me. For example, von Neumann's axioms for set theory, and likewise his axioms for a cellular automation,¹ are ugly and clumsy, though seminal and famous, because in them he tried to express something that other mathematicians were not to take up for decades. In his set theory, dissatisfied with the static idea of the set, he attempted to take as basic instead the more processual idea of the transformation or mapping, at whatever cost in elegance of form. His abortive attempt prefigures the modern work in category algebra. Von Neumann never went to the operational meanings behind his symbols in the way characteristic, say, of the young Einstein; few ever do. Nevertheless, von Neumann exceeds the patience of most of his physicist readers in his treatments of epistemological questions of meaning and measurement. He left his personal mark on all the domains of applied mathematics, and became a master at the use of mathematics as a language with meaningful content.

This makes his errors the more conspicuous. He as much as anyone introduced the concept of the collapsing state into quantum theory, and this concept is inconsistent with his own recognition

¹ Automaton?

that individual quantum systems have no state. There is a subtle trap—call it symbolatry for short—sometimes concealed by beautiful mathematics, the implicit and therefore incontrollable assumption that there is a natural isomorphism, emotionally an identity, between symbols and actuality. Sometimes as here von Neumann falls into this trap, as Heims notes. Pioneering has its hazards. It takes much longer to forget an old language than to learn a new one.

The end of this dialogue is not yet in sight. There may well be a point of view that reconciles the discordant views of Einstein (and Wiener) with Bohr (and von Neumann). If we compare them with the assertions of quantum theory—not the objective ones of classical mechanics, but the self-referential ones, the hard line between the two kinds of theory begins to soften.

Self-reference would be one of the major mathematical motifs of the century if no one but Gödel had played on it, but it permeates the mathematics of Wiener and von Neumann too, with a characteristic difference. For Wiener, self-reference took the form of self-regulation, for von Neumann, self-replication. Thus Wiener was led to invent cybernetics, a theory of communication, control and self-regulation in animal and machine, to make his actions and those of other scientists matters of conscience, and to decline power. Von Neumann, on the other hand, developed a theory of reproductive automata that foreshadows remarkably the actual genetic mechanism, assisted mightily with the automatic computations for nuclear bombs, and entered the circle of the power elite. The narrowness of his understanding and concern is measured by his statement (with Morgenstern) that “the typical problems of economic behavior become strictly identical with the mathematical notions of suitable games of strategy”—another plunge into the same trap of symbolatry.

Heims is concerned with mathematics and physics mainly as background to the actions of his people in and after World War II. (He calls that war a watershed, but surely he means a divide.) Wiener works at MIT on defense against air attack; von Neumann works at Los Alamos on the nuclear bomb. Both find their tasks require them to develop precisely the kind of mathematical structures they most love, integral differential equations for Wiener, logic systems for von Neumann. Wiener involves himself in protest against the Nagasaki massacre, considers never publishing again

to avoid abuse of his work. Von Neumann separates himself even from the *Bulletin of Atomic Scientists*, a mildly anti-military voice, rejecting two invitations.

Von Neumann, with his middle-European Jewish origins, was alert to the danger of Hitler and Stalin before most of us, just as he was more conscious than most of us of the inadequacy of the computer as a model for the brain or the world, thanks to his involvement with such machines. I suppose that for him it would have been the greatest immorality not to arm the United States to the teeth.

Heims regards von Neumann's haste to build bombs and super-bombs, computers and supercomputers, as another case of the widespread faith in the machine, the epidemic addiction to the technological fix. The trap of a superstitious belief in hardware—technolatry?—sits right beside the trap we have already noticed, which might be called a superstitious belief in software, and both wait for anyone who identifies the world with a computer, as the very analysis into hardware and software requires.

Heims' agenda surfaces in the epilogue. Like Noah, he does not take the continued survival of civilization for granted. Perhaps he sees that all nations have access to nuclear explosives limited only by budget (and an occasional Israeli sortie); that today cities are held up for ransom as yesterday airplanes were, and tomorrow nations will be; that biological weapons are or will soon be less controllable,² cheaper, more insidious, and deadlier than nuclear. Heims' main concern is how we are to survive this evolution of our technology of death. His agenda consists of actions for such survival.

The Los Alamos team were as much slaves as masters of the nuclear genie. They could not keep him in his bottle forever, they could only help him out. Had only they exerted a wiser influence over the time and place of his dreadful emergence! Heims draws from their success and failure conclusions on how to fight against repetitions of that history. Action groups, a concern for wholeness, whistle-blowing—he pulls together many of the most hopeful developments of the last two decades. We are baby scorpions in a

² In light of this surprisingly adept insight, I invite the reader to look into Critical Art Ensemble's study of germ (biological) warfare, Marching Plague.

bottle and our stings are growing. If we survive long enough to escape our bottle, we must evolve into a community, and soon.

There is an element of irony in their deaths. The mathematician of self-regulation died of heart failure. The mathematician of self-replication died of cancer. From their lives Heins has made controversial and provocative ammunition for the movement for a viable world. He has deepened and shifted my perception of Wiener and von Neumann. He has made fresh the old dictum that intellect when divided from brain and soul and body breeds monsters.

A Critique of the Domination of Nature

by Trent Schroyer

I wish to speak a word for Nature, for absolute freedom and wildness, as contrasted with a freedom and culture merely civil—to regard man as an inhabitant, or a part or parcel of Nature, rather than a member of society. I wish to make an extreme statement, if so I may make an emphatic one, for there are enough champions of civilization...

— Henry David Thoreau

Late Cretaceous to Pleistocene Cocoliths from the North Atlantic.

Initial Report of the Deep Sea Drilling Project (volume XI supplement to volumes XXXIX, XL, XLI). A project planned by and carried out with advice of the *Joint Oceanographic Institutions For Deep Earth Sampling*. Prepared for the National Science Foundation by the University of California (Scripps Institution of Oceanography). US. Govt. Printing Office.

I —————

17th century, modern science has seemed confident that the human species is independent from organic nature.¹ Universal knowledge of inorganic structures provides an ever refined system of

¹ In *The Phenomenon of Life: Toward a Philosophical Biology* (N.Y., Harper, 1966), Hans Jonas has argued that we moderns live under the perspective of pan-mechanism in which the very existence of life has become the inexplicable phenomenon. The worlds of archaic humanity had the opposite problem. Living within world-views of pananimism (or vitalism), the inexplicable problem—in the sense of existential paradox—was death. In this sense pre-modern societies culturally constituted death as part of human existence. In modern cultures we have viewed organic life under the same cognitive forms that we used to understand inorganic matter-energy relations in space and time.

techniques that (supposedly) separates us from nature in an irreversible manner. Socio-technical evolution step by step transforms all in-built human capabilities in a cycle of technical learning that creates tools that are reinforced till they become machines and are finally replaced by automatic systems. This behavioral cycle of feedback-guided learning is an artificial world construction process that is unconsciously determined by the human need for security and safety.² The irony is that more control over nature does not seem to decrease anxiety about the terror of nature.

While a sense of the inevitability of socio-technical progress pervades modern culture, so too does a sense of a "broken connection" with biological and cultural continuity. The nuclear image of possible human annihilation, and the permanent "crisis" ethos of contemporary societies, meld together to require what Robert Lifton has so aptly called "psychic numbing." Hence, the fear of survival returns and the search for symbolic immortality (began perhaps with the fall from the ignorance of death) renews the quest for a technical transcendence of nature.

But a "dialectic of enlightenment" has plagued this quest since the beginning in that each renewed level of technical learning requires greater sacrifice and renunciation in the development of self-hood at the cost of greater losses of the capacity for spontaneity, participatory solidarity, and imaginative participation in nature. The technically determined separation from nature has ironically undermined the stability and coherence of the human world; technical progress and loss of cultural form are simultaneous processes. At stake are the dreams of the modern enlightenment; reaffirmation of religious orthodoxy as the only cultural cement is the neo-conservative sedative.

² Hence human existence is predicated on this fear and terror of nature. See Arnold Gehlen, *Man in the Age of Technology* (N.Y., Columbia University Press, 1980). Gehlen's interpretation of the history of socio-technical development has influenced both conservative [See Peter Berger, et. al., *The Homeless Mind* (N.Y., Vintage, 1973) and critical social theory (see Jurgen Habermas' "*Science and Technology as Ideology*" in *Toward a Rational Society* (Boston, Beacon, 1970)]. In Habermas' essay, Gehlen's history of technology is used to reject Herbert Marcuse's claim that the universality of one-dimensionality requires the development of a "new science and technology." This claim is dependent upon an evolutionary perspective that sees cognitive development as a progressively more universal and invariant instrumental relation to natural "objects." This presupposes that the mathematization of the human sensual manifold, as in Kant's notion of natural knowledge, is the only form of possible knowledge of nature and is adequate to its "object."

Into this matrix of despair is slowly surfacing a potential power that recalls the slumbering memory of the behemoth. Awakening from a sleep induced by the modern epistemological principle that “nature-in-itself” is constituted only as an object of technical control, *Gaia*, or the organic unity of the earth, appears to some observers who have an interest in human technical *hubris*. Rather than dead matter in motion according to universal laws, recent scientific discoveries (renewing old beliefs) suggest an internal self-organizing formative activity within natural events. In so far as this is true, Western rationality, which begins with the total transcendence of nature, may be encountering its decisive trial. Efforts to drain all immanent formative activity from nature, to smash all pantheisms, were justified in the West as essential for sustaining the ego-autonomy essential for civilization. Today ecologists everywhere begin to suggest that the *good-for-nature* should inform our ethical mediations of technical progress. Ethical norms are then emergent from both the interdicts of culture (*nomos*) and from the limits of nature (*physis*). Maintaining a balance of these two sources of normative integration requires a type of critical insight which the ideologies of progress today seem to lack.

But the problem may not be “progress” as a socio-cultural ideal. Indeed there is one learned argument that “progress” was central to classical antiquity in the West from the very beginning.³ But “progress” here meant growth of an organic whole that exhibits persistence and change, identity and difference. The model of nature was cited as exemplary; Seneca could thus say: “Nothing is completed at its very beginning.” Harmony seems to require an ongoing insight into the unity of nature and culture, *physis* and *nomos*. Hence, recent scientific theorizing points a way out of modern mechanical materialism and suggests new possibilities for “man”-nature interaction.

The word “nature” (*physis*) in its Greek origin comes from *phyein* meaning to grow out of, to appear by itself. Nature is that which is somehow identical with the process through which it appears and comes into being. Nature’s movement is self-moving flow. A new discovery of this appearance is suggested by David Bohm who claims that we need to look on the world as an undi-

³ Ludwig Edelstein, *The Idea of Progress in Classical Antiquity* (Baltimore, The Johns Hopkins Press, 1967).

vided whole. The new form of insight into nature's being can best be called undivided wholeness in flowing movement. The view implies that "flow" is in some sense prior to that of the things that can be seen to form and dissolve in the flow. According to Bohm's interpretation, a new order of nature is coming into focus. Bohm argues that the evolution of physics has moved beyond the order of Galileo and Newton (the separability of the world into distinct but interacting parts) to a new scheme of the continuity of fields (in relativity) and the inseparability of the observing instrument from what is observed (in quantum mechanics). The new order implied is that of a *hologramic enfolding of the information about the whole into each part*.⁴ Instead of the classical Cartesian-Newtonian explicate order (where each part has its own place outside of others), the new implicate order has enfolded information about the whole in each part. The difference is that between an image of nature as a composite unity and a *hologramic order*.

While it would be possible to recall that archaic worldviews also held to a hologramic presence of the whole in each part,⁵ the more relevant point here is that awareness of co-present elements returns as a center of physical inquiry and supplements the present analytic abstraction of a composite or explicate order. A new scientific theory implies a new practice interaction with nature. The *search for patterns that connect us* with natural ecosystems constitutes a re-orientation of scientific-technical learning. As Gregory Bateson has argued, a communicational science is concerned with the meta-relationships of events in contexts, while a strict causalistic science focuses upon the reality of "objects" while excluding contexts.⁶ This defines an epistemology change from Galilean "resolutive compositive method" to an organismic ap-

⁴ David Bohm, *Wholeness and the Implicate Order* (Boston, Routledge & Kegan Paul, 1980), p. 11.

⁵ See deSantillana and von Deschend *Hamlet's Mill: An Essay on Myth and the Frame of Time* (Boston, Gambit, 1969) for an account of how the flow of time and time of music formed the archaic world's experience of nature as ordered by the order of time.

⁶ See Gregory Bateson, *Steps to an Ecology of Mind* (N.Y., Ballantine, 1972), p. 252.

proach.⁷ It also forces us to re-evaluate the modern belief that we are separate from nature.

Something like a forgetfulness of our immanent participation in nature has accompanied the celebration of technical transcendence since the 17th century. Belatedly I see that Hannah Arendt's distinction of work and labor has an implicit philosophy of nature that is compatible with this changing image of nature.⁸ The notion of *labor* reminds us that the life process imposed on us by our bodies, also ties us into the recurrent cycle of all biological life. In the human metabolism with nature labor mediates by an endless incorporation of matter and energy into the body (consumption) and the endless housekeeping which redirects the processes of growth and decay and maintains the human world against the intrusions of nature (e.g., pollution, excessive growth, etc.).

In this sense the constitutive idea of modern ideologies (capitalist and socialist) that freedom begins beyond the limits of necessity abstracts from our immanence in organic nature. Both Marxist socialism and economic liberalism share the utopian presupposition that freedom is possible only as a function of emancipation from necessity. While the ideology of free enterprise rests its case upon an ongoing revolution of progress (i.e., economic growth stimulated by ever new levels of technical control over nature), Marxist socialism views class struggle as a dialectical self-positing

⁷ Critiques of modern science's fallacy of "simple location," or the instrumentalist spatialization of events, has been central to A.N. Whitehead's philosophy of organicism. Whitehead argues that the basic physical unities are "concurrent actualities" and resemble a living organism in that they depend not on its components but on the *pattern* through which they are composed. See *Science and Modern World* (N.Y., Free Press, 1925).

⁸ Hannah Arendt, *The Human Condition* (Garden City, N.Y., Doubleday, 1958). Hannah Arendt's claim that all European languages discriminate between "labor" and "work" indicates a dimension of the bio-social world that is totally ignored in social theory. While all modern social theories of progress project "work" as the form-giving fire and nature as the object and resource for human production, the endless recurrent necessities of sustaining biological life is lost in the modern image of "process" (of nature and economic production). We labor with our bodies and work with our hands; this fundamental difference is documented by the universal existence of songs of labor that accompany the rhythmically ordered co-ordination of the body. (Songs of work are social and sung after work.) In the midst of labor, tools lose their instrumentality and function as means to an end; the certainty of the motion predominates. Labor constitutes the mediating interface of human world and nature and reflections on meaning of this linkage for sustainable form of human survival is essential.

that releases the suppressed technical powers of production. Both are variations within a common perspective. That perspective is the belief that all future human possibilities depend upon an extension of the domination of nature.

Whereas progress as permanent revolution runs up against the finitude of resources and socio-cultural deterioration in a society where stability can be achieved only through expansion, socialism runs into the authoritarian contradiction of separating the administration of things from the democratization of need interpretations. Both ideologies are latent theologies of technical transcendence of nature and both promise a delusory form of human emancipation. Remembering the residual moment of the human condition in which we remain embedded in nature also forces us to question the tenability of those elements of progress ideologies that promise emancipation from labor—namely, consumerism and the superiority of “socialized” production. The question of what is more rationally produced by individual households, communities, and regions is evaded by techno-economic elites responsible for centralized decision-making. But more basically the hyperstimulated expectation that new controls over nature provide new freedoms from nature is the cultural mechanism that transfigures needs, and reinforces dependency upon centralized authority. How to create and select those forms of technical innovation which are compatible with organic nature and with non-dependency is the project of defining an ecologically rational form of social development. In the present context of centralized production systems, the question not systematically confronted is how to increase individual and local participation in production in order to achieve greater flexibility in our harmonization with the limits of organic nature. Only a democratization of technical learning that diversity within natural ecosystems (reversing the disastrous current trends toward simplification) can promote a concretely universalizable increase in the flexibility of the societal-natural interface. Until we can begin to develop new problem-oriented scientific inquiries into the carrying capacities of eco-systems, optimal design integrations of “man”-natural habitats and a systematic return to a “communicative” orientation to nature (cybernetically the substitution of information for hardware), we will not have the democratization of technical learning essential for sustainable forms of human survival.

II ---

Hannah Arendt has noted the sense in which modern science began by viewing nature from a perspective outside the earth. At the beginning of modern science:

...the old dichotomy between earth and sky was abolished and a unification of the universe effected, so that from then on nothing occurring in earthly nature was viewed as a mere earthly happening. All events were considered to be subject to a universally valid law... (which) was valid beyond the reach of human sense experience..., valid beyond the reach of human memory and the appearance of mankind on earth, valid even beyond the coming into existence of organic life and the earth itself.⁹

With modern science a cultural conviction emerged that the human species had established itself as “universal” beings who could reason beyond the limitations of terrestrial existence and use cosmic laws for the guidance of terrestrial actions. Arendt calls this belief in technical transcendence of the earth, which is so fundamental to modern science, “earth alienation” and sees it as the most fundamental revolution of modernity. With the transition to universal science, terrestrial and celestial phenomena were unified mathematically as physics and astronomy. Newton’s synthesis was made possible by the algebraic treatment of geometric relations without regard to the age-old distinction of earth and sky. With this mathematical formalization, the last vestige of terrestrial qualitative difference was abstracted away.

Yet the “universalism” of Cartesian-Newtonian mechanics may be an abstractive fallacy for bio-social forms of organization to the extent that a contextless infinite framework is presupposed. Bio-social events have context specific causalities that differ fundamentally from the linear irreversible causalities of classical mechanics which holds that action and reaction are equal and opposite or that like causes create like effects. Classical mechanics provides predictive knowledge where a system can be considered closed and energy transformations viewed as irreversibly tending toward

⁹ Hannah Arendt, *The Human Condition*, *op. cit.*, p. 238ff.

dynamic disorder (e.g., heat processes under the entropy principle) but such analysis abstracts from any contextual constraints (organizational information that reacts back or amplifies causal impacts).

Although the emergence and evolution of cybernetics since the Second World War has developed a critique of mechanical causation, a more generalized theory has recently added an alternative to classical mechanics and equilibrium thermodynamics. Contemporary non-equilibrium thermodynamics (e.g. Ilya Prigogine's theory of dissipative structures)¹⁰ adds another dimension to our understanding of emergent evolution in that biological processes exhibit deviation counteracting causalities that maintain non-equilibrium structures that are highly improbable. Biological organisms can maintain fluctuating structures within *limits* of contextual information patterns (e.g., homeostatic regulations). Such structures subsist against entropic decay, actually increase their complexity, and generate new self-organizing heterogeneity.¹¹ This new perspective shows that instead of random disorganizations, the outcome of bio-social events depends upon the stability of dissipative structures within the limits of contextual organizational information. Similar conditions do not necessarily produce similar results. Systems that are open to their environment for matter-energy exchanges may tend toward an equilibrium—but they may also, due to more comprehensive integrations, jump to a higher energy flow-through. For example, successional change in eco-systems demonstrates how interacting life forms can create more integration of the system and more (non-hierarchical) differentiation of the food chains. The mature eco-system has greater diversity with greater capacities to accumulate and re-use resources. This movement, from fragile simplicity to complex and more stable diversity, exhibits a successional transformation from quantity as growth principle to quality as principle of structural stability.¹²

¹⁰ Ilya Prigogine, "Unity of Physical Laws and Levels of Description" in M. Grene (editor) *Interpretations of Life and Mind* (N.Y., Humanities Press, 1971) and Ilya Prigogine and others "Thermodynamics of Evolution" in *Physics Today* Vol. 25 #1, 1972.

¹¹ See John and Nancy Jack Todd, *Tomorrow Is Our Permanent Address* (N.Y., Harper & Row, 1980), p. 48.

¹² See Magoran Maruyama, "The Cybernetics: Deviation-Amplifying Mutual Causal Processes" in *American Scientist* #51, 1963, and G. Nicolis and I. Prigogine., *Self-Organization in Non-Equilibrium Systems* (N.Y., Wiley Interscience, 1977).

Such successional transformation brings into the organization of the eco-system more organized inter-connectedness—that is, more contextually operative patterns of reciprocal causation that enable energy-matter transformations to realize optimal spatial organization. In this sense the eco-system, due to its own *informational structure* creates its own morphic genesis within that context. The patterns of this morphogenetic structure are presented within terrestrial *appearances*—representation of this order within universal physio-chemical formalized language is possible but the *genesis* would be lost.¹³ A complementarity of natural science approaches to, at least, terrestrial organic systems is suggested.¹⁴

A complementarity of analysis is, of course, what Gregory Bateson suggested by his distinction between entropic ecology (bio-energetics) and “communicational,” or negentropic ecology.¹⁵ Awareness of relations, patterns, interactive forms, symmetries, etc. is essential for recognition of how natural processes are transformed in *time*. Understanding the *genesis* of context-specific organizational forms is necessary if the static world of mechanics, or the random decay of structures, is not the sole basis for a universal physics. Indeed if we take these physics of a static world seriously, time is only a parameter of the four-dimensional geometry called physical dynamics. Although the second law of thermodynamics (the entropy law) can be taken

¹³ Lancelot L. Whyte, “Towards a Science of Form” in *Hudson Review* Vol 23 #4, Winter 1970–71, reminds us of the sense in which the natural world is a perceptually present world of spatial units from molecules, crystals, organisms to solar systems and spiral nebulæ. How these spatial forms are generated—how these units and hierarchies of units arise in nature—is the project of a morphic science.

¹⁴ H.H. Pattee, “Complementarity vs. Reduction as Explanation of Biological Complexity” in *American Journal of Physiology* Vol. 236 #5, May 1979 where he argues:

As a consequence of this property of information none of the rules or constraints of information-processing systems can be reduced to rate-dependent equations (to the structural laws of nature T.S.), and therefore their descriptions cannot be integrated in time, as are rate equations, to give the trajectory or behavior of the system. Such informational constraints that have rate-independent alternative structures are called nonintegrable... constraints. I would define biological function as activity that is controlled or measured by nonintegrable constraints.

— (p. R244)

Both the explanatory laws of physics and the cybernetics of nonintegrable constraints are essential for an account of biological organization.

¹⁵ Bateson, *op. cit.*, p. 460.

as defining a general trend in collections of atoms, molecules, etc., there are some implications that point beyond such an order of nature. For example, it differs from the “composite unity” notion of natural order (the microscopic building block image) by referring its cognitive claims to the patterns of collectivities of objects. But more interesting in a world of spatial events, it refers to a temporal *irreversibility* of processes—especially on the macroscopic scale, and especially in the sphere of “biological-space” where highly improbable (in dynamic terms) non-equilibrium structures are situated in wider contexts. Hence, the theory of dissipative structures suggests that the physics of dynamic spatial events is not complete and requires the complementarity of an analysis of irreversible structures too.¹⁶

The implications of this effort to extend theoretical physics has resulted in the Nobel Prize (1977) for Ilya Prigogine and its technical import is to define a new scientific revolution that the future will explore. But an implication that is relevant here is that it has broken the epistemological frames of modern science and suggests that Whitehead’s insights were basically on the right track. The study of nature itself has led to an insight into the “evolutionary” horizons of natural processes in themselves; the pre-theoretical sense of future and past turns out to be a more adequate model of “time’s arrow” than the cognitive representations of the physics of classical mechanics. “Time” is not just a subjective illusion of an anthropomorphic observer but a property of dissipative structures. The scientific myth of the “infinite” universe of matter in (determined) motion is broken—suddenly a new nature appears where self-organizing innovations are always possible. The game of natural “process” is not completely representable in the abstractions of physical dynamics—bifurcations and instabilities within macroscopic nature forces an end to the imposition of geometrical spatialization of events, and concentrates our attention upon the *genesis* of organized, functionally integrated, organic forms. Recognition of pattern formation cannot be constructed from instrumental measurements alone but requires also a time dimension—a *morpho-genetic* reconstruction.

¹⁶ Ilya Prigogine, From Being to Becoming: Time and Complexity in the Physical Sciences (San Francisco, WH. Freeman & Co., 1980).

The human encounter with nature is no longer representable by an instrumental interest in nature. A more complex dialogue with "nature" is essential in that both pattern formation and limits of dissipative structures fluctuations must be known to understand development.

Theoretical physics now suggests that the organic cannot be reduced to the fundamental "primary" laws of the inorganic; "secondary" laws (i.e., non-equilibrium thermodynamics) seem equally basic. It is no longer possible to postulate that the rate-processes of trajectories (for macroscopic) and wave functions (for microscopic) are sufficient in themselves and they must be studied in conjunction with the developing world of dissipative and morpho-genetic structures. Such a complementarity will go into the very foundation of theoretical physics itself—as well as be duplicated at every "level of organization" within a self-organizing universe.¹⁷

For example, the genesis of morphic patterns (or the generation of spatial forms) is accessible to description by the methods of holistic biology or ethology and yet these descriptions may use data created by formalized measurements of energy-flow, etc. Thus, descriptive reconstruction of contextual patterns of homeostasis or other more complex forms of self-organizing orders, "morpho-genesis," is possible. But such contextual patterns can be viewed as created by the interaction of forms of life striving to maintain themselves in context. Such morphic forms of organization display a patterned order that has been called "authentic phenomena" (Portmann) within the perceptible surfaces of the things that surround us.¹⁸ The origins of these perceptually discoverable forms are unintelligible in the formalizations of a Galilean science and yet are significant for the interaction of life forms. Life shows itself in surface patterns that display an active posturing of life's identity, form, and innerness. Life forms have a centricity, an inwardness that cannot be reductively explained or anthropo-

¹⁷ G. Nicolis and I. Prigogine, *Self-Organization in Nonequilibrium Systems: From Dissipative Structures to Order Through Fluctuations* (N.Y., John Wiley & Sons, 1977).

¹⁸ See Marjorie Grene's *Approaches to a Philosophical Biology* (N.Y., Basic Books, 1965) for a discussion of Portmann's thinking in contrast to other biological theorists who reject the Galileian primary qualities as fundamental for organic life. For a brief introduction to Portmann in English, see "Beyond Darwinism" in *Commentary* XL (1965), pp. 31–41.

morphically interpreted. Insofar as we are ourselves participating within the natural energies that impinge upon us, we are related to a morpho-genesis of nature that is not universal.

Hence, a morphogenetic epistemology is an alternative to the earth-alienation of a constructivistic mathematization of the sensual manifold. Its place in the contemporary system of knowledge is more important than the current division of knowledge would imply—for two reasons. First, as a Gaia hypothesis below claims, we may be living in the midst of an organic unit whose living operations must be recognized to avoid ecological destruction. Secondly, the current division of knowledge has created a “blind spot” in our knowledge which requires the rethinking of how modern science relates to socio-economic development on a global scale.¹⁹ The second becomes even more crucial in the context of the presence of *Gaia*.

III —————

The Gaia hypothesis was formulated by a space scientist trying to define how to identify the presence of life on Mars or Venus. By modeling the earth’s atmosphere along the principles of an analytical chemistry equilibrium, James Lovelock discovered significant differences in the atmospheric composition of the earth in comparison to Venus and Mars.²⁰ Computer simulations indicated that the final equilibrium, or steady state, atmosphere for earth would resemble that of Mars and Venus with approximately 98% carbon dioxide, about 2% nitrogen, and traces of oxygen. The actual earth’s atmosphere composition is, however, maintained at a highly improbable composition of 0.03% carbon dioxide, 79% nitrogen, and 21% oxygen. Furthermore, this unlikely atmospheric composition seems to have been maintained for more than three billion years despite the fact that the sun’s early intensity was 30% lower. From these and other improbable conditions (e.g., the constancy of the salinity of the oceans despite continuous salt input into the seas) that make life possible, Lovelock and others have

¹⁹ This argument is developed below in Section IV.

²⁰ J. E. Lovelock, *Gaia: A New Look at Life on Earth* (N.Y., Oxford University Press, 1980)

proposed that the only possible explanation for these statistically impossible coincidences is to see the atmosphere as an organic construction: that is, as an adaptation by the biosphere-and oceans that secures the conditions necessary for life. Although all of the adaptive mechanisms that create the optimal global parameters necessary for life maintenance are not yet understood, many have been described. These are the reciprocally causal compensatory processes that return life parameters to acceptable levels.

For example, atmospheric oxygen levels, which are constantly increased by the products of photosynthesis, are kept in the 21% range by a self-regulating methane production cycle which absorbs oxygen within the atmosphere and releases it in the stratosphere. In the absence of methane production by bacterial fermentation of the anaerobic muds and sediments of the sea beds, marshes, and estuaries, the oxygen concentration of the atmosphere would rise as much as 1% every 12,000 years. (The probability of forest fires starting increases 70% for every 1% rise in oxygen concentration; at 25%, all vegetation on earth will burn.) Increases in atmospheric oxygen lead to overgrowth of aerobic micro-organisms which in death decay and increase the methane production potentials of the anaerobic microflora at the bottoms of seas, marshes, wet-lands, etc. This organic self-regulating control of the amount of oxygen in the atmosphere is also tied into other complex signaling mechanisms that involve complementarities of nitrous oxide and methyl chloride (both of organic origin) with methane in the atmosphere, and constitute an organic cycle that extends throughout the global processes of biosphere and oceans. Reconstructing these patterns, the contemporary science of aeronomy increasingly documents the fact that without life's interference, oxygen *and* carbon dioxide levels could not be regulated. Thus, self-organizing global patterns reveal the self-reproducing goal-adaptations by *Gaia*—an identity that becomes more and more inescapable.

These invisible global patterns that make visible the constants essential for life are themselves modifications of the environment by the totality of life forms themselves. Only this hypothesis can account for the highly improbable homeostasis of the earth for over three billion years. While the Gaia hypothesis itself has not yet been scientifically established, its current plausibility provides several highly significant implications. First, if Gaia exists, then our actions in relation to the natural environment must become

more informed about these self-regulating regulations (for example, modern increases in fossil fuel produced carbon dioxide and its “impact” on the Gaian regulation mechanisms). Secondly, the extent to which we currently do understand Gaian reproduction cycles, helps us suddenly to see that the vital “organs” of Gaia are the continental shelves and wetlands where planetary controls are centered in the ecology of aerobic micro-organisms and anaerobic microflora that are so important for atmospheric regulations. These ecosystems are of crucial importance for Gaia and their protection from human destruction therefore become a primary end for human survival.

The Gaia hypothesis challenges contemporary fears that pollution is the major problem of environmental destruction and that the dynamic of technology is its cause. Instead, what has to be understood are the morphogenetic symbiotisms within the global patterns of Gaia. *Where* we bring about socio-technical innovations may be more important than *what* we do. Given the global dynamic of an international economic system (see below), the ecological hazards of the modernization of global agriculture seem more dangerous than industrial pollutions (at this time). As world populations increase, the crisis potentials of agricultural modernization will also increase. Increasing human control over the earth’s biomass will force higher energy interventions in just those areas where global diversity and symbiotism are essential for optimizing conditions for terrestrial life. Specific agricultural projects—such as deforestation of the tropics and sea “farming”—may have global consequences unrecognized at present. Much more understanding of the “wisdom of Gaia” is needed for the human species to avoid altering some of the time cycles and in-built deviation-counteracting regulations of a global organism whose homeostasis is only now being recognized.

The Gaia hypothesis remains fruitful as long as the global patterns of goal-maintenance cannot be explained in terms of the laws of their components. No doubt the charge of “teleology” will appear.²¹ But if we understand that “teleology” refers to some-

²¹ As indeed it has: See W. Ford Doolittle’s review of Lovelock’s book in *Coevolution Quarterly* #29, Spring 1981, pp. 58ff. where the charge that the feedback loops of Gaia are either created by natural selection or, more likely to Doolittle, occur by chance. In response, we can return to Prigogine’s theory of dissipative structures:

thing that stands outside of a process and yet directs it too, then homeostasis and morphogenetic processes are not teleological. The patterns of reciprocal causality are “teleonomic,”²² in the sense of goal-directedness according to the operations of informational structures inherent in the forms of organization. Hence, no claim is made that a final end stands outside of the mechanisms of change and directs it by “causing” it to change—rather, emergence of stable non-equilibrium integrations are constitutive of organic organization (e.g., homeostasis of body temperature), ecosystem succession through differentiation and non-equilibrium integrations.

How a “program” for goal-directedness is acquired is separate from the teleonomic manifestations of its operations. The fundamental question that emerges whether if the “program”—the informational structure—is an unplanned result of teleonomic operations of self-maintenance or an indication of a “program of purpose” in nature? The assumption of Gaian theorists, if I understand them, is that the homeostasis of Gaia can be understood only in the reconstruction of history of its formation on the one hand, and in increased global monitoring of the atmosphere, oceans, and natural environmental regulations (made possible by contemporary satellites and information technologies) on the other. The “program of purpose” inherent in Gaia is teleonomic operations and the program of homeostasis is an unplanned result defined only by the *limits* of the structure itself. In this sense, Gaian “purpose” is teleonomic in that the self-maintaining forms do not necessarily have a program of *self*-maintenance—stability

We here propose an alternative description of prebiotic evolution. The main idea is the possibility that a prebiological system may evolve through a whole succession of transitions leading to a hierarchy of more and more complex and organized states... As a result, if the system is to be able to evolve through successive instabilities, a mechanism must be developed whereby each new transition favors further evolution by increasing the nonlinearity and the distance from equilibrium. One obvious mechanism is that each transition enables the system to increase the entropy production...

— in “*Thermodynamics of Evolution.*” *op. cit.*

However other reviewers of the book find the hypothesis tenable: See K. Mellanby, *New Scientist*, Oct 4, 1979; René Dubos, *Nature*, Nov. 8, 1979; P Morrison, *Scientific American*, March 1980.

²² Erns Mayr, “Teleological and Teleonomic: A New Analysis” in *Boston Studies in the Philosophy of Science* 14 (1974), pp. 91–117.

and instability are both possible as perturbations of dissipative structures. Of course we do not know enough about the Gaia “program”—but the possibility that there is a morphogenetic logic to nature’s development cannot be avoided. More complex patterns of heterogeneity, differentiation, and symbiotization may evolve and the human species may become more and more central to Gaian development.

If the Gaia hypothesis is correct, the earth is not a “space ship” to be maintained by human planetary engineers. This technological metaphor continues the unconscious forms of technical control that must be transcended in order to participate cooperatively in Gaian ecology. “Nature” is not, as the modern myth of progress suggests, amenable to endless interventions that secure socio-economic development.

IV —————

The logics of commodification and technical control force a shorter and shorter time frame upon socio-economic decisions. “Time is money”: the scarce resource of investment cycles determine a global dynamic of environmental simplification which amplifies the technical interventions and domination of nature on a world scale. International differences in “income” (read hierarchical power advantages) force a global dynamic of rapid economic development for all.²³ Low income countries are forced by rising food prices, especially in areas already subject to declining food production, to pursue desperation techniques that further degrade the land and create competition for scarce capital between the competing goals of agriculture, industry, and energy. The response now viewed as necessary is, for example, greater technical interventions into agricultural production where the present commodity values determine decision-making to the exclusion of ecological consequences. Hence, monocultural crop simplifications, loss of soil nutrients, and increases in pressures upon water resources, all compound to further force the less developed nations of the world

²³ See EM. Lappe and J. Collins, *Food First: The Myth of Scarcity* (Ballantine Press, 1978). Also see *The New International Division of Labor* by F. Frobel, J. Heinrichs, D. Kreye (Cambridge University Press, 1980).

to push for immediate increases in their incomes in order to continue the use of these high-energy technical interventions. These lead to deforestation, over-grazing, destructive cropping practice, desertification, and salination (water depletion through increased irrigation), and loss of genetic plant and animal resources as wild habitats are destroyed. The ultimate consequence of such “neutral” applications of science to ever more powerful interventions in agricultural production is an intensification of the income gap between the less and more developed countries and an even greater desperation that leads to worse ecological interventions to meet immediate needs.²⁴

The logic of management and development imposed by an international economic system forces the immediate evaluation of all resources as present commodities. Economic rationality presumes that the commodification of the environment—as the costs of producing a resource and bringing it to markets—also makes ecological sense. This logic of commodification is also extended to pollution, where the polluter-pays principle supposedly will restrict levels of pollution.²⁵ But, the ecologically necessary components—such as genetic variety supplied by wild habitats—do not have any commodity value in present market evaluation. They are “external” to the costs of private production.

Despite growing awareness of environmental dangers, the dynamic of the international economic system has become ever more disruptive since the middle of the 1960’s when the post-World War II economic boom ended. Since then, declining output, overcapacities, stagnating rates of investment in the developed core of an international economy, have led to a new entrepreneurial strategy based upon investments in the rationalization of the production process, both within core economies as well as in planned plant relocations in less developed countries. This new strategy for maintaining capital accumulation on a world scale simply utilizes the greater technical power that new forms of transportation and communications provide, while also subdividing the production process so that cheap labor can be used with little or no cost of either training or being responsible for the work force. New operational breakdowns of manufacturing processes permit the use

²⁴ See Gerald O. Barney, The Global 2000 Report to the President of the U.S.: Vol. I The Summary Report (NY., Pergamon Press, 1980).

²⁵ See Klaus Myer-Abich, *op. cit.*

of unskilled or semi-skilled workers over which the plants have more control and less costly responsibility.

The human costs of this new international division of labor is greater insecurity for labor forces throughout the international economy. Workers in core industrial-market societies experience more unemployment, plant closings and, in some cases, loss of their acquired professions too. The dynamic in less developed nations is tied into the uneven development pattern where the modernization of agriculture increases production at the cost of destroying traditional rural communities and subsistence forms of survival. Forced into migration to urban-slum plant relocation centers, these newly "liberated" workers provide an inexhaustible source of the cheapest and most exploitable labor.

However, the plant relocations are part of the forces of underdevelopment in that this industrialization is oriented only to production for export. Local purchasing power is too low to tie into this modernized sector and thus a dual economy is maintained. Dependency begins however when such countries attempt to provide the infrastructure needed for plant relocations (i.e., water, energy, roads, airports, etc.) because they hope they can realize benefits from it. But use of capital surplus generated from the modernized agricultural sector to try to finance industrial development puts additional strains upon rapid agricultural growth (with all the associated environmental problems mentioned above) while actually depleting and stagnating the rural social community and economy.

What Western economists are only now beginning to recognize is that development of natural resources is mainly an ecological problem that requires the recognition of bio-economic limits. This, of course, does not include the recent brands of economics that have emerged to renew late capitalist expansion (e.g., monetarists, "supply-side" economics). The problem with these new instruments of economic guidance is that they have no awareness of the bio-economic contexts of economic processes and seem to assume that the price mechanism can create matter and energy, prevent ecological crises, and stop social conflicts that derive from the inequal distribution of natural resources and the knowledge and

tools needed to develop them.²⁶ Not least of all in these cycles of economic and technical pressures upon the earth is the growing desperation of newly proletarianized workers everywhere. Increasing intensification of social conflict and wars has led to increased militarization and police violence. The *dis*-economies of this global economic rationalization expand with every new phase of “modernization” of the knowledge and tools used by “under-developed” peoples.

This global dynamic of enforced domination of nature and international divisions of labor is a story that can be told from the point of view of the expanding system’s “stability”—or from the point of view of coercions upon the subsistence forms of human survival which it uproots (de-territorializes).²⁷ This global dynamic is created by the interests of the metropolises over the interests of villagers, peasants, rural communities, dependent unskilled workers, etc. on an international scale. Rather than assume that the developed world’s techniques are essential for “human survival” (which means more than minimal biological needs, since it involves cultural beliefs about the good life), the encounters of developed-nondeveloped worlds can be narrated from the point of view of those who are nor yer dislocated from subsistence forms. The relevance of this perspective is not to advocate a “no-growth” and “de-modernization” ideology but to begin from a situation where human survival demands an active participation in nature and thus where a new form of “development” can be experimentally innovated. These contexts have the sense of place (which mobile wage-laborers have usually lost) and collective identity that is essential for active resistance to new phases of modernization in the interest of outside structures. Advocacy research that can demonstrate where the hidden social costs of “socializing” production imply increasing the chances of de-territorialization (i.e., greater dependency) and irreversible environmental destruction, and de-colonialization movements can be identified and supported. In these areas experimental models of eco-development can and are being created that discover multiple-use of local re-

²⁶ See Nicholas Georgesev-Roegen, “*Inequality, Limits and Growth from a Bio-Economic Viewpoint*” in *Review of Social Economy* V. 35, Dec. 1977.

²⁷ See Serge Moscovici, “*The Re-Enchantment of the World*” in Norman Birnbaum, *Beyond the Crisis* (N.Y., Oxford University Press, 1977) for an analysis to which this paper is indebted.

sources, identify sustainable yields that meet the needs of local peoples, while encouraging self-reliance and symbiosis between people and nature.²⁸ This means participation in the natural forces that make life possible in ways which are compatible with their permanent sustainability (e.g., renewal energy sources) both locally and globally. Participation in nature does not mean delusions of “self-sufficiency,” or ascetic “voluntary simplicity,” or reactionary ideologies of “survivalism,” but active appropriation of technical knowledge of renewable energy, food production, health care, full use of indigenous co-operative forms as well as political networking with other groups. Collectively these efforts form an alternative of eco-development and “reinhabitation.”²⁹

Thus, a sphere of emancipation not generally recognized is latent in the “ecology movement’s” rejection of the existing hierarchies of international and internal colonization of subsistence forms of production and socialization. A democratization of technical learning would unify at the level of everyday practice a problem-solving approach that is compatible with household and local survival and the eco-system’s carrying capacity. This approach is already implied by efforts to create counter-movements in science (such as the “appropriate” technology movement) and can be recognized in the American population shifts of the 1970’ which signaled a significant return to rural living. What is less visible is the growth of subsistence exchange networks (the “underground barter economy”) which increases the flexibility and availability of resources to the many categories of subsistence lifestyles.

To realize, as Ivan Illich’s insights document, that the unrecognized pre-condition for the possibility of wage-labor is “shadow-work”—or the enforced forms of labor that complement wage-labor such as “house-work,” the forced consumption of schooling, accreditation, or other activities required for “job-holding.” These

²⁸ Raymond Dasmann, “Eco-Development” in the *Planet Drum Review* Vol. 1 #2, Winter 1981.

²⁹ The term “re-inhabitation” is taken from one of many local journals which are now advocating the watershed as the natural eco-development unit. The strategy is the use of a combination of oral history and local ecological research as a place identification approach. See Paul Ryan’s *Talking Wood: Living in the Passaic Watershed*, 1980 (Talking Wood, PO.Box 364, Pompton Lakes, N.J. 07442). (But the original use of the term was by Peter Berg in an article on “Re-Inhabitation of California” in *The Ecologist* in the early 1970’s.)

forms of unpaid servitude emerged simultaneously with the enclosures of commercial capitalism which had created a major conflict of domestic and “public” spheres of existence. The result was a new economic interest in the sex-coupling of female shadow-workers and male wage-workers that replaced more equitable forms of subsistence work for both sexes.³⁰

Illich’s thesis is that the bifurcation of work in the modern era into wage-labor and shadow-work, which has been unnoticed by Marxists and Liberals, constitutes an intensification of modern society’s “war against subsistence.” Marx’s notion of international capitalism forming an irreversible context of world-history receives a significant contextualization by Illich’s naming of the form of domination that falls through the Marxist categories. Marx effectively accepts Ricardo’s theory of the comparative advantage of an international specialization of production, and in doing so, affirms the civilizing impact of capital despite the exploitation of poor nations by the national economics of the “developed” world. That unequal economic exchange creates dependencies internationally (and within national economies) indicates that the actual advantages of the higher productivity of capitalist production and wage-labor must now be balanced by systematic analysis of the real increase in use-values given the hidden costs of shadow-work and ecological destruction. The costs of shadow-work can be recognized as a major burden placed upon the majorities within the “developed world” too—in the form of endless schooling for job-holding and long periods of private accumulation for a capital-intensive household. In so far as this can be documented, it will show that the real dominations of modernity are the destructions of subsistence activity and the enforced dependencies of wage-labor and consumer lifestyles.

Subsistence activity begins with a self-reliance and self-determination in the meeting of human needs that is also aware of the co-evolutionary need for nature’s patterns to “subsist” too. Adoption of subsistence strategies of adaptation to the environment maximize social flexibility and ecological diversity, while also eluding the endless desire for new commodities that seems to be the motivational glue of modern commodity-intensive worlds. What has been called the “counter-cultures” by both apologists

³⁰ See Ivan Illich, *Shadow Work* (Boston, Marion Boyers, 1981).

and critics fails to grasp their unique basis in subsistence production of use-values. While sociological essayists condemn these practices as communal ideologies that seek “pseudo-*gemeinschaft*” or are “parasites” on the prevailing social systems, they fail to reflect upon the split between wage-labor and shadow-work that their own academic careers presuppose.

Eco-development and re-inhabitation movements are the theory and practice that could make a difference for parts of the “third world” and for enclaves of the fourth world. Within modern political states, the very same movements are often viewed as “de-centralization strategies.” But the more effective language is no longer socio-political but ecological concepts of bioregions, watersheds, and ecosystems. These units represent real “unmovable capital” which can be defended against the forces that would commodify them as “natural resources” and abandon them to centralized management decision-making processes. The point of indigenous, or re-inhabitation settlement, is to claim the rights of inhabited place against corporate natural resource planning as justifiable resistance to colonially occupied territories. Here is where “mediating structures” are really needed that would provide state resources for local employment to define multiple use and sustained yield potentials of a bioregion as well as to provide access to legal due process. Because “property rights” are basically the norms of use agreed upon by law, the strategy of eco-development will require systematic transformation of the norms of property use as part of the rights to liberty of citizens. An ecologically rational society cannot emerge without a politically concrete understanding of the need for extending the normative regulations that protect the democratization of social practice. Here is another area where a counter-movement in the (social) sciences is a necessary precondition for a realizable alternative future.

Critical social scientists beginning from the existing practice of, say, the feminist or ecology movements, may make it more possible to radicalize and guide experimental practice by constructing models of democratization that anticipate more universal and reflexive forms of learning. The existing strategies for “self-management” of productive organizations could be recast in terms of the “communicative rationalization”³¹ of decision-making processes, and how

³¹ For the notion of communicative rationalization, see Jurgen Habermas’ “*Science and Technology as Ideology*” in *Toward a Rational Society* (Boston, Beacon, 1970).

these may be more discursively open to participation. Societally the notion of communicative democratization is also helpful for the modeling of more open policy formation processes in which a discursively formed debate could challenge the technocratic suppression of publics, Immanent critiques of societal processes of compromise and consensus formation could radicalize existing political struggles for democratization in America such as:

- a) the forming of parallel structures that can provide advocacy services for depoliticized policy spheres;
- b) the forming of resource networks that can act collectively on local or wider issues;
- c) the use of advocacy and network forms to support the creation of voluntary associations of all kinds that can empower people to solve their own problems.

In these cases, analysis of the blocks to democratization can be measured against the openness of consensus achieved without force. A social ecological limit to the democratic forming of the goals of society rests upon the legitimacy of the *non-coerced* processes by which they are formed.

An overall consequence of this communicative notion of democratization is to resolve the 19th century antinomy of socialist and anarchist principles of the political versus the social revolutions. It makes possible a reconciliation of a de-centralizing practice that increases local and/or regional autonomy—while also providing a notion of rational consensus formation which can be extended by the operations of both scientific communities and socio-political processes. The rationalization of communicative learning, like anarcho-communist libertarianism, sees the dissolution of social force that prevents the conscious resolution of conflicts as the “mechanism” for the creation of more appropriate forms of freedom. What has been missing in anarchist libertarianism is the capacity to move beyond the heroism of the deed and anticipate more universalizable forms of democratization. Conversely what has been missing in orthodox Marxist “productivism” is a criterion for emancipation that goes beyond the self-validating

However, this paper represents a critique of Habermas’ instrumental concept of natural science as well as his orientation toward core nation-states of the West. For an account of his notion of critical theory, see my The Critique of Domination (Boston, Beacon, 1974).

ideology of “socialist authority.” While anarchists effectively view all past forms of “justice” as corrupted and destroyed and only the present authenticity of affinity-groups as consistent with libertarian futures, they fail in their conception of how these “islands of liberation” relate to wider social and political processes.³²

V —————

The dynamic of global development and the counter-potential of eco-development and re-inhabitation defines a conflict potential central to the current international economic development as well as internal to core nation-states. For example in the United States the energy crisis era has resulted in regions that have been designated “zones of national sacrifice” (by the National Academy of Science). In these areas, such as Appalachia and the American Indian reservations, from Mexico to South Dakota, designation of such zones justifies energy corporation colonization as a national necessity. The extensive domination exercised by corporations over the life chances of mountaineers and Indians has been hidden behind the claims that these areas are the major coal and uranium resources of the country. In both cases, the images of backward cultures and the need to integrate the regions into the national economy are used to justify a colonial practice that basically leaves the area’s people more dependent and their land irreversibly damaged. In both areas, resistance to ecological destruction and re-affirmation of ethnic identity create movements for protection of rural and/or tribal culture. These areas (and

³² Yet there is a sense in which the anarchist position’s notion that theory and practice is ultimately unified at the level of action which changes reality cannot be faulted. Especially in the American context, there is an affinity of anarcho-libertarianism and the historical symbols of independence, self-determination, and self-reliance which are, at least in origin, not reducible to possessive individualist idealizations of self-interested production for gain. These American practices were socially and ethically mediated by the ever-present American quest for “community.” An anarchist practice still permeates the American movements for decentralization, ecology and appropriate technology, feminism, etc. There is also a unique amalgam of Old World utopian surplus and contemporary anarchist, neo-primitivist, and nativist symbols that simply mystifies Marxists—especially theoreticians who expect social relations to dance according to their notion of reason.

others such as parts of the northwest) are the internal third worlds of the United States and represent critical bioregions where central economic policy directly contradicts the needs of human survival. Here, as in other colonized parts of the world, the possibility of *human* survival (and ecosystem sustainability) does not depend upon administrative and economic rationalizations, but upon the democratization of knowledge and tools on the one hand and the activation of rehabilitation and decolonization movements on the other.

The scope of a truly universalizable emancipatory practice requires a systematic recognition of the ecologically sustainable forms of production and appropriation of traditions. Both economic liberalism and Marxist socialism remain hopelessly rooted in 19th century assumptions of nature as an infinite reservoir of resources and infinitely manipulable as the progress of technical knowledge provides more and more power over nature. These ideologies are equally blind to ecology, subsistence forms, and the possibilities of the critical re-appropriation of tradition. In the United States there are potentialities for activating indigenous traditions that have a libertarian cultural surplus for justifying the empowering of people, the identification with place, and local and ethnic identity.

This raises the issue of “cultural nationalism” which the left sees as identifications with particularistic identities that are potentially “reactionary.” In this light, the recent statement by the Sioux Indian spokesman Russell Means at the 1980 Black Hills Survival Gathering voices a response to this logic:

Revolutionary Marxism is committed to even further perpetuation and perfection of the very industrial process which destroys us all. It offers only to “redistribute” the results—the money, maybe...

So, in order for us to really join forces with Marxism, we American Indians would have to accept the national sacrifice of our homeland; we would have to commit cultural suicide...

...I hear revolutionary Marxists saying that the destruction of the environment, pollution, and radiation will all be controlled...Do they know how these things will be controlled? No, they simply have faith science will find a way... Science has become the new European religion for both capitalists and Marxists; they are truly inseparable...

All European tradition... has conspired to defy the natural order of things. Mother Earth has been abused, ...and this cannot go on forever... Mother Earth will retaliate, the whole environment will retaliate, and the abusers will be eliminated. Things come full circle... *That's* revolution, And that's a prophecy of my people, of the Hopi people... American Indians have been trying to explain this to Europeans for centuries.³³

Other voices from internally colonized sectors of this country speak the same vision, albeit in different traditional symbols:

A healthy culture is a communal order of memory, insight, value, work, conviviality, reverence, aspiration, It reveals the human necessities and the human limits, It clarifies our inescapable bonds to the earth and to each other... A culture cannot survive long at the expense of either its agricultural or its natural sources. . The word "agriculture," after all; does not mean "agriscience," much less "agribusiness." It means "cultivation of land." And "cultivation" is at the root of the sense both of "culture" and "cult." The ideas of tillage and worship are thus joined in culture, And these words come from an Indo-European root meaning both "to revolve" and "to dwell." To live, to survive on the earth, to care for the soil and to worship, are all bound at the root to the idea of a cycle... If we corrupt agriculture we corrupt culture, for in nature and within certain invariable social necessities, we are one body...³⁴

It is my contention that the Sioux spokesman and the poet from Kentucky both speak for the same American future and presuppose the same notion of time's order in nature. In tha way they are both involved in the cultivation of an ecologically rational society, which a little reflection on time's order in nature implies.

³³ Russell Means, "For the World to Live, 'Europe' Must Die" in *Mother Jones*, Dec. 1980.

³⁴ Wendell Berry, *The Unsettling of America: Culture and Agriculture* (San Francisco, Sierra Club Books, 1977).

Book Review THE GEOPOLITICS OF
INFORMATION (*Anthony Smith, Oxford University
Press*)

B. P. Menon

The first inkling I ever had of the geopolitics of information came when I was six years old, in the “first standard” at Miss B. Hartley’s school in Calcutta. Our textbook for geography, a leftover from the then recently extinguished British Raj, described “hill stations” as “places where white people go during the hot summer months.” Miss Graham, our teacher, a leathery grey-haired white woman (whether Anglo-Indian or not was a matter of speculation), had us underline all the important definitions in the book. When she came to “hill stations” she bowed to the realities of independent India and had us underline the sentence with the exception of the word “white.” The underlined definition read “hill stations are places where people go during the hot summer months.” I thought nothing of this definition till my mother chanced upon it while supervising my homework. I heard her snort. She muttered something under her breath, reached for my pencil, and obliterated the entire sentence from the page.

As far as I can see, the call for a New World Information and Communication Order, for which UNESCO is regularly criticized in the Western press, is based on sentiments similar to those of my mother—a desire on the part of the leaders of the world’s poorer countries to protect their people from the subtle and not-so-subtle racial and cultural propaganda of the rich countries of Europe and North America. Most Western journalists, especially those who have taken an interest in the debate on this matter, will of course snort at my use of the word “propaganda.” For them it is but “free flow of information,” with good lads like themselves (and increasing numbers of lasses) doing their objective best to report the world as it is. Attempts to discuss the imbalances in the flow of world news (with most of it going now from the rich countries to the poor), they see as a threat to the freedom of the press. And

UNESCO, they think, “under the influence of communists and radical Third World governments” is trying to “license” journalists when it dares speak of acceptable standards. What most Western journalists fail to notice is that such reactions provide the best example there is of the overtly propagandistic role of Western mass media. The popular fears and suspicions attached to the whole matter of the Third World’s desire for change in the global order of things are not accidental. They have been deliberately fostered and are the defenses of an entrenched moral and economic value system. It is not hard to see that the fears raised by Western commentators on the matter of Third World demands for change are bogeys. They result either from a gross misunderstanding of facts or, in a distressingly large number of cases, from deliberate distortions and lies. For the benefit of those inclined to dismiss this as (to use phrases I have heard in this regard) “unreal,” “paranoid,” or “super-sensitive,” let me present here some concrete evidence, an annotated version of a “news story” that appeared in The New York Times on 28 June.

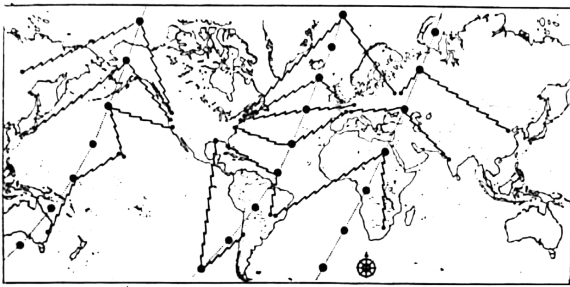


Figure 3.1 *Echo*: transmitter-receiver stations. (Bell Labs).

U.N. Gave \$432,000 To the Foreign Press To Publish Its Views¹

By BERNARD D. NOSSITER

Special to The New York Times

UNITED NATIONS, N.Y., May 27—The United Nations has acknowledged² giving subsidies of \$432,000 to 15 foreign newspapers for supplements promoting the organization's view on aid to the third world.

The newspapers receiving the money included *Le Monde of Paris* and *Asahi Shimbun* of Tokyo, each of which received the maximum grant of \$48,000, according to a table supplied by the United Nations.

A 16th paper, *Jornal do Brasil* of Rio de Janeiro, said it ran the supplements but refused the grant as improper.³

A Japanese Provided Money

The money was provided by Ryoichi Sasakawa, an influential conservative Japanese businessman who has supported the United Nations financially before. His help with the supplements was solicited by Genichi Akatani, a former United Nations Under Secretary General for Public Information. Mr. Akatani obtained \$1.25 million, according to his Japanese successor, Yasushi Akashi.

None of the supplements, which appeared quarterly, were labeled advertising, nor did they contain any references to the grants.⁴ They consisted of articles written by the participating

¹ This is incorrect. The aim was not to promote the U.N. or its view but to get a wide-ranging exchange of different views.

² The use of the word "acknowledge" is calculated to make it seem as if the U.N. had previously tried to hide this information: In fact, the project was announced to the press in 1979. Press releases, leaflets and booklets on it were released. *The New York Times* itself was asked to participate in the project. A letter from its publisher, Arthur Ochs Sulzberger, said: "It is with great regret that we shall not be able to participate. I do hope that you will find other newspapers that will be able to cooperate and I look forward to seeing the product of your ideas."

³ No representative of the *Jornal do Brasil* ever said at any meeting of the editors that the grants were improper.

⁴ The payments covered a part of the newsprint costs. If this made the supplements "advertisements" then all stories filed from U.N. Head-

newspapers and by United Nations agencies. Each participating paper was required to carry three articles produced by the United Nations, according to Leila Doss, director of the division for economic and social information in the Department of Public Information. Some of the articles written by United Nations officials were identified as such in at least some of the papers.

Reached by telephone in Paris, *Le Monde's* director, Jacques Fauvet, said. "It is desirable to support the north-south dialogue,"⁵ and he added that he saw "no reason to-refuse" the money. Mr. Fauvet said he did not know that his paper was required to run in each supplement at least three articles prepared by United Nations agencies.

He said that decisions on what went into the supplements were left to Jean Schwoebel, *Le Monde's* former diplomatic correspondent, who receives \$69,600 a year from the United Nations as the project's coordinator,

In Rio de Janeiro, Walter Fontura, editor in chief of *Jornal do Brasil*, said his newspaper rejected \$24,000 to reimburse the paper for newsprint because "we do not feel it is proper to receive any kind of subsidy." He said, "It raises a question with respect to the material."⁶

Mr. Fontura said he tried to persuade the other 15 newspapers that participated to reject the subsidies, "but I was not applauded." Without the money from the United Nations, he did not feel obligated to run its articles. His supplements carried only material chosen by his editors and supplied by the participating newspapers.

quarters by *The New York Times'* correspondents should also be labelled as ads. For the *Times* has accepted free office space at the U.N. for over three decades. The cost of this runs to several hundred thousand dollars.

⁵ The concept of the North-South dialogue, central to the whole project, is mentioned here for the first time in passing.

⁶ The attempt here is to contrast the Mr. Clean image of the *Jornal do Brasil*—a newspaper which has thrived under one of the most repressive military juntas the world has seen—with the impropriety of the other papers involved. The unstated—and absurd—premise here is that the U.N. bribed some of the most independent papers in some of the most openly democratic countries of the world. And that it did so with a few thousand dollars!

Meeting Now in Geneva

What happened to the rest of Mr. Sasakawa's \$1.25 million gift is not clear.⁷

However, the editors of the newspapers involved or their representatives have been meeting every month at the fund's expense in Vienna, Paris and other cities to choose themes and the contents for the supplements. They are in Geneva now to look for fresh funds. Generous expenses⁸ are allotted them, and Mr. Fontira said he had dismissed one of his staff members who accepted a cash allowance.

What the United Nations received for its money is unclear. Mr. Fontura said the project "is not contributing to a dialogue."⁹

In one issue, a long article by Bhaskar P. Menon of the United Nations' Division for Social and Economic Information, deplored the fact that the "new international economic order" had not been enacted. But Mr. Menon did not explain that this is the term used to refer to an enormous transfer of goods and services from rich to poor through the erection of commodity cartels, the printing of money by the International Monetary Fund, big increases in aid and similar devices.¹⁰ Mr. Menon simply described all this as the "decolonization of the world economy."¹¹

Others Also Omitted Details

Mr. Schwoebel, the coordinator, wrote that the supplements should persuade readers to "make sacrifices" for a "new economic and social order." He, too, omitted details. Similarly, Secretary General Kurt Waldheim said the supplements would "help to

⁷ By saying this is "not clear," young Bernie makes it sound as if murky things were afoot. The information was not only available, it was given to him.

⁸ The "generous expenses" were standard U.N. per diem payments which barely cover the cost of hotels and food. The throwaway reference to an unnamed person fired for accepting "a cash allowance" is the very worst type of yellow journalism. It has nothing to do with the U.N. project.

⁹ This conflicts with the earlier assertion that the supplements promoted U.N. views.

¹⁰ An absurd characterization of the New International Economic Order.

¹¹ The quote on "decolonization" is falsely attributed. The full quote in the article reads: "*Developing countries are asking nothing less than the decolonization of the world economy, their own complete economic emancipation.*"

foster a better understanding of the vital objectives of the new international economic order" but left out specifics.

A supplement that appeared last fall in *Dawn in Karachi*, Pakistan, carried a story from *Zycie Warszawy* of Warsaw, another of the participating newspapers, attributing inflation in Communist countries to imports from the rest of the world; an article by a World Health Organization writer on the group's workers in Thailand, and a staff-written review of Western inflation that traced its roots to the "struggle" between "monopoly profits" and unions.¹²

The first supplement appeared in mid-1979. According to Miss Doss of the United Nations, the newspaper grants ran out after a year. The *Frankfurter Rundschau* of Frankfurt, which had a \$24,000 subsidy, and *Die Presse* of Vienna, which received \$16,000, then dropped out of the group, she said.¹³

Now Mr. Sasakawa's gift is exhausted, so Mr. Schwoebel has asked the United Nations to appeal to the General Assembly for \$200,000 to attract more money. Opposition from the United States, Britain and other nations is regarded by United Nations officials as certain to kill this plan.

Mr. Schwoebel has said that three oil countries, Algeria, Venezuela and Kuwait, might replenish the fund, which would raise fresh questions: of influence, Mr. Akashi, the United Nations information chief, said, however, that he would not hesitate to administer money from such governments.¹⁴

The other papers in the project and the subsidies they received were *La Stampa*, Turin, Italy, \$40,000; *El Pais*, Madrid, \$24,000; *Politika*, Belgrade, Yugoslavia, \$37,000; *Zycie Warszawy*, Warsaw, \$40,000; *Magyar Nemzet*, Budapest, Hungary, \$24,000; *El Moudjahid*, Algiers, \$24,000; *Le Soleil*, Dakar, Senegal, \$16,000; *Excelsior*,

¹² A mild version of McCarthyism—code words to set off anti-communist alarms. Again the quotes and assessments are lifted out of context.

¹³ Does not mention the fact that the other newspapers carried the supplements for the second year without financial support. In doing so, the papers in developing countries were making quite a sacrifice as their newsprint is expensive, in short supply, and imported.

¹⁴ "Such" governments conjure up all the sinister images the press here has succeeded in attaching to OPEC countries.

Mexico, \$24,000; *Indian Express*, New Delhi, \$40,000; *Kayhan Newspapers*,¹⁵ Teheran, Iran, \$16,000; *Darn*, Karachi, \$16,000.

¹⁵ Young Bernie was told the Kayhan did not participate although it was willing to. Its inclusion here is for obvious jingoistic reasons.

Peters projection

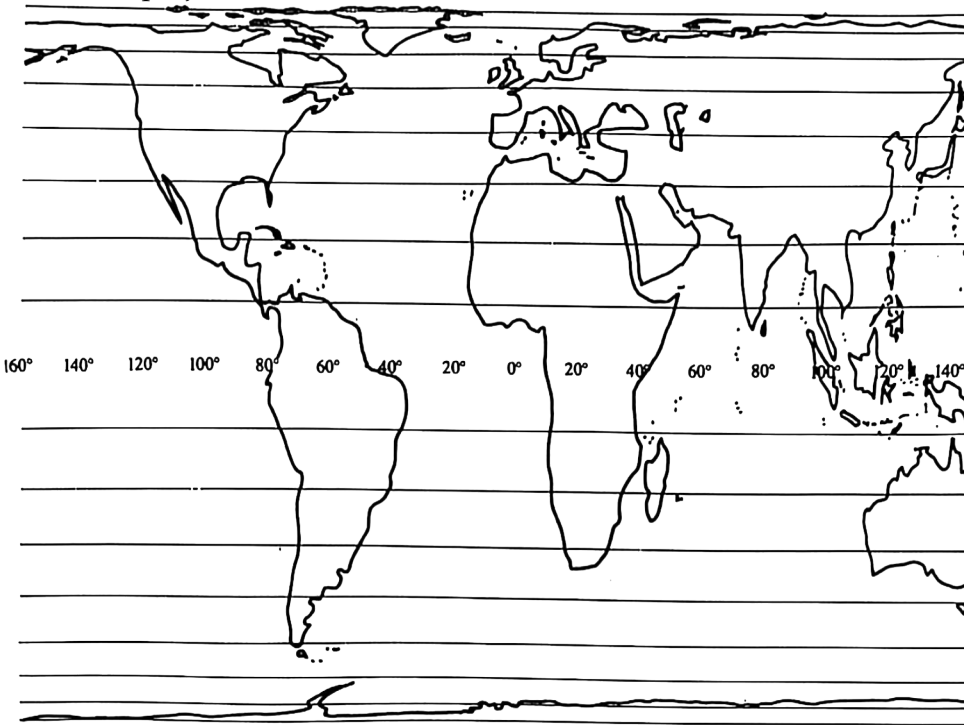


Figure 3.2 This map is based on Peters Projection rather than the more familiar Mercator Projection. It represents the more densely settled zones of the earth in better proportion to each other than does the Mercator Projection, and is thus considered an important step away from Eurocentric concepts of geography and culture.

After this story appeared on page one of *The New York Times*, it was picked up by the major wire services and distributed worldwide. *Newsweek* did a story titled "the U.N. Buys Some Good News" (though even a cursory examination of the international supplements would have shown that nearly all the news was bad). *The London Times* and the *Guardian*, also in London, carried the Reuters version of *The New York Times* story without any effort to verify its accuracy. Newspapers in developing countries gave only muted attention to the story but they did seem to accept as true the allegations made. Though the papers participating

What is the North-South dialogue?

The demand for the New International Economic Order originated from a group of developing countries in Africa, Asia and Latin America. They form the "South" of the world in relation to the developed countries of Europe and North America. The discussion of global economic change between the rich and the poor has thus been dubbed the "North-South" dialogue, although the geographical south does include such developed countries as Japan and Australia. Also, the socialist countries of Eastern Europe object to being lumped with market economy countries in the "North", but the phrase has been too convenient to fall into disuse. In the years since the call for a new world order the dialogue has settled into negotiations on a number of subjects and it would be more correct today to speak of North-South *negotiations* rather than of dialogue.

When the United Nations General Assembly called for the New International Economic Order it did so by consensus. But this consensus hid serious differences between the developing country group and several of the richest countries. In essence, their differences turned on the issue of whether the existing order of the world economy could be reformed or whether it needed to be structurally changed. Developed countries which had benefited most from the post-war economic system were loath to support basic changes. Developing countries, many of whom had not participated in the creation of this system and few of whom had benefited from it, saw no reason why a new order should not be negotiated from the basics.

Since 1974 the dialogue and the negotiations between the developed and developing countries have been almost continuous. In a number of forums they have dealt with all the major issues involved in changing the world's economy. This includes trade, money, food, industry, science and technology, transport and communication.

The process has involved governments in major world conferences. It has brought countless panels of experts to study specific aspects of the subject. It has involved reports from eminent commissions such as those led by Willy Brandt of the Federal Republic of Germany and Sean McBride of Ireland. Non-governmental organizations have participated, as have journalists in influential sections of the media.

In the closing years of the 1970s there was general recognition that North-South negotiations were in the doldrums. Important advances in several areas had been made, as described in the following pages, but the urgent and comprehensive action necessary

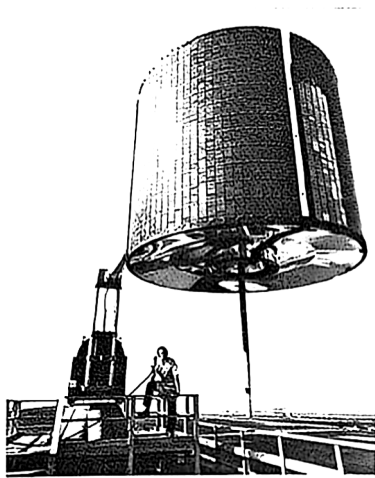


Figure 3.3 *Early Bird*: first commercial communications satellite underwent tests at Hughes Aircraft Company before it was shipped to Cape Kennedy for launching. Satellite is raised skyward on long boom on radio frequency range to test antenna. Built for the Communications Satellite Corporation, *Early Bird* weighs about 85 pounds after placement in synchronous orbit of 22,300 miles above earth. Positioned over the Atlantic, it provides 240 two-way telephone channels or two-way TV between Europe and North America. Satellite is also capable of carrying teletype, facsimile and high-speed data. (Bell Labs).

in the World Newspaper supplement project were aware of the facts and reacted with appropriate indignation, the damage to the U.N.—and to the Third World—in the eyes of world public opinion, was considerable.

To those of my readers who are at this point shaking their heads and preparing to dismiss me as yet another communist-inspired Third World radical, let me hasten to introduce the excellent book by Anthony Smith, *The Geopolitics of Information*. Its subtitle is *How Western Culture Dominates the World*. Anthony Smith is director of the British Film Institute in London, a veteran of BBC radio and television, author of several books on broadcast and print journalism. An eminently *Un-Third World Non-Communist* personage by any standards.

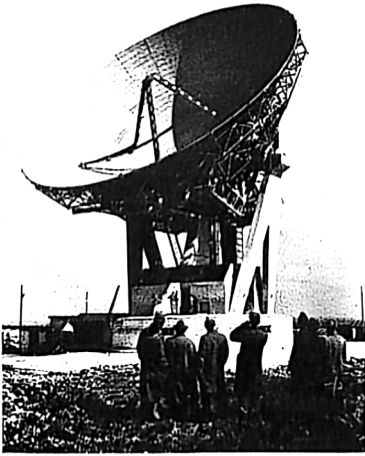


Figure 3.4 *Telstar I* (Earth Station) Goonhilly Downs, Cornwall, England. 85-foot paraboloid mounted on concrete azimuth. Structure turns on large ball bearings and is turned by bicycle chain. Two concrete 'A' sections hold elevation structure and steel dish. (Bell Labs).

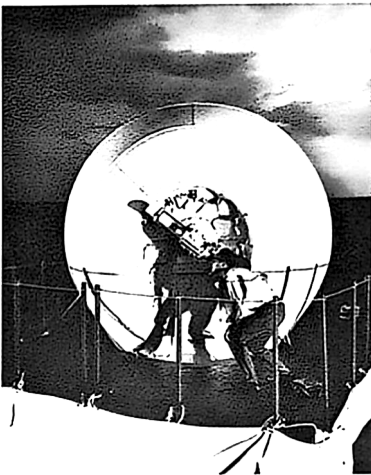


Figure 3.5 *Telstar I*: At Cape Canaveral Bell Labs engineer sights through a telescope attached to radar antenna at the Delta rocket carrying *Telstar* satellite into orbit. (Bell Labs).

The book is a short one: 192 pages. But it is well researched, clearly written, and honestly argued. If you want a clear grasp of the current debate on world information this book is essential. It covers the ground from the “Old International Information Order” to “Cultural Dependence,” to “News Imperialism” and “A New International Electronic Order.” It ends with a chapter that asks the question: “Double Standards of Freedom?”

To commend the book, however, is not to agree with all its conclusions. Anthony Smith *sees* the Third World point of view; he does not by any means agree with or represent it. He sees, for example, as did UNESCO’s MacBride Commission, that the current debate over information is not entirely centered on differences over Western traditions of a free press. As the MacBride Commission puts it, and as Smith quotes: “Many people have come to realize that sovereignty, identity and independence result not only from formal political decisions but are also, and perhaps even more, contingent upon the conditions of cultural and economic life... in short, upon circumstances which affect, in an increasingly interlocking fashion, the overall development of each and every nation.”

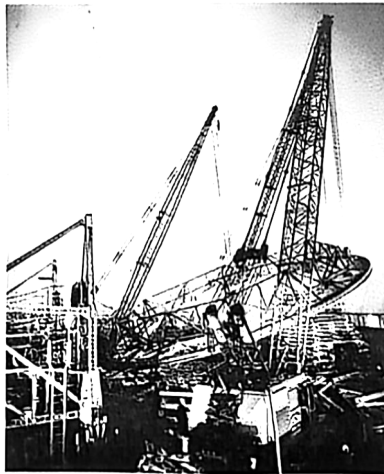


Figure 3.6 *Telstar I* (Earth Station), Andover, Maine: construction of 177 foot long reflector antenna used in satellite began with launching of *Telstar* in spring of 1963 (Bell Labs).

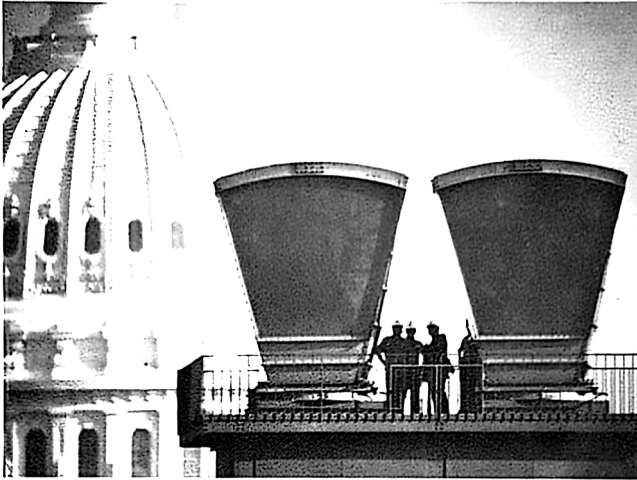


Figure 3.7 In sight of Capitol building, Washington, D.C. technicians complete link in continent and ocean-spanning telecommunications network. (Bell Labs).



Figure 3.8 *Project Apollo*. Live satellite transmission. (Bell Labs).

Smith argues that “the existing information order of the world is a product of and has itself extended the historical relationship between the ‘active’ and the ‘passive’ civilizations, the seeing and

the seen, imperial and empire, exploring and explored. The prosperous nations of the North have not come to terms with the fact that they are now being obliged to be themselves 'observed' as the relative political status of the great power blocs is beginning to change. They are insisting upon their cultural prowess, even where their economic and political power has diminished." But will there be a more balanced flow of news in the future? No, says Smith: "There is no chance that the Third World will generate a large volume of independently sold and internationally acceptable information about itself until more developing nations establish the principle of a free press which, again, is unlikely..."

This raises the question of what a free press is: free from what, or whom? In rich Western countries the answer is obvious: free from the apparatus of government. But this is possible only because the media have the support—and are in fact largely funded by—private commercial interests. In most developing countries this option does not exist, for the simple reason that the private commercial sector is either

- a) largely foreign owned,
- b) rigorously controlled by the government and utterly beholden to it, or
- c) non-existent.

Also, in the post-colonial situation of many poor countries, the governments include the champions of the popular interest while businessmen—including private publishers of newspapers—have, to put it kindly, mixed loyalties. This is one reason why we find certain clown-like figures from the Third World attending the parleys of Western newspaper publishers and adding their names to declarations that go against the interests of their own countries and people.

Even among journalists (usually people at the fine cutting edge of change), it takes time for colonial attitudes to pass. In India, for instance it took a change in generation before the perspective of the establishment press became "un-colonial." (A perfect example of the colonial mentality of the older generation of editors in India was the black-bordered full-page stories published on the death of Winston Churchill, as old and steadfast an enemy of India as there ever was.)



Figure 3.9 *Telstar I* (Earth Station), Pleumeur, Brittany, France. Ground station built by French National Center of Telecommunications Studies. Radome looms over countryside. (Bell Labs).

The larger point which Smith makes about the importance of a free press in the Third World is, of course, a valid one. Poor countries can for entirely understandable reasons opt for local control, but the politicians and bureaucrats in charge are then incapable of journalism. They succeed only in boring people with the official view, of creating a thriving market for rumor and distrust among their own population. And of course, they fail too in altering global news flows. But we in the Third World must ask what is the alternative. Leave ourselves open to the tender mercies of Western journalism and monopolies? No thanks.

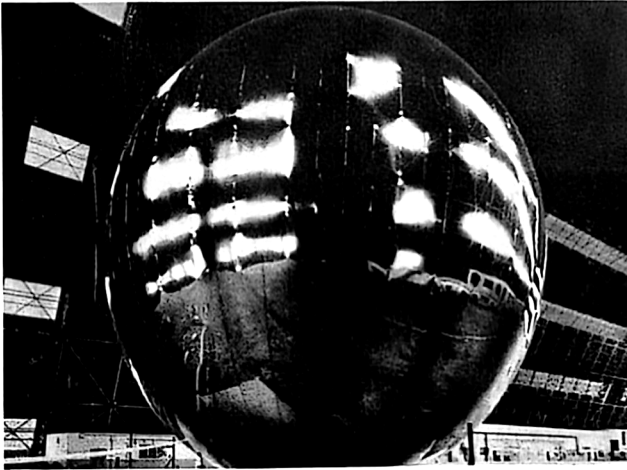


Figure 3.10 *Echo* (Bell Labs).



Figure 3.11 President Kennedy signing legislation to establish globe-circling system of communication satellites (August 31, 1962). Left to right: Congressman Oren Harris (D-Ark.), Senator Warren G. Magnuson (D-Wash.), Senator Mike Mansfield (D-Mont.), Senator Richard Russel (D-Ga.), Senator Hubert Humphrey (D-Minn.), Joseph Beirne, (President, Communication Workers of America), Congressman William L. Springer (R-Ill.), Senator John O. Pastore (D-R.I.), unidentified, and FCC Chairman Newton N. Minow. (Bell Labs).

