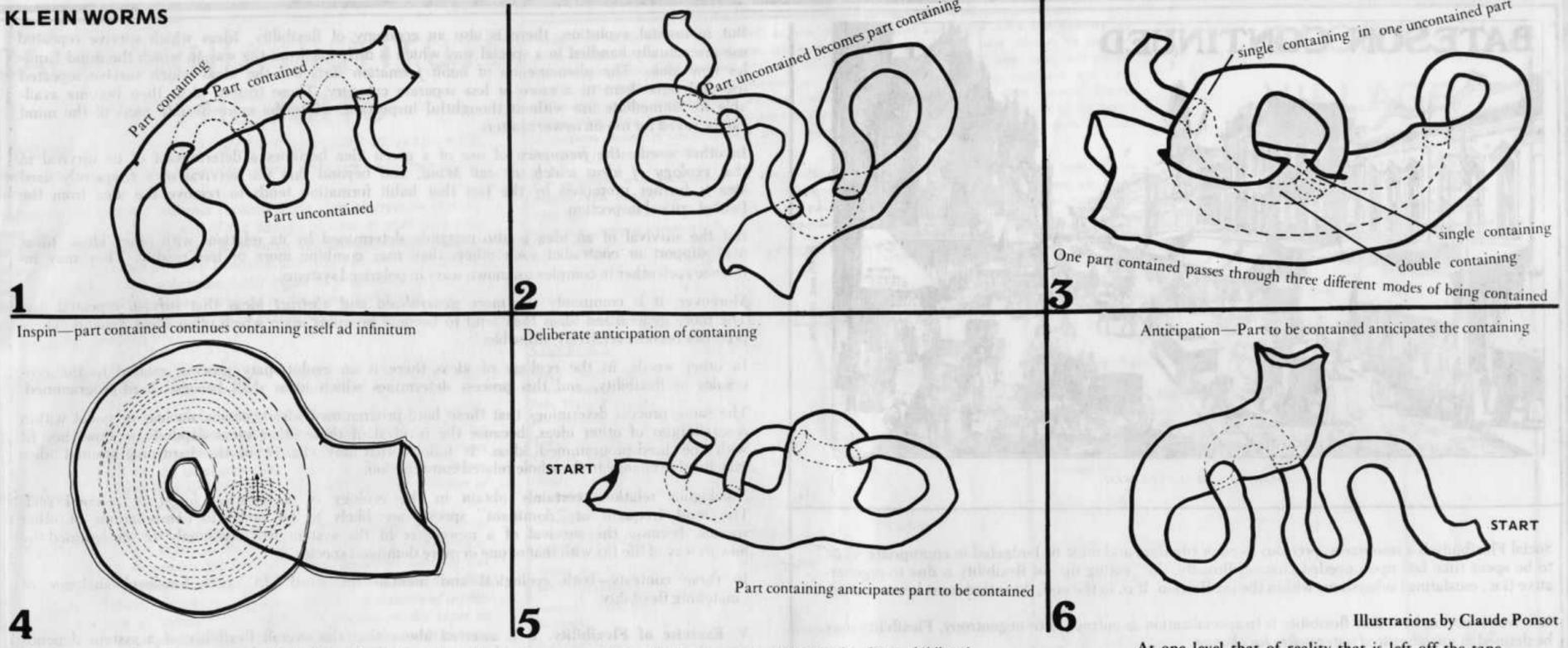


KLEIN WORMS



There are three specific areas where I think this topological calculus of intention can be of use: acid metaprogramming, a grammar of video infolding and perceptual sharing, and in soft control structures using plastic membranes.

Relative to acid metaprogramming I am not recommending LSD-25 to anyone nor am I endorsing Leary's approach. I am simply looking at some of the work that John Lily has done and suggesting this calculus might be useful in that context. Both in *Programming and Metaprogramming in the Human Biocomputer* and in *Mind of the Dolphin* Lily uses the notion of interlock to describe communication between people and between species. In *Programming and MetaProgramming* he describes a personal experience with acid that in some way undercuts the metaphor of interlock, and to me suggests that the Klein worms might be a better way to describe the process he calls "interlock." Here is Lily's description of that experience he titles "the key is no key."

Mathematical transformations were next tried in the approach to the locked rooms. The concept of the key fitting into the lock and the necessity of finding the key were abandoned and the rooms were approached as "topological puzzles." In the multidimensional cognitive and visual space the rooms were now manipulated without the necessity of the key in the lock. Using the transitional concept that the lock is a hole in the door through which one can exert an effort for a topological transformation, one could turn the room into another topological form other than a closed box. The room in effect was turned inside out through the hole, through the lock leaving the contents outside and the room now a collapsed balloon placed farther from the self metaprogrammer. Room after room was thus defined as turned inside out with the contents spewed forth for use by the self-metaprogrammer. Once this control "key" worked, it continued automatically to its own limits.

With this sort of an "intellectual crutch" as it were, entire new areas of basic beliefs were entered upon. Most of the rooms which before had appeared as strong rooms with big powerful walls, doors, and locks now ended up as empty balloons. The greatly defended contents of the rooms in many cases turned out to be rela-

tively trivial programs and episodes from childhood which had been over-generalized and over-valued by this particular human computer. The devaluation of the general purpose properties of the human biocomputer was one such room. In childhood the many episodes which led to the self-programmer not remaining general purpose but becoming more and more limited and "specialized" were entered upon. Several levels of the supra-self-metaprograms laid down in childhood were opened up.

The mathematical operation which took place in the computer was the movement of energies and masses of data from the supra-self-metaprogram down to the self metaprogrammatic level and below. At the same time there was the knowledge that programmatic materials had been moved from the "supra-self position" to the "under self-control position" at the programmatic level. These operations were all filed in meta-program storage under the title "the key is no key."

*Programming and MetaProgramming,
Lily, pp. 42-43*

Relative to video infolding it is near impossible to describe in words even using Klein worm graphs what I'm talking about. The following will mean little to anyone except those who have had some experience of taping with themselves at different levels.

Taping something new with yourself is a part uncontained
To replay the tape for yourself is to contain it in your perceptual system
Taping yourself playing with the replay is to contain both on a new tape
To replay for oneself tape of self with tape of self is to contain that process in a new dimension
Parts left out of that process are parts uncontained
All of this is mapable on computer graphic terminals.

At one level that of reality that is left off the tape is the part uncontained
Raw tape replayed is part contained in the head
If it is somebody else's tape you are watching you can to an extent share in this live perceptual system via the tape he took.
To watch another's edited tape is to share in the way he thinks about the relation between his various perceptions in a real time mode. This enters the realm of his intention.
If you are editing some of your tape along with tape somebody else shot and he is doing the same thing using some of your tape then it is possible to see how one's perceptions relate to another's intentions and vice versa.

Relative to sharing perceptual systems it is somewhat easier to talk about since there are parallels with photography and film.

The most explicit experience of this mode of perceptual sharing came in the early days of Raundance when Frank Gillette, Ira Schneider, Michael Shamberg and myself "shot" twelve rolls of tape on earth day. Both in replay that evening (we laughed our heads off digging each others tape while the old perceptual imperialist, Walter Cronkite explained Earth Day for us) and in the edits that followed each of us got a good idea of how each saw and thought about the events vis-a-vis the others.

Relative to soft control systems using plastic membranes I am thinking mostly of the soft cybernetic work being done by Warren Brody, Avery Johnson and Bill Carrigan. The sense of the sacred and the transcendental that surrounds some of the inflatable subculture is to me a kind of pseudomythology. Consciousness might be better invested in designing self-referencing structures where awareness is imminent in the structure and its relation to the users; not by being invested in a religious way to a "special" structure that does not relate intelligently to the users.

A Klein Worm couch is a suggestion of a possible way of moving in that direction. It could be built of strong polyurethane, filled with air, perhaps by a constant flow from a pump. People might interrelate kinetically through the changes in the air pressure. Design of the actual couch could be arrived at experimentally by combinations and transformations of the structures described above.

Illustrations by Claude Ponsot

RESTRUCTURING THE ECOLOGY of A GREAT CITY
 by Gregory Bateson



Originally prepared for a symposium of city planning, Oct. 26-31, 1970, sponsored by the Wenner-Gren Foundation for Anthropological Research.

This position paper consists of the following parts: 1. A rather lengthy gathering of generalities about biological systems; and 2. An attempt to apply these generalities to practical problems. Since I know little about Manhattan, I have chosen two books by authors who are involved in problems of city life and planning and have applied the touchstone of theory to these books.

First, it will be convenient to have not an ultimate goal but some sort of abstract idea of what we might mean by ecological health. Such a general notion will both guide the collection of data and guide the evaluation of observed trends.

I suggest then that a healthy ecology of human civilization would be somewhat as follows:

A single system of *environment combined with high human civilization* in which the flexibility of the civilization shall match that of the environment to create an ongoing complex system, open-ended for slow change of even basic (hard-programmed) characteristics.

We now proceed to consider some of the terms in this definition of systemic health and to relate them to conditions in the existing world.

I. A High Civilization. It appears that the man-environment system has certainly been progressively unstable since the introduction of metals, the wheel, and script. The deforestation of Europe and the man-made deserts of the Middle East and North Africa are evidence for this statement.

Civilizations have risen and fallen. A new technology for the exploitation of nature or a new technique for the exploitation of other men permits the rise of a civilization. But each civilization, as it reaches the limits of what can be exploited in that particular way, must eventually fall. The new invention gives elbow room or flexibility, but the using up of that flexibility is death. (I owe this insight to Mr. Philip Wylie.)

Either man is too clever, in which case we are doomed, or he was not clever enough to limit his greed to courses which would not destroy the on-going total system. I prefer the second hypothesis.

* Notes on the Syntheses of Form by Christopher Alexander, Harvard University Press, 1964; and *The Uses of Disorder: Personality and City Life* by Richard Sennet, Knopf, 1970.

It becomes then necessary to work towards a definition of "high."

A. It would not be wise (even if possible) to return to the innocence of the Australian aborigines, the Eskimo and the Bushmen. Such a return would involve loss of the wisdom which prompted the return and would only start the whole process over.

B. A "high" civilization should therefore be presumed to have, on the technological side, whatever gadgets are necessary to promote, maintain (and even increase) wisdom of this general sort. This may well include computers and complex communication devices.

C. A "high" civilization shall contain whatever is necessary (in educational and religious institutions) to maintain the necessary wisdom in the human population and to give physical, aesthetic and creative satisfaction to people. There shall be a matching between the flexibility of people and that of the civilization. There shall be diversity in the civilization, not only to accommodate the genetic and experiential diversity of persons, but also to provide the flexibility and "pre-adaptation" necessary for change (e.g., the heterozygosity of wild species.)

D. A "high" civilization shall be strictly limited in its transactions with environment. It shall consume unreplaceable natural resources *only* as a means to facilitate necessary change (as a chrysalis in metamorphosis must live on its fat). For the rest, the metabolism of the civilization must depend upon the energy income which Spaceship Earth derives from the sun. In this connection, great technical advance is necessary. With present technology, it is probable that the world could only maintain a small fraction of its present human population, using as energy sources only photosynthesis, wind, tide, and water power.

II. Flexibility. To achieve, in a few generations, anything like the healthy system dreamed of above or even to get out of the grooves of fatal destiny in which our civilization is now caught, very great flexibility will be needed. It is right, therefore, to examine this concept with some care. Indeed, this is a crucial concept. We should evaluate in our survey, not so much the values and trends of relevant variables, as the relation between these trends and ecological flexibility.

Following Ross Ashby, I assume that any biological system (e.g., the ecological environment, the human civilization and the system which is to be the combination of these two) is describable in terms of inter-linked variables such that for any given variable there is an upper and a lower threshold of tolerance beyond which discomfort, pathology and ultimately death must occur. Within these limits, the variable can move (and is moved) in order to achieve *adaptation*. When, under stress, a variable must take a value close to its upper or lower limit of tolerance, we shall say, borrowing a phrase from the youth culture, that the system is "uptight" in respect to this variable, or lacks "flexibility" in this respect.

But, because the variables are interlinked, to be uptight in respect to one variable commonly means that other variables cannot be changed without pushing the uptight variable. The loss of flexibility thus spreads through the system. In extreme cases, the system will only accept those changes which change the tolerance limits for the uptight variable. For example, an over-populated society looks for those changes (increased food, new roads, more houses, etc.) which will make the pathological and pathogenic conditions of over-population more comfortable. But these *ad hoc* changes are precisely those which in longer time can lead to more fundamental ecological pathology. (For a discussion of the *ad hoc* problem, see attached "Statement on Problems Which Will Confront the Proposed Office of Environmental Quality Control.")

The pathologies of our time may broadly be said to be the accumulated results of this process—the eating up of flexibility in response to stresses of one sort or another (especially the stress of population pressure) and the refusal to bear with those by-products of stress (e.g., epidemics and famine) which are the age-old correctives for population stress.

The ecological analyst faces a dilemma: on the one hand, if any of his recommendations is to be followed, he must first recommend whatever will give the system a positive *budget of flexibility*; and on the other hand, the people and institutions with which he must deal have a natural propensity to eat up all available flexibility. He must create flexibility and prevent the civilization from immediately expanding into it.

It follows that while the ecologist's goal is to increase flexibility, and to this extent he is less tyrannical than most welfare planners (who tend to increase legislative control), he must also exert authority to preserve such flexibility as exists or can be created. At this point (as in the matter of unreplaceable natural resources), his recommendations must be tyrannical.