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MAKING MEANING, MAKING TROUBLE

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Between 1976 and 1982 I wrote a series of exploratory essays in search of a theoretical framework for my studies of education and social dynamics (Lemke 1984). In 1976 I was writing as a physicist new to educational theory, trying to make sense of learning as a social process and as one aspect of human biological development. I saw learning as shaped by evolution and mediated by language and other semiotic systems.

My view of language was influenced by Roman Jakobson's (1965, 1971) discussions of the relations between paradigmatic alternatives and syntagmatic combinations, and by Noam Chomsky's (1957, 1959, 1965) distinctions between deep and surface structures. At that time I saw the communication of surface structures as a means to the unconscious learning of deep structures, not just in language, but in all areas of human behavior. (This was contrary to Chomsky's own conclusion that something innate in the brain was needed to get from surface structure experience to deep structure principles. To some degree this may be true regarding very general matters of syntactic structure, but insofar as meaning plays a role in such processes, the consistent patterns that connect utterances and events to their larger textual and situational contexts provide critical additional information not considered by Chomsky.)

I followed Jean Piaget (1970) and Claude Levi-Strauss (1963) in their structuralist view that all meaningful behavior was organized like language according to systems of abstract formal relations. And I extended Piaget's (1971) concern with developmental biology to a general analysis of learning as an aspect of the self-organization of the "instructional systems" (social interactions) in which we participate. In this I drew on the work of developmental and evolutionary biologists C.H. Waddington (1957) and Konrad Lorenz (1965) who were interested in complex behavior, physicists Ilya Prigogine (1961) and Erwin Schrodinger (1967) who had begun to ask how complex systems evade the law of entropy and become more organized with time rather than less, and early work in cybernetics and the theory of self-organization (von Bertalanffy 1950, Ashby 1956, Kauffman 1971, Thom 1975). I read Vygotsky (1963) and Luria (1959) for theories of the social mediation of intellectual development. In retrospect these perspectives seem only to have grown in significance since 1976.

By 1977 I had read Gregory Bateson's (1972) classic Steps to an Ecology of Mind and was trying to reconcile the then emerging (and thereafter long dominant) mentalist perspective on learning in cognitive science with what seemed to me to be much more powerful views of learning's social and cultural foundations. I also began to read the work of Michael Halliday (1975, 1976) and to add a functionalist view of language, that language is organized according to what it has evolved to do, to the formalist perspective of Chomsky's structuralism. But above all it was Bateson's focus on meta-communication, and his proposal (1972: 132-3) that the notion of redundancy in cybernetics and information theory could be extended to include the role of context in meaning (meta-redundancy, see below), that enabled me to begin developing a general model for semiotics that was both formal and functional (Lemke 1984: 35-39) and fit with a dynamic model of social learning and development (Lemke 1984: 23-58).

Halliday's wonderful Language as Social Semiotic (1978) provided the tools for doing semiotic analysis of language and behavior without losing sight of the social contexts that provide the basis for both cultural meaning and individual development. By 1979 I had abandoned cognitive models of meaning for social and semiotic ones. I also began my research on communication of science in classrooms (Lemke 1983b, 1990a) and a long informal collaboration with Michael Halliday. I found myself traveling across the U.S. and around the world trying to explain to people a new synthesis of ideas about social meaning and human development as aspects of the self-organization of complex social systems.

Many of the principles I was using were unfamiliar. Few educators or psychologists knew much about complex systems theory, linguistics, or semiotics. Few people in linguistics in the U.S. knew much about the alternatives to Chomskyan formalism that grew out of the East European and British traditions that Halliday drew from. I found sympathetic listeners among anthropologists interested in language and among biologists interested in system theory. I had an even more difficult time explaining what I was up to to my friends in the arts in New York. So I decided to write "Making Trouble" (1982), which proved to be very popular and circulated in xeroxed copies passed hand-to-hand even long after it was published as part of Semiotics and Education (Lemke 1984: 94-150). Even then, it was not widely available, and one or two offers to re-publish it as part of other volumes did not work out. When plans for this book were first being made, many friends and colleagues urged me to include it here.

"Making Trouble" was not written as a formal academic paper. It was never intended for publication and contained no footnotes or citations. It was partly an effort to write my way through to a fuller vision of the theoretical ideas I was working on, and partly an attempt to communicate those ideas as clearly as I could to a wide range of interested friends and colleagues. What follows are extended sections of "Making Trouble", slightly edited, with some of the missing citations added and an occasional comment (in brackets).

The original "Making Trouble" began with an attempt to problematize the notion of objective truth. It proposed that meaning is a much more fundamental notion than truth, indeed more fundamental even than the notion of "reality" itself. The basic argument was that claims about truth or reality are meanings made by people according to patterns which they have learned, and that trying to understanding how and why people make the meanings they do is more useful than fighting over the truths of their claims. This leads naturally enough to the problem of whether a theory of social meaning-making is not itself just another claim about truth and reality. Confronting this paradox led me to reconceptualize the nature and role of theory itself, demoting it from its traditional status as the goal of inquiry to that of just a tool in social activity.

The Trap of Theory: Reflexivity and Praxis

Can any theory be a theory of itself? If I am building a theory of how people make meaning socially, can I build a theory of my own theory-building? If I can't, my theory can never be complete, and since my theory-building is just the sort of thing I want to make a theory of [i.e. social meaning-making], a theory that didn't cover that wouldn't be much of a theory at all. But if I do include my theory-building in the scope of the theory, I run into a different but no less serious problem.

Some time ago, Kurt Godel (1931) tried to answer, within the limits of what other people would accept as a valid mathematical proof, the question of whether a formal system of mathematical or logical axioms, assumptions, proofs, theorems, etc. could prove theorems about itself. For example, could it show that within the system it was possible to prove all the theorems that followed from the axioms? or might some true theorems not be provable? His answer made a lot of people very unhappy. Godel

proved, to the satisfaction of other mathematicians and logicians, that no formal system with rigorous rules for what was a valid proof and what was a true theorem, even something as simple as the rules of arithmetic, much less anything as complicated as formal logic, could be proven to be both internally self-consistent (i.e. you couldn't prove the same theorem to be both true and false within the rules) and complete (in the sense that all the possibly true theorems could actually be proved true somehow within the rules).

Since neither Godel nor anyone else he knew was interested in systems that were internally contradictory, his results showed that if the systems were free from internal inconsistencies, then they had to be incomplete: there had to be true theorems that could not be proven, or possible theorems for which one could not determine whether they were true or false. And the theorems that gave rise to this trouble were basically the theorems of self-reference, those that enabled the system to say things about itself, to contain itself in its own domain as a theory (see Kleene 1952, Hermes 1969, Hofstadter 1979). This means that the foundations of logic and mathematics, on which all of science and rational argument are based, cannot be proven both consistent and complete by their own criteria of truth and standards of proof. It also means that no formal theory can be built which includes itself in its own domain without inconsistencies. It means that no formal theory can explain or justify itself, not even logic itself. But this is exactly what a theory of social meaning has to do. It has to be reflexive, it has to account for the processes of making theories, of which it is itself one special case.

Do we really need formal theories? Could we be content with "informal" ones that had no explicit assumptions, no strict procedures for deductions or criteria of logical consistency and truth? What do we need theory for at all? We need a theory because we always already have one. If we don't formulate explicitly our ways of making meaning in particular contexts, the meanings we make will be governed automatically, by default, by the limiting meaning systems of our narrow communities, even when we are not aware of this.

Making meaning is a practice, a process, an activity. It is not itself a formal system. All formal systems, all meaning relations, are immanent in and enacted by our actions, by what we do in using them. Our objective in inquiry is to add to and change the patterns of our actions in such a way that we can analyze and criticize the way things are done now and create new, different patterns in place of the automatic ones we are limited by. Our real goal then is not to make a theory of how things are, but to develop a praxis, a critical way of analyzing, doing, creating. Part of this praxis is going to be using theories, which are themselves just ways of talking and doing. Each of these will be partial and incomplete, but hopefully internally consistent. We may use different theories which are not inconsistent with one another because they are incommensurable, because they lead us to view the world, or a situation, in totally different terms. The practical consistency of theories does not depend on whether they generate statements about the world that are consistent in the sense that notions of a single truth about the world require. It depends only on how using these theories leads to the actions we take; it is their consistency within our praxis that matters.

We will use theories as tools in our praxis, not make them ends in themselves. We will not regard theories as goals in themselves, as pictures of the one true reality, but simply as tools we use in critical, creative, self-reflexive action. Our theories will not be directly self-reflexive; they will not contain themselves in their own domains. It is our praxis that must be self-reflexive: we must analyze and criticize our own processes of analysis and criticism, and all our newly created practices of every kind for getting inside of, and outside of, what we and other people do to make the kinds of meanings we make.

Praxis is the self-reflexive, self-critical, unstable, creative meta-practices of a community. If meta-theory means theory about what theories are and should be, then meta-practices are practices which practice on themselves, which are applied to themselves, like meta-criticism, the practice of criticizing your own ways of criticizing things. If we do this sort of thing, then our practices (and meta-practices) will be unstable, because at every turn we must turn back into and so out of that turn, making a next turn at which this must happen yet again. This is not so easy to do, or to live with.

Praxis is its own meta-praxis. Its practices are meta-practices.

[Praxis is also social; the practices are social activities in which we participate and over which none of us has sole control. The unstable character of praxis is an aspect of the dynamics of the social system of practices, its way of generating its own future by acting on itself and transacting with its environments.]

[For these same reasons, and contrary to many superficial arguments, Language as a formal semiotic system is not usefully regarded as being its own meta-language. It is only Language-in-use, language as part of material social practices (which can be re-coded in the terms of any semiotic system), that can actually turn back on itself, represent itself, act upon itself. Only systems of material-semiotic social practices, regarded as action, as activity, can be reflexive. Mental processes as such cannot be, nor can formal linguistic or semiotic processes.]

Part of good praxis is using theory. Not "the theory" that claims to describe the way things are, but theories that are just ways of talking about something, ways that are useful for certain purposes, as part of certain activities. The tools we use in this sense are not just ways of "talking"; they are never purely verbal, never consist solely of declarative propositions. They include many ways of doing: ways of writing, ways of moving, ways of making meaning with any action, practice, or process at all. They can be ways of visualizing, ways of sequencing, arranging, juxtaposing, intercutting, branching, classifyng, identifying, subordinating, superordinating, integrating, diversifying, and in general of bringing into and out of every possible kind of relationship we can make sense of. Visual artists, filmmakers, choreographers, architects, composers immensely enrich the ways of making meaning and the ways of sharing ways of making meaning beyond what talk alone can do.

[Regarded as action, speech is never a purely linguistic phenomenon, and the meanings we make by speaking always also rely on other semiotic resources, such as gestures, facial expressions, movements, pauses, voice qualities, rhythms and tones, and a variety of nonverbal actions. Likewise writing always has its visual, typographic dimensions of meaning-making, and printed texts have long co-evolved with the conventions of pictures, diagrams, maps, tables, graphs, etc. It is not the texts as objects, nor the speech as verbal text, that makes meaning, but our activity in interacting with these, producing and interpreting them, that makes meaning. Texts do not "have" meaning; meanings are relations we make through practices in which we are never the sole participant, never the sole originator of the practice.]

Communities as Dynamic Open Systems

[Human communities are ecosystems. Ecosystems are biological, chemical, and physical systems. The physics, chemistry, and biology of complex self-organizing systems can tell us much that is useful about human communities: about the conditions necessary for the existence of human communities, about the properties human communities "inherit" because they are special cases of more general kinds of systems, particularly ecosystems. Human individuals, as organisms and as socially constructed "persons", are one level of organization in terms of which we can look at these complex systems of processes. Seeing how we are like more general kinds of natural systems also helps us to see how we are special, how the

practices by which we make material objects and processes assume meaning in our communities lead us to interact materially with them in ways that would not occur in other kinds of systems, and lead to pathways of self-organization unique to human ecosocial systems. Human learning and development arise as aspects of our participation in these processes of self-organization, and so do social and cultural change.]

Biology, when it is not trying to describe human communities in particular, but just telling us its ways of seeing all animal communities, and so ours among them, says such things as: Members of the community of different ages and sexes behave differently and treat one another differently, according to age and sex. Members of the community interact with one another in a very large number of different ways (showing off, sounding off, courting, mating, grooming, roughhousing, fighting, sharing food, mimicking one another, etc.) but have contacts with members of other communities in only very limited ways (usually fighting or scaring one another off). Individual differences between members may affect who mates with whom, or who fights whom and wins, but the patterns of behavior of the group will continue pretty much the same.

These patterns of behavior result from the interplay of our chemistries and our environments. The chemistry starts off at conception with the patterns of chemical reactions in a single cell. They depend on patterns from the mother's egg cell and the father's sperm cell chemistries, which are different in detail, but similar in broad qualitative outline for all members of the species. The environments for every chemical reaction, and for every system of interdependent chemical reactions, expand in larger and larger circles, from the neighboring molecular architecture to the large-scale cellular organelles, from the border chemistry of neighboring cells to the external flows of heat and nutrients around the developing embryo, from the internal chemistry and physiology of the mother to the external environment with which the mother-embryo system as a whole must transact to live.

From shortly after birth (and maybe for a time before), and all during the life of the organism, one of the most important environments in which the adaptive patterns of the species (our evolved, genetic patterns) become the actual behaviors of individuals is our social environment: the patterns of contacts with other members of our own species. We do not inherit behavior with our genes; we inherit only chemical possibilities. These possibilities become us through the direct and indirect interaction of our chemistries with their/our environments: with the food we eat, the climate we live in, the sunlight and other energies to which we are exposed, and a thousand other factors -- but critically important among all of them is our interaction with other human beings.

Survival is not easy. Those strategies for making organisms that can survive and reproduce, which are "economical" in their chemistry, have survived and prospered. One key survival strategy in our species and many others has been not to put all the information needed to make the behavior of the adult into the chemistry of egg and sperm, but to rely on the environment itself to supply much of this information. The chemistry of egg and sperm only provides a means of using environmental materials and information, a selective sensitivity to certain features of the environment. At each stage of development from embryo to senior, the processes of the previous stage, plus the input from the environment that that stage was "waiting for", was selectively sensitive to and ready to use, makes a next stage which is now ready for something else. Not only does this epigenetic strategy save on the initial chemical investment in survival, but it can flexibly adapt, within limits, to changes in the environment, so that our course of development can change as new, "current" information comes in.

This strategy can be risky in a highly unpredictable environment, so a back-up strategy has survived in the many species that are specifically social: the same lifelong chemistry-plus-environment strategy that results in children who are primed to learn also results in adults who are primed to teach. The selective

sensitivity of the child gets tuned to a reliable source of information, reliable because that source -- other people in its community -- has similarly evolved to provide just that kind of information (e.g. about the local language in use in the community in that generation). The child sets off a teacher-response in adults just as adults set off a learner-response in children (this is stronger the younger the children are).

Have you ever felt a compulsion to make faces or noises at a baby? to talk to it, to try to make it smile, or react in a meaningful way? to interact with it in ways that are providing it with very useful information about and practice interacting with the kinds of sounds and facial patterns that can be significant in its community? Have you ever noticed that babies and young children have all sorts of things they do to trigger behaviors in you that will feed their need for information? Information on what language is spoken here, what the rules of behavior are, what is good and bad, what counts as meaningful and what doesn't, how to move your face muscles just the right way, how to make other people be good to you. The partnership of adults and infants/juveniles of the same species is a remarkably effective one because both can be guided by similar sequences, stage by stage, of building-in environmental information.

This cooperative social strategy is not just for babies in interaction with adults. All of us, all the time, are meeting each others' needs for social information, helping and coercing each other into the behavior patterns of our community. We do not learn these once and for all at some particular time; we are re-shaped into them again and again by the features, including behaviors of our fellow humans, of the specific situations to which they are adapted. What persists in us, for the most part, is just a disposition toward certain sorts of behaviors when in these situations. We do not need a complete model of how to behave; the situational environment will fill in the details for us, will remind us, will constrain us, keep us on track. This happens even when no other people are present.

[This picture of development was based mainly on the models provided by Waddington (1969-71), Lorenz (1965), and Piaget (1971).]

[In this sense all behavior, all development is learned, is a product of interaction with an environment which supplies essential information. Our own modern culture, however, has gone rather a long way toward the belief that behavior originates purely internally, either as the will of some mysterious Self which is not me because it is inside of, a mere part of the whole me (it used to be called the Soul before psychology replaced theology), or as the causal result of some biochemical process that makes us be the way we "are".]

So we are taught to say that babies are that way because of the nature of babies, and old people act as they do because that's what getting old does to you. It wouldn't do to say that kids are rebellious and troublesome because the way adults interact with them makes them that way, or that old people are crotchety and irritable and forgetful because that is how we make them be. No, we have to believe that it is all out of our hands, all a matter of hormones and oxygen levels in the brain. No matter that no one has ever established a direct link between these chemical conditions and complex patterns of meaningful social behavior -- or that it is impossible in principle to do so because material causation and cultural patterns of meaning belong to two entirely incommensurable theories/discourses about the world. No matter either that we know that social interactions can lead to hormonal changes and differences in the level of oxygen in the brain. We are not taught to connect what we have not been taught to connect.

What does physics have to do with human communities? with learning and development in social systems? In the discourse of physics, a flame, a person, a community, and a city are examples of a particular kind of physical system: a dynamic open system. Such systems have a special kind of survival problem: they need to get from their environments the matter, energy, and information that keeps them

going, but in getting these and using them to live, they degrade the the quality of the environment they depend on. The energy of fuels, food, sunlight is degraded into waste heat that is no longer useful for any other purpose of the system. That waste heat goes into the environment, and unless it dissipates away from the system, it can make the environment too hot for its survival. The matter in foods, fuels, and raw materials of every sort is likewise degraded by the use we make of it into waste products that also must be carried away into the distant environment lest they poison us. And the information, the orderliness, on which not only meaning in general, but the special usefulness of energy and matter also depends is transformed by the processes of life into disorder, noise, randomness, a chaos that has no meaning in our system of meanings. That too can be deadly to us unless we can find ways to insure that we will continue to have a physical and social environment with which we can interact to obtain the useful matter, energy, and information we constantly need to survive.

A flame is a border zone between a fuel (wood, wax, gas, oil) and the oxygen that combines there with the fuel to make light, heat, smoke, and all the waste-products of burning. A flame is a dynamic open system. Or better to say: a flame can be usefully talked about in the discourse of dynamic open systems. It has a structure: often a visible shape or repeating pattern. It has currents of vaporized fuel and draughts of oxygen, bringing into the system from its environment what it needs to survive. The system must be open to its environment to survive: if we close off the flame from its source of fuel or oxygen, it dies. But in the system, through the system of processes we call a flame, those materials and the latent energy and order in them, react chemically. Latent chemical energy becomes "used" energy in forcing the recombination of chemical atoms of fuel and oxygen, becomes heat that drives the currents that keep fuel and oxygen coming in and coming together, heat that drives the currents that carry away the smoke and waste products (including the heat itself) that would otherwise smother the system in its own by-products (or disrupt it with its own heat). If these processes of burning, if its complex structure, were interrupted for even a moment, the flame would die.

Dynamic open systems are those which survive only by continuous interaction with their environments through processes that exchange matter, energy, and information with those environments. In the exchange, the system survives at the expense of the environment, which is inevitably "polluted", degraded, losing useful matter and energy and information, getting back waste heat and waste products and disorder. If the system is large and the environment small, or limited, the system may exhaust the available resources of the environment, or it may use them up faster than the environment can can make new supplies available, or it may produce so much heat or waste that it burns itself up or poisons itself because the environment cannot dissipate these rapidly enough. A system may create so much noise and disorder in its environment that its interactions with it become chaotic and the systematic pattern by which alone it can survive is disrupted, and it dies.

A delicately balanced ecosystem which internally recycles wastes is still only a larger-scale example of a dynamic open system. The environmental paradox of life returns at a higher level of organization and complexity, as we will see.

[The discussions here of living, developing systems as dynamic open systems, or energy-dissipative thermodynamic structures, are based mainly on von Bertalanffy (1950), Prigogine (1961), and Schrodinger (1967).]

Babies are hot. Their bladders, bowels, and bellies trickle, void, and spit up erratically, fouling their environments. They crave the energy and matter of milk and food, and the information of social communication with others of their own species. As babies, and as children, in different ways, but always in some ways, they interact with their environments, physical and social, so that their own internal order and complexity increases as they grow and learn and develop, at the same time that they

fill the environment, or would fill it if it were not for the community, with heat and wastes, with noise and trouble, with disorder of every sort. To be around one is to know firsthand what physicists call entropy, the property we can assign to anything to measure it on a scale from ordered, organized, useful and meaningful (low in entropy) to disordered, disorganized, useless and meaningless (high in entropy). A scale from language to noise, from food to waste, from the neatly piled toys to the chaotic aftermath of the play by which we grow, from the things that work to the same things broken and ruined by a use that is teaching a system of meaning even as it de-means [sic] what was used to teach.

Left to themselves, would babies survive? They are not built, we have not evolved, to develop alone. Our communities provide the information we need, the support system of information and organization which helps us maintain those interactions with the environment by which we live. Parents feed, change diapers, clean-up after us. The community environment helps us get food and get safely rid of wastes. The parent, the community smiles at, talks to, give toys, and removes dangers the child produces as by-products of its development (all those broken bits). The community makes an environment filled with meaning, with information, with the patterns that have meaning in that community and to which, in the cycles of chemistry-plus-environmental-input (epigenesis) the child becomes selectively sensitive.

The child triggers off in us our side of the pattern's processes as we trigger of its in it. When the child makes noises that are not meaningful in our community's system of meanings, we talk at it, and to it, and with it in the orderly patterns of our language. And we do the same with hugs and smiles and gestures and foods, and with when we do what, and with what goes with what else, sharing and building with the child toward the shared patterns of the community.

[These interactions also shape and change the adults who participate in them. Child-rearing is a powerful shaper of parental adult behavior, values, beliefs, and practices.]

What would happen if the adult responded to the child only with nonsense talk? If we reflected back to the child the low levels of meaning, the "noise" it is making, its only just-barely-patterned forms of vocalization? It would not come to share a language or a system of meaning with us. The community works diligently to insure that the child's system of meaning and action comes close enough to common patterns to insure the community's survival. For the community is also a dynamic open system that can die. Its structure lies in a pattern of human activities perpetuated through the pattern of meanings those activities enact. One of the raw materials that feeds it is the newborn, and one of the degraded waste products it must dispose of is the newly dead. Its patterns of meanings, its ways of doing things, can colonize other commmunities, or hybridize with them, forming joint communities with a hybrid meaning system and patterns of actions. And through its action systems and meaning systems it regulates the interactions of its members with each other and with their physical environment: our language, laws, attitudes, expectations, agriculture, transport, materials and energy supply, waste disposal, environmental conservation.

Dynamic open systems are peculiar among the kinds of systems physicists have traditionally studied. It was not until quite recently [i.e. the 1960s and 70s] that theories were made to describe them [notably Prigogine 1961, 1962, 1980]. Until the importance of our being open systems was recognized, that what we are and what we do depends as much on the state of our environments as on the state of whatever we choose to call "us", it seemed that something happening in "us" was the reverse of what happened in all other kinds of physical systems. Our entropy appears to go spontaneously down: we get less disordered, more organized, more complex and regular in our behavior as we mature -- at least up to a point -- and even after that point we still manage to hold our own against disorder until we begin to fail as a system, to die, to decompose, to dissipate back into the environment of which we were always an integral part, but in which we had maintained our identity as a system. All other kinds of physical systems are always

spontaneously increasing their entropy: whatever they do, they go from a state of greater order and complexity to states of lesser organization, all the time. We have already described how dynamic open systems manage to grow and develop in complexity, at least while they last: they do it by processes that feed on the order of their environments. They are thus caught in a paradox of survival: to continue to live they must disturb and degrade the environments that sustain their lives.

This dilemma is partly overcome by the integration of dynamic open systems into larger supersystems. Neighbors help each other survive. Cells in a body are fed, and their waste products removed by the cooperative action of supersystems of cells: tissues, organs, and the body itself. Bodies, organisms, people through communities do much the same thing. We act in ways that keep us all going -- at the price of our submitting to the supersystem's overall patterns, which are simply the patterns of our interactions with each other and with our environments.

[Note that the dilemma of life is also its motor of change: to live we must interact with and change our environments in ways that make our current ways of living less reliable for survival. We create the conditions which lead to change in our ways of being-through-interaction.]

How do supersystems come to be, evolve, and change? The theory of dynamic open systems is consistent with the possibility that, rather than simply having an individual system exist first, then interact, and eventually become dependent for its survival on participation in a supersystem, that instead an original larger-scale system may become internally differentiated, different parts becoming more and more specialized, until eventually the original system is better seen as a supersystem with each of its parts functioning as a dynamic open subsystem. Then each of those subsystems can become internally differentiated and specialized, and so on. Either way we get a view of hierarchically related levels of organization in complex, dynamic open systems. For any particular level of interest, we can see it as being sustained both from below, by the actions of its subsystems, and from above by its participation in a still larger supersystem.

[For a fuller discussion of hierarchical organization, see Salthe 1985, 1989, 1993. Internal differentiation of dynamic open systems is itself an aspect of general processes of self-organization; the evolution of the resulting subsystem interactions towards co-operative maintenance of the supersystem is simply a condition of their survival.]

These complex systems still remain not only open, but dynamic. They must be able to change and respond to changes in the environments with which they have to interact to survive. They cannot afford to become perfectly internally self-regulating up and down their levels of supersystems and subsystems, because perfect regulation would make them rigid, inflexible, unable to respond -- able only to go on and on in ways suited to prior environmental conditions. Too limited by its own policing of patterns of internal processes, the system would not be able to adapt, and it would die. So successful systems, survivors, cannot be perfectly self-regulating. They must leave themselves room to manoever; they build into their subsystem processes contradictions, processes that run counter to one another, and counter to self-regulation.

Dynamic open systems are never stable; at best they are meta-stable, temporarily stable in relation to some constant set of environmental conditions, but ready to change as their environments change -- as the environments surely will do, if only because of the effects of the system on them.

Our communities, and their patterns of action and meaning, also reflect this fundamental strategic balance. There is self-regulation on one side, and on the other provision for necessary flexibility, for imperfect self-regulation, escape hatches, internal contradictions, and even counter-regulatory

subsystems (hopefully including our own unstable self-reflexive praxis) which enable the system to change.

Making Meaning: Contextualization and Meta-redundancy

We act, and, in acting, mean. We type, talk, move, eat ... and make sense of every pattern of acting in relation to other actions: in relation to the possibility of what we call "doing nothing" and in relation to having done this rather than that.

Every act, including the acts we are taught to call perceiving or recognizing "things" or "events" has meaning for us as a type or kind of act, event, thing: a category or class. In our society we learn to see some acts as being of the same type as others, having certain kinds of similarities to other acts. We learn to construct particular sorts of relations of similarity or difference among acts. Any two acts have, in principle, an infinite number of possible similarities or differences, but only some of these are meaningful in a particular community.

An act has as many possible meanings as there are relationships which the community can construct between it and other acts. Describing an act requires us to use terms of description that select or emphasize some of its possible meanings. What we call features of the act (or thing, or event) are really as much about what kinds of similarity and difference between acts matter in our community, as much about us, as they can be about the act "itself".

We say that when an act occurs it occurs in some context, and that "its" meaning depends in part on what that context is. Better to say that we make the act meaningful by construing it in relation to some other acts, events, things (which we then call its contexts). The relations we construct to some (and not other possible) contexts select and emphasize some of the possible meanings of the act. In a particular community, only some acts-events-things are considered to be meaningful contexts for others; not every possible relationship is made, or regarded as meaningful: there are patterns and limits to meaning-making.

Meanings are normally made through the construction of two sorts of patterns at the same time: patterns of relations of an act to other acts that might have occurred (paradigmatic relations) and patterns of relations of an act to its contexts, i.e. to other acts that did occur (or events that are occurring). An act has meaning for us because it and not something else with a different meaning happened, and because both it and other acts happened that together have meaning. Both these sets of relations, the relations of alternatives and the relations of combinations, are constructed differently in different communities.

The two kinds of relations are not independent of each other, either. Every act can be construed as belonging to many possible sets of alternatives; which set is relevant to its meaning at any time depends on the context, i.e. on other acts with which we see it as being in combination. Similarly, what sort of combination we recognize among a group of acts depends on the sets of alternatives to which we assign each act, on our guess as to the kind of act each is.

The key question is always: What goes with what? With what alternatives is an act in contrast? What are the relevant contexts in which the act has meaning? It is because there are patterns and limits to what is expected to go with what in a particular community, that meaning becomes possible. If there were no patterns and no limits, if every possible combination or set of alternatives were equally likely in every possible context, then there could be no meaning. Because there are patterns and limits, some meanings get made in a given community and others do not. And since the pattern of meanings made is enacted by

the pattern of actions enacted, this also means that in a given community many possible things are simply never done -- not just because they are forbidden or wrong, but because they are literally "unthinkable", meaningless, invisible possibilities that never even occur to us. And yet sometimes we happen to do these things anyway.

Meaning consists in relations and systems of relations of relations. These relations are basically contextualizing relations: they tell us what the contexts are in relation to which an act or event has its meanings in our community. They specify what the combinations are that an event of a given type can belong to, and what the kinds of events are, the sets of alternative events or acts of the "same" kinds, that can make up the various types of combinations.

[In all cases, contextualizing relations are constructed or construed by meaning-making practices of the community. They cannot be deduced from inherent or intrinsic properties of acts, events, things, for these do not "have" such properties. We attribute "properties" to entities, but it is more useful to view their meanings in terms of relations. Entities: things, events, acts, as individuals rather than as types, are themselves complex constructions which we are taught to take as phenomenal givens, as first-order realities. What we are taught to understand as ourselves, as organisms and social identities, are complex meaning-constructions as well as aspects of the interactive processes of material systems. Cf. Chapter 5.]

The pattern of meaning relations constructed in a community can be called its Meaning System; it is enacted by the actions of people (with things) in that community. Those actions make meanings and they sustain the Meaning System of the community by not violating its limits, by conforming to its patterns. Sometimes we do things that cannot be made sense of in terms of the existing Meaning System. They may go unnoticed, even by us, because they lack all meaning; they are not meaningful acts, events. Or they may contribute to a change in the Meaning System, and, with it, the pattern of ways of doing things in the community. We will return to this issue when we consider how the relations between the community as a system of meaning-making practices and the community as a self-organizing dynamic open system of material interaction processes tend to both keep the community stable and keep it changing.

How can we describe the Meaning System of a community? It is first necessary to appreciate the nature of its complexity. It is not just that it includes all the cultural practices by which we make things, acts, and events of different kinds meaningful. It is not even just complex because this system of practices constructs many different kinds of contextualizing relations among all these different things, acts, and events. It is fundamentally complex because it also necessarily constructs such contextualizing relations among the contextualizing practices themselves. It is a system of relations of relations. Of contextualizations of contextualizations. Of combinations of combinations. Of alternative sets of alternative sets.

Does this recursive complexity make the task of describing the Meaning System hopeless? Godel's paradox certainly applies here: the complete description of the Meaning System would have to include itself as part of the description, and that act of self-description would inevitably change the system being described, etc. But we do not need complete descriptions for our praxis. What is needed is a way of keeping straight the complex architecture of a Meaning System while we explore any part of it far enough to expose how its limits hide themselves from us through our own actions.

[In fact, it is pointless to concern ourselves with the notion of "the whole Meaning System" as if there could be a unitary, global self-consistent system there. The Meaning System is everywhere local; it is a vast number of bits and pieces, specific ways of making meaning in specific contexts, and while it is

possible to construct useful relations among these different bits and pieces, there is no need to assume that all the bits and pieces could ever be fit together in any one grand consistent scheme. We should stop assuming that such a totalizing scheme exists despite the fact that it is impossible to describe it. There are local meaning-making practices. There are interesting relations we can construct between these. But there is no global Meaning System. What we mean in using the term is really "the Meaning System way of looking at things" in each local domain, or across various such domains (but never all at once). A better way to think of the global architecture of the Meaning System is as a fractal mosaic of patches, as in the discussion of ecosocial systems in Chapter 6.]

The contextualizing relations of a Meaning System can be described as a hierarchy of meta-redundancy relations.

Redundancy is a formal way of describing what goes with what else. [The negative connotations of "redundant" as the word is used informally come from a puritan culture of efficiency that sees anything which is not necessary as wasteful. In both ordinary usage and the more specialized uses of the word in information theory, cybernetics, and semiotics, two things are "redundant" when they go together in a predictable way: if you see one, you can be pretty sure the other is somewhere around too. In communcation, redundant information repeats information already available in another part of the same signal or transmission. It is useful for double-checking the accuracy of a message. Whether redundancy is necessary or not depends on how likely it is that messages get partly scrambled in transmission. In semiotics, however, redundancy is always necessary for the construction of meaning. Since events, including spoken or written words, do not have intrinsic meanings, but only the meanings we make for them by fitting them into various contexts, regular or predictable ways of combining events and contexts are necessary. If all possible combinations occured with equal likelihood in all situations, we couldn't make or communicate meanings at all.]

Meta-redundancy is just a way of describing how the redundancy, the predictable relation or connection of two things, can itself be redundant (i.e. have a predictable connection) with something else. This is redundancy of redundancy, or meta-redundancy. [The basic notion was introduced by Gregory Bateson (1972: 132-3) and is closely related to his views on meta-communication (messages about messages) and meta-learning (learning how to learn). Cf. also meta-mathematics (the mathematical theory of mathematical theories).] If there can be meta-redundancy, then why not meta-metaredundancy? As we will see there is a whole hierarchy of levels of meta-meta-meta-... redundancies which provide a formal description of the relations and patterns that make up the Meaning System of a culture. The human brain seems to rebel against thinking about more than one meta- step at a time, so let's take these ideas slowly and carefully to see what they really mean.

Think of any two sets of alternatives, say a set of different words and a set of different facial expressions. We can say that a redundancy relation exists between these two sets whenever not all possible combinations of words and facial expressions are equally likely, or tend to occur equally often. When this relationship exists, then if we already know the word, we can make a better than random guess as to which facial expression it will go with, and if we already see the expression, we can similarly predict the word. The visual information and the verbal information are redundant with each other. If for every word you could say in our culture there was just one possible facial expression that had to go with it, and vice versa, then the sets of words and expressions would be totally redundant and no meaning would be added by having combinations of words and expressions above and beyond the meaning that could be made with either one alone.

[The last statement here is not quite correct. No information would be added in this case, but there would be additional meaning because language and the visual semiotics of facial expressions are not

commensurable, they do not create the same kind of information, do not make meaning in relation to the same sets of alternatives, combinations, contexts, etc. The additional meaning, however, would be simply the "sum" of the separate meanings, there would be no possibility of "multiplying" the meanings, i.e. having flexible possibilities of combining them in different ways to index different situations or further contexts. The increase in "informating-carrying capacity" of the system would be the minimum possible.]

But the actual relationship between these two sets in our culture, in our Meaning System, is much more complicated. You can of course say almost anything with almost any facial expression, but most of the possible combinations would not make sense to anybody, and they don't happen very often. Some combinations are usual, and others are comic, perverse, bizarre, crazy, or just meaningless. Still, there are many possible words that can go with a particular facial expression, and many possible facial expressions that can go with most words, so we can in fact make more meaning with combinations of facial expressions and words than we can make with either form of communication alone.

[In information theory, the combined information-carrying capacity of two sets of events or signs, two codes, used simultaneously is reduced as they become more redundant. The information, or "surprise" value of any particular combination depends on the probability or frequency with which each of the possible combinations occurs. In semiotics, on the other hand, the meaning value of a combination only depends on the existence of other possible combinations, and its meaning relationships to them, and not on their frequency of occurrence. This leads to some of the difference in perspective between semiotics and information theory, even though they are perfectly consistent with one another. Information theory is concerned with information to the extent that all information is alike; semiotics is concerned with information in the sense that all information is different. Information theory looks for the common denominator in all forms of information and quantifies information in common units (e.g. bits, bytes); semiotics identifies the significant ways in which units that carry information differ from one another. Semiotics seeks to explain how the combinations of units that occur depend on their distinctive differences from one another; information theory is concerned only with the overall frequencies of combinations that result. Determining the amount of information that a text could contain is very different from determining the possible meanings that a text could have in a community.]

Which facial expressions we combine with which words depends on the situation, on the context. If you smile when you say "I hate you", maybe you're crazy, but more likely there is something special about the situation. In fact, even if we knew nothing else about the event than that this combination had happened, we would expect something to be different about the situation. In different contexts, the pattern of what goes with what is different, and has different meaning, even in the same culture, the same Meaning System. Change the situation, change the context, and we might expect different facial expressions to accompany particular words. Part of how we know what the situation is is by paying attention to which patterns of combination seem to be in use. These patterns are part of what defines the situation, what makes the situation what it is (joking, sarcasm, fear, insanity, etc.). So there is a partly predictable relation between situational contexts and the pattern of combinations of words and facial expressions. That is, there is a redundancy between the set of contexts and the set of redundancy relations between words and expressions.

In the way we behave meaningfully in our culture, the appropriate patterns of combination of words and facial expressions depend in part on the situation, and the situation is defined, in part, by which pattern of combinations people normally use in that type of situation. What is the set of situations redundant with? not the sets of words by itself, nor the set of facial expressions by itself. It is redundant with the pattern of combinations of words and expressions, with the redundancy relations between the words and expressions. Situations are redundant with the redundancy between words and expressions. The words

and expressions stand in a relation of first-order redundancy to each other, and the situations stand in a relation of second-order, or meta-redundancy to the redundancy of the words and expressions.

[Redundancy is a formal relation, and formally relations of relations are of a different "logical type" than the first-order relations. See Bateson (1972) or Russell and Whitehead (1913) or any discussion of meta-mathematics and logical theory (e.g. Kleene 1952, Hermes 1969). Meta-redundancy is a three-term or ternary relation which is not reducible to any combination of two-term or binary relations all at the same level, i.e. of the same logical type. C.S. Peirce (e.g. 1955) long ago argued that semiotic relations had to be irreducible ternary relations because something (an Interpretant) had to determine in what relation a sign (or Representamen) stands to what it stands for (its Object). Peirce's semiotic model is certainly more flexible than Bateson's, but precisely because it is a model of pure logical relations that apply in all domains, it can be more difficult to see exactly how to apply it to specific meaning-making practices. Bateson's model has the advantage, for my purposes, that it takes human social communication and learning as its paradigm instances of semiotic behavior.]

The pattern of redundancy between the set of Words and the set of facial Expressions can be presented symbolically as:

[Words / Expressions]

This is a pattern we create by how we use these words and expressions.

Formally, this symbolism represents the joint conditional probabilities of the sets of Words and Expressions:

C(i,j)[Word(i),Expression(j)]

So far, though, this is not yet a meta-redundancy relation. It is not a contextualizing relation. It does not tell us anything about how this pattern of combinations helps to define a context, or how it might be different in different contexts. The meaning that a particular combination of a word and facial expression has for us depends on the situational context; without a context there are many possible meanings for each combination (each perhaps corresponding to a different context, a different set of assumptions for interpreting the meaning of the combination), the combinations, like the isolated Words and Expressions themselves, only has a meaning potential [cf. Halliday 1977, 1978].

The contextualizing relation is represented by the larger meta-redundancy pattern we have been describing. Symbolically:

[(Words / Expressions) // Situations]

or more simply:

[Words/Expressions//Situations].

The first slash-mark stands for the basic redundancy relation (first-order redundancy); the double slash-mark indicates the meta-redundancy (second-order redundancy, of higher logical type). Perhaps it is even better to think of the whole formula as representing the meta-redundancy relation among the three sets: Words, Expressions, and Situations. In mathematical terms this could be represented by the joint conditional probability distribution:

C(i,j;k)[Word(i),Expression(j);Situation(k)]

which tells us, for each situation-type (k), what the probabilities are that various possible probability distributions C(i,j) will be found in that situation-type. If there were total redundancy between situations and use-patterns for words and facial expressions, only one pattern would be possible in each type of situation, but in general human cultural behavior is more complex than this: some patterns are simply more likely in some situations, but there are always other, less likely patterns possible. In a particular event, we might see only one pattern, but even then the meaning of that pattern depends in part on the fact that other patterns could have occurred, other patterns which do show up sometimes in other, similar events of generally the same situation-type.

For the same sorts of reasons, we have to recognize that this whole meta-redundancy system of relationships among situations, words, and facial expressions could also be different under some circumstances. Are the connections we make between situations and word-facial expression combination the same if we are watching a play, perhaps an avant-garde one, as they are for ordinary events of daily life? Couldn't a playwright (or a novelist) create a fictional world where we learned to take as normal very different connections between situations and word-facial expression combinations? Couldn't we create a stage-world where when people smiled and said nasty things the situation was normal, but if someone said something nasty and scowled we'd suspect an unusual situation? There could be many such drama worlds, each with their own conventions about such things. If we tuned in in the middle of a televised drama, and discerned a pattern in the relations of [Words/Expressions//Situations], couldn't we then make a better than random guess about which playwright's world we were probably viewing? There would now be a new, still higher-level meta-meta-redundancy between the set of such Worlds and the meta-redundancy relations of [Words/Expressions] and Situations:

[Words/Expressions//Situations///Worlds]

Of course, Worlds are not just created on the stage. There are communities very different from ours, different cultures, different societies, different periods of history. They might have, within them, special worlds, such as those of drama, or myth, or rituals, or worlds where only men or only women participate. In each of these Worlds, there might be different patterns of [Words/Expressions//Situations], redundant with the set of alternative Worlds. Even beyond all this, these different communities, these different overall Meaning Systems that contextualize the different Worlds the community recognizes will have different particular patterns of [Words/Expressions//Situations ///Worlds], and so these patterns would then be redundant at some very high level with the set of alternative Meaning Systems human communities have enacted in different times and places. Symbolically:

[Words/Expressions//Situations///Worlds////Meaning Systems].

Building a contextualization hierarchy of meta-redundancy relations starting from words and facial expressions was just for purposes of providing an example. We could have started from any two sets of types of meaningful events that are redundant in our community, i.e. that are not equally likely to combine in all possible ways, but are more likely to make certain combinations. We would then generally find that which combinations were more likely and which combinations less likely would depend on some sorts of contexts. Alternatively we could say that these combinations are part of our basis for recognizing (construing) and for enacting (constructing) these contexts. What is a context? It can be anything, at any level of complexity, with which some pattern of combination of other things is redundant. What matters is when and for what it is a context, when and for what it is relevant to constructing/construing the meaning. Contextualization relations are meaning relations, they are the relations we construe/construct to make something meaningful. They tell us what to relate it to, and in

what way, and under what circumstances. All meaning is relational. Nothing has meaning in and of itself. Something has meaning only in terms of how we relate it to other things, how we contextualize it. A description of how and when these contextualizing relations are made in a community is a complete description of its Meaning System.

[For more ways of using meta-redundancy relations to interpret contextualizing practices in a community, i.e. its ways of making meaning, see Lemke 1984: 33-58.]

It is important to notice that at every level of the meta-redundancy hierarchy, redundancy relations are symmetrical. If A is redundant with B, then B is redundant with A. In this way, while the higher levels in a hierarchy contextualize the lower ones, the relations among the lower ones constitute or contribute to the patterns that define the higher ones. The context is itself as much defined by the patterns of what is going on in it as it defines the frame of reference for interpreting the meanings of those patterns. Symmetrical hierarchies are very different from the control hierarchies we usually think about: in the command relations of generals to captains, and captains to sargeants, and sargeants to privates, there is no symmetry. Of course, as social semiotic relations, there is still an important symmetry even in control hierarchies: chiefs and indians are both constituted by their relations to one another.

[For a discussion of different kinds of hierarchies, see Salthe 1993.]

We have already talked about still another kind of hierarchy, the constituency hierarchy of supersystems and subsystems of a complex dynamic open system. Here also the higher level supersytems are constituted by the material, interactional processes among the lower-level subsystems which they in turn limit and regulate. Since these two hierarchies, the supersystem hierarchy and the contextualization (meta-redundancy) hierarchy seem to be enough to describe everything that is meaningful within our Meaning System, what we really want to know is how to use both at once.

[The Meaning System consists of contextualizing relations for making meaningful connections among things, for making them mean for us. These relations describe our meaning-making practices, what we do with language and other forms of action and interaction. These doings are themselves meaningful cultural practices. But they are always also material processes of the dynamic open systems we call human communities in their (physical, ecological) environments. When we describe these systems we use a variety of different Discourses or ways of talking that emphasize different kinds of relationships among the processes/practices. The Discourses of the natural sciences discuss the kinds of meaningful relationships among processes that are spoken of in terms of relations of exchange of matter, energy, and information/entropy. The Discourses of the semiotic sciences discuss the kinds of meaningful relationships that are spoken of in terms of similarity and difference, classification and categorization, evaluation, orientation, and contextualization. The natural sciences are semiotic sciences, with specialized interests. They can only describe systems of material processes by using systems of semiotic practices. But equally, every semiotic practice can be described by the Discourses of the natural sciences as a material process. Human communities can be adequately modeled only when we combine both these viewpoints: when we examine how the semiotic cultural values of material processes play a part in the material self-organization of ecosocial systems, and when we understand the role of material self-organization in producing the regularities (redundancies) that are Meaning Systems.]

Consider the system of interactions that constitutes the community as a dynamic open system. Those interactions include human actions recognized as meaningful by the community, but they also include processes which occur in the environment are which are part of the total dynamic open system, even if they are not recognized as meaningful in that community. The totality of processes of this Interaction System enacts, constitutes, or grounds all the possible Meaning Systems of the community. The actions

and processes recognized as meaningful in the community represent its actual Meaning System, and it is only in terms of this Meaning System that the processes of the Interaction System are meaningful.

One can imagine that there must be "invisible" processes, meaningless and not even recognized as processes in our present Meaning System. But Meaning Systems change: processes that were not processes for us become recognized as new kinds of meanings, constructed in the new Meaning System. The meaning-making practices by which we recognize them are now also new material processes of the Interaction System of the community. We can say that the Interaction System materially constitutes the Meaning System, that the Meaning System is immanent in, is a pattern of meaning-making practices we construct with the processes of the Interaction System. Yet we cannot see, analyze, or talk about the Interaction System except through our current Meaning System, the one we are enacting now through the patterns of our actions. Nevertheless, that Meaning System has limits and gaps, however invisible these are for us most of the time. There can be meanings outside the limits of the current Meaning System: the system can change.

Every Meaning System seems complete, but, by the now familiar argument of Godel, no such system can ever be complete. Every such system is constituted by an Interaction System that cannot be stable and drives the Meaning System to reveal its incompleteness by changing.

Do not confuse the Interaction System with a "material world out there" existing independently of the Meaning System. The two Systems are simply two different, intimately interrelated aspects of the same material, semiotic system [the ecosocial system of Chapter 6]. These two Systems are two different viewpoints or perspectives on one system; as Discourses, they are themselves tools for making meaning. Neither has precedence, neither has greater claim to truth or reality, each is as essentially incomplete as any coherent, consistent view must necessarily be. The possibility of "slippage" between these two ways of making sense of human cultures and communities can help us to talk about system change.

Making Trouble: Disjunctions, Slippage, and System Change

Regarded as Interaction Systems, as dynamic open material ecosystems, human communities develop in ways that preserve their ability to respond to changing environments. They do not develop so as to be perfectly self-regulating, since this would lead them to follow the same patterns regardless of what was happening in their environments. It is in the nature of dynamic open systems that they themselves tend to change their environments by interacting with them, and the results can sometimes be unpredictable. So such systems insure that they have something in reserve, a repertory of possible behaviors, ways of interacting, that gives them some flexibility, some plasticity of response. Some of their internal interactions work counter to perfect self-regulation; these systems embody contradictions to enlarge their range of behaviors, enhance their resilience. [Cf. Holling 1986.]

The Meaning System of a community participates in this general strategy. Not only do Meaning Systems operate so as to limit change, to narrow the range of behaviors that people might meaningfully imagine doing, they must also incorporate gaps and contradictions, incomplete sets of alternatives, counterfunctional subsystems that tend to destabilize the Meaning System and prevent its complete closure, the perfect homeostasis that would keep the community from changing how it makes meaning to enable it to adapt to inevitable changes in its material environments.

How do Meaning Systems limit our vision? How do they contain the reserve alternatives necessary for adaptation, while managing to withhold these from view, or limit their range of operation? And how and when does self-regulation break down and radical system change take over?

How do Meaning Systems hide their limits from us? One way seems to be through the absence of certain contextualizations. There are certain combinations of things, certain connections, it never occurs to us to make. There are gaps in the system of contextualizing relations that do not seem to be there because all those that are in use form a pattern that leads us "around" the absent ones. In order for a gap to remain unnoticed, there must not be any possible combination of meaning-making practices that could lead us into it. I believe that these gaps exist everywhere 20in the Meaning System; they must, because meaning-making is only possible so long as not all combinations, not all connections are equally likely to be made in all situations. And since, at least locally [i.e. patch-by-patch across the many scales of a fractal mosaic system], the connections which are made form a System, i.e. are complexly interdependent on one another, the effect of the gaps pervades the System. One function of every meaning-making practice in a culture is to participate in a Meaning System which avoids leading us into its own gaps. One could say that there is, in this sense, a global [really "mosaic"] system of disjunctions, i.e. a system of meaning-making practices that "avoids" the gaps.

A Meaning System without a system of disjunctions would have to be either too unstable or too stable for survival as a dynamic open system. If the practices of the Meaning System allowed us to make any connection, then many of these would be incompatible with the operations of the community and could eventually lead to disintegration of the intimately interdependent network of cultural practices. The same system of disjunctions also prevents excessive stability. By preserving a reservoir of unrealized possibilities, some of which are compatible with a future, expanded or revised, successor of the Meaning System, the system of disjunctions preserves the adaptability of the community, the space of incompleteness where change can work. The same system of disjunctions that resists change thus makes change possible. The gaps are points of tension, of contradiction, and of potential change, within the system.

It is, for example, quite common for people's politics to be democratic, while their religion remains "monarchical". Historically, both would have been monarchical, but one changed without the other seeming to require a corresponding change because there was a disjunction in the Meaning System between the Discourses and practices of the political domain and those of the religious domain. Historians might quite possibly show us some of the semiotic work that was done in the relevant periods to create or maintain this disjunction, to repair it when breached. Social semiotics ought to be able to show us how the disjunction continues to operate in people lives, in their ways of talking about and thinking about these domains. Some of us can now see the presence of this disjunction because we operate with a Meaning System in which these connections have been made.

Consider again how we have historically used exactly the same arguments to justify the denial of equal legal and political rights to serfs and peasants, to the propertyless, to members of non-White races and non-European cultures, to women, and to children. When each of these arguments fell, the others remained largely unaffected, because there were disjunctions in the Meaning System rendering them all fundamentally "different" despite their (now) obvious similarities. The similarities had to be constructed by contextualizing practices, by making the connections. In earlier versions of the dominant Meaning System in our cultural tradition, the practices for doing this simply did not exist. [Arguments of this general kind are also made by Foucault; cf. the general program of his Archeology of Knowledge (1969) and examples in The Order of Things (1966).] Even today, most people do not make this connection in the case of oppression of younger humans by older ones [see discussion in Chapter 7]. The system of disjunctions preserves for us the possibility of further change, at the same time it prevents us from doubting all our beliefs each time we change one of them. In a Meaning System, however, because it is a system, every belief, every meaning-making practice is interdependent with every other -- in ways we are not supposed to be able to see.

[Note that the pathways of such interdependencies may lead outside what is currently recognized as/by the Meaning System, through connections of material processes in the ecosocial system.]

Still another powerful example of the system of disjunctions is the separation of the prestige Discourses of our community into three general domains, each of which resists any synthesis with the other two: Science, Art, and Politics. (Religion used to be a separate domain, and belonged to an older and somewhat different system of disjunctions.) Science speaks the language of Truth, Art the language of Beauty, and Politics the language of Good. More generally, the Discourses of Science are those that are concerned with the truth of propositions about how the world, including the human world, "is" in some objective sense. They include the Discourses of philosophy and the social sciences, and even of history and literary criticism, all the academic discourses, all the technical discourses of our community. They are the discourses we are meant to assent to; their power is the power to compel belief in the truth of what they say. The Discourses of Art, on the other hand, are not mainly concerned with truth, but rather with honesty, authenticity, the feel of things, their emotional effect upon us when we interact with them. Their power is the power to make us feel, to engage us more totally, more bodily, than the Discourses of Science. This is the language of poetry and literature, of music and visual art, drama, film, and performance. ["Language" in the sense of a semiotic system of resources and patterns of using them; a system of practices, not necessarily only verbal language itself.]

Finally, there is the language of Action, of politics and rhetoric, which moves us to act in the name of the Good. It concerns itself with values and action, with what ought to be done in the material and social world. Its power is that it can move us to act.

A Discourse, a way of speaking, is considered less scientific, or even rendered "unscientific" exactly to the extent that it includes elements either of the language of feeling or of the language of action and values. Use the linguistic and stylistic resources of the poet or artist for scientific communication, and you will not have standing as being scientific. Argue from values or the implications of propositions for action and social consequences, and again you are considered outside the bounds of science. Suggest that science is really art masquerading as objective truth, that it is stories we tell about the world, narratives and fictions that are useful for certain social purposes, and the defenders of the disjunctions will (paradoxically) rail against your views as if science really were a matter of core values and the Good. Argue that human social values shape every aspect of science, that science is inherently political, that science is and should be subordinate to and subject to political analysis and control, and the disjunctions will become starkly visible. These disjunctions operate successfully mainly insofar as they are tacitly accepted. Once you begin to look for the aesthetic dimension in science or its dependence on specific cultural and historical values, the connections are easily made. The disjunctions themselves are recent and local products of one particular historical, cultural tradition.

Art also repels both the scientific and the political in our dominant cultural tradition. Art which limits itself to the scientifically true is considered narrow and unimaginative, or overly "technical". Art which incorporates political values and a call for social action is considered tendentious and propagandistic. Art is not supposed to concern itself significantly with either truth or politics.

Political rhetoric, in the broad sense of argument for social action based on appeals to social values, is also supposed to remain "rational" and not ground itself in the powerful emotional appeals of Art, lest it be called "demagoguery". It is also supposed to maintain a clear distinction between "facts" (matters of Science) and "values", or else it will be accused either of "interfering" with the freedom of science to pursue truth objectively, or of "misusing" facts to support policy.

It should be very clear that this system of disjunctions strongly stabilizes our cultural system by forbidding to science and politics the language of love, which would make us trust them; forbidding politics and poetry the language of objectivity, which would make us uncritical of them; and forbidding poetry and science the language of justice, which could move us to act. At the same time, these disjunctions also preserve powerful possibilities for meaning in reserve.

[It should be clear that those disjunctions which favor the interests of social castes who have the power to "police" violations of them, and who work to keep them from spreading or undermining other disjunctions or meaning-making practices they benefit from, are more likely to persist for longer periods of time. These are the specifically ideological disjunctions embodied in the Meaning System of a community. Cf. Chapter 1.]

[I omit here a discussion that traces the pattern of mutual reinforcement among these disjunctions in order to identify the most fundamental or core beliefs which they protect from effective challenge. The result of this analysis essentially converges with the postmodernist critique of the notions of objective truth and objective reality as sketched in Chapter 1.]

Breaking through the limits of our Meaning System, breaching its disjunctions or making a connection, enacting a practice, that lies outside it, does not in itself necessarily change the Meaning System. We often do things, make meanings that go outside the usual patterns of the system, but they tend to go unrecognized and unrepeated. They are counted as "slips" or "accidents" and "errors" by the terms of the prevailing Meaning System. Connections which are not recognized by the System are labeled as accidental or "coincidences", as meaningless. These non-events, these almost-were meanings, lie at the borders of the Meaning System, usually well policed by our acceptance of the system of disjunctions. The disjunctions here work to keep these "slips" isolated, unconnected to anything and so no threat to the rest of the Meaning System. Only when the limits are broken in a way that does make systematic connections, that creates a rival set of meanings, is there a real possibility of system change. [It is in these cases that power relations come into play and policing becomes a conscious activity, a value-based opposition, even though neither side may have a good sense of just what larger aspects of the Meaning System, and of the Interaction System, are at stake.]

Contradictions do not exist just within the Meaning System (gaps or disjunctions); they necessarily also exist between the Meaning System and the Interaction System. This is another fundamental source of potential system change.

The Meaning System perspective and the Interaction System perspective are not just two different ways of looking at a human community as a dynamic open system of processes/practices. They are also radically incommensurable perspectives. There is no possible one-to-one relationship between the two descriptions in any domain.

[This point has often been made in many different ways. Bateson (1972) talks about the distinction between "digital" (discrete, typological, categorial, "lumped") aspects of meaning and "analogue" (continuous, topological, "distributed") aspects. Pike (1982) uses a similar notion to distinguish "particle" aspects (discrete, typological) from "wave" and "field" (continuous, topological) aspects. Verbal-semantic meaning systems (especially word-relations) are predominantly typological; visual-motor meaning systems are predominantly topological. Much of the mathematics of classical science seems to represent a bridge from the verbal-typological to the continuous-topological, just as its visual representation schemes, such as graphs, attempt to bridge this difference from the other side. Some aspects of verbal meaning are more topological in character, as with the gradable semantics of evaluations; but most of the topological meaning in speech is considered "paralinguistic".

A phenomenon which has a topological description, i.e. a phenomenon which we construct as a phenomenon by using meaning-making practices that make connections of the topological kind (e.g. the acoustic soundstream of speech as recorded by an oscilloscope or sonograph), can never be completely and exhaustively described by a digital or typological code (e.g. the categorial system of phonemes, tonemes, etc. in formal linguistics). It always "overflows" our attempts to "capture" it in our category systems. It can be endlessly re-classified according to infinitely many different systems of classification, each of which construes it as having a different set of relevant features (cf. distinctive features in linguistic phonology).]

The creative process in art often leads to the making of new meanings through the "slippage" between the Meaning System and the Interaction System. Imagine a choreographer making a new dance. He is a fluent speaker of the dance idiom, usually a dancer or former dancer himself. He is involved in creating a polysemiotic construction: the meaning-making practices of music, of narrative, and of dance movement are being combined according to a Meaning System that specifies which combinations of rhythms and movements and sequences are meaningful and valued in his culture. He envisions, and perhaps feels in his own body, the next possible sequence of movements he would like his dancers to perform. He comes into the studio, the musical phrases for these movements begin, and the dancers start to enact his instructions. Those instructions, and much of his plan for the dance, are couched in terms of the verbal language and the visual image language of choreography: they represent meaningful movements and combinations of movements, movement types. These movement types are categories or ideals of movement. Real human movements are construed, are seen (by by the dancer himself, felt) as instances of these categories to the extent that certain criterial features of the movement, defined by the category system, look "right".

But this dancer and that dancer never do the "same" movement (as defined by the movement-type category) exactly the same way. Even the same dancer will never (can never, from the Interaction System perspective) do it the same way twice. But most of these differences do not "matter"; the movement still counts as "right", as of the same type, so long as it meets the criteria that do matter. Bateson defined information (or in our terms, meaning) as: "a difference that makes a difference". Here we are considering the differences that do not make a difference. So far as the categorial meaning of the movement goes, it is the "same" movement. Overlaid on this basic system of categories there will be other meaningful differences: a bold version of the movement, a strong version, a light version; a style to the movement associated with this school of dance training or that school. These are finer subdivisions or cross-categorizations. At some point there may be just the identifiable style of a particular dancer, and maybe of that dancer at a particular period of her career. [These are "indexical" meanings, meanings that index a context. The feature combinations that define them are redundant with this or that style, this or that dancer's manner, training, etc.]

Finally there are the differences, the variations, that simply don't count, that don't mean anything at all. They may be very small differences, a fraction of a degree in an angle, a fraction of a second difference in timing. Or they may be bigger differences, but not ones that matter for any of the meaningful kinds of difference in the culture of dance. [They index nothing.]

But these sub-criterial, infra-semiotic differences, while they are redundant with nothing in the meaning system, lead to no meaningful similarities or differences of category or type or meaning, may still enter into relationships in the Interaction System that sometimes cannot be ignored.

The dancers follow the choreographer's instructions, perform what was semiotically conceived as a sequence, but somehow something goes wrong. A new combination or sequence doesn't feel right, or

doesn't look as right on the dancers' bodies as it did in the choreographer's imagination. Real bodies do not perform ideal movements, they perform real movements which always have additional features besides the criterial ones they need to have to count as dance movements of the right types. Sometimes when these real movements are juxtaposed, or when two dancers have to co-ordinate their separate movements, something that seemed workable when viewed solely in terms of ideal movement types is not physically, anatomically possible or comfortable on the real bodies of the dancers.

The choreographer now sees what is happening in terms of both the semiotic categories of dance and in terms of the deviations, the "slippage" between real, material movements, and ideal movement types defined by only some of the infinity of features that any real movement can be construed as having. The simplest solution is to have the dancers execute the "same" movements in a slightly different way, but maybe that doesn't work. One could try asking other dancers to try it, but that is rarely practical. In fact, choreographers tend to improvise in such situations. What they see on the dancers is not exactly what they envisioned in terms of the idiom of dance. More is always happening than that idiom takes into account or cares about. And that more can lead the choreographer to see the movement possibilities differently than before, to imagine a possibility he could not have imagined if he had never seen this "slippage". The Interaction System is at work; material interactional processes are producing possibilities of self-organization that may never have existed until that particular configuration came into being. The choreographer may begin to create a meaning for the slippage; differences that were not significant before can become visible, become significant. A new plan for the movement may emerge from this. Perhaps a new sense of movement possibilities. Perhaps even a new movement style, a new movement type, which, if taken over by others, if seen by others and danced by others, could represent ultimately a change in the Meaning System of dance.

In every semiotic system we find this same slippage. In language, the Interaction System view enables us to describe the patterns of sound energy continuously varying in time and as a function of the range of frequencies in the sound. But most of that continuous variation is not relevant to whether we hear a "b" or a "p", a "b" or a "v". Only a very few general, average, outline features of the acoustic soundstream are criterial for which phoneme we hear, whether we hear "bear" or "pear". You and I can both make soundstreams that others will hear as having these criterially different features, but the details of our soundstreams will be different. I cannot even say exactly the same speech sound in exactly the same way twice. Again, most of the differences do not matter. The Meaning System is concerned only with which phoneme we utter, but we cannot in fact, in terms of the Interaction System perspective, utter a pure phoneme. We have to utter a "phone", a real sound that has many acoustic features other than the ones that matter, the ones that distinguish one linguistically meaningful sound from another, the ones that are redundant with differences in words, in meanings.

Some of the differences in the ways I might say "bear" will not index different words, but might index whether I sound fresh or tired, excited or frightened. Other differences might simply index that it is I who am speaking, or my "accent" as a member of some group. And an infinite number of other differences will index nothing at all, signify nothing at all. But someone who has an oscilloscope that creates potentially visually meaningful patterns from otherwise meaningless sound features might learn to shape their speech in new ways, and recognize that shape, and teach this to others, so that it might in time become a recognized index of something and enter the Meaning System. The oscilloscope was built according to prescriptions of some other part of the Meaning System, one disconnected from that having to do with the interpretation of speech sounds. But the Interaction System relations between the physical machine and the physical acoustical sounds can create the possibility of new meanings, changes in the Meaning System.

When a new meaning gets made, either through the opportunities afforded by slippage or by breaching a disjunction, it is usually not even recognized as a meaning, or as an event. If it is recognized at all, the system of disjunctions will label it "just a slip" or non-sense, "that doesn't make sense." Sometimes the new connection is recognized and not isolated but seen as part of a whole new possible system of meanings, as implying a more general new way of making meaning that could apply also in other contexts. It may spread and be used in some new subcommunity indexed by its use. Most often this new little piece of a meaning system gets added onto the existing system in such a way that it stays quarantined to its little subcommunity, and after a time other subcommunities that interact with it find a way to accomodate it [cf. the possibilities for heteroglossic relations among divergent Discourses, as in Chapter 3.] They may label it a peculiarity of another group, and they will most likely also consider it unimportant or inferior to their own practices.

But sometimes a new system of meaning-making practices, new ways of doing things, new ways of talking about something, can form a genuinely rival alternative system which competes for the hearts and minds of members of a community. It represents an alternative mode of self-organization of the processes/practices of the community. Perhaps it is one that could only come into existence once the previous system had developed in a certain way. Or perhaps it originated in a separate, alien culture.

When a rival meaning system gets made within a community, rather than being encountered from outside, there is a key difference: it is more likely to "fit" with the gaps in the existing majority system, to be compatible with the Interaction System of the community, and so to be a serious rival contender. It can appeal to members of the community despite its violation of disjunctions precisely because it is in some sense (in relation to the Interaction System) still a part of the community. It is more likely to know where the family skeletons are buried, that is, to expose and threaten specific parts of the local system of disjunctions. But it is also more easily co-opted, more easily out-manoevered by the rest of that system. It is, after all, just this sort of rival that the system of disjunctions had historically evolved to prevent, or defeat. A completely alien system, on the other hand, is more likely to take it by surprise, unprepared. But then an alien system is also less likely to catch on, less likely to prove adapted to the Interaction System of the community. It is not as easily co-opted, but it is more easily isolated.

Radical systemic changes in the culture of a community, occuring over short periods of time, must generally involve major changes in the Interaction System as well as in the Meaning System. These are major re-organizations of the material processes of the community, major by the criteria of the Interaction System: major shifts in the distributions and flows of energy and matter in the system. Such shifts can be triggered by relatively minor (by matter-energy criteria) changes in the meaning-making practices of the community, but such changes (e.g. in its value system or beliefs) would then have to be counted as major by the criteria of the Meaning System.

Leaving aside encounters with external Meaning Systems, we can imagine two modes of internal subversion of a Meaning System. Because the totality of meanings, i.e. the background realm of no-meaning [recall that where all meanings are equally likely, there is no meaning; the pleroma or totality is also the no-meaning realm], is also the ground against which all specific meanings are figured, and grounds every material act, "alien" meanings will also be made within the community itself. These include not just the "accidental" slippages we have already discussed, but also "playful" meanings. Play happens wherever the system of disjunctions fails to get us to police ourselves, wherever Chaos is a welcome friend, embraced in laughter and not shut out in terror of no-meaning. Play is the complement and antithesis of praxis, of the systematic, reflexive explication of the system of disjunctions as it operates in our own practice. Play is the unspeakable source of the possibility of praxis because it creates the possibility of a meaning-space outside the Meaning System, beyond the limits set by the system of disjunctions, from which that system can become visible to us in its effects on our practice.

[The metaphors of war between rival Meaning Systems are masculinist figures of speech; they create a mood of seriousness, responsibility, danger. They call for the virtues of courage and strength. They are allies of the system of disjunctions, moving us closer to the center which that system protects: the perspective of the dominant caste who have shaped our Meaning System. The sign of play escapes this system, or at least shifts us toward its periphery, towards the elements it marginalizes. To be playful is to be not-serious, to drop responsibilities, to laugh at rivalries, to get free of the Ought and the Is. Play has no goals, it makes itself unpredictably. Play makes trouble for every System. Play makes possible every System, and No-System.]

Make trouble.

[Play!]