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RHETORIC 2001

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Amazingly, the assertion that we live in a century of major technological and social transformation is already a cliché. Even the assertion that the proportions and velocity of this transformation are unrivaled in the history of our species begins to grow trite. We in English, like our colleagues throughout the humanities, associate this widely-recognized revolution with atomic reactors, computers and television circuits. We conceive of it as essentially scientific and have allowed ourselves to be intimidated by its complex mathematics and technical jargon.

In doing so we have sold ourselves short. Like all major changes in human culture, however material their bases, this is also a revolution in consciousness. Our most basic thought-patterns, those we have come to think of as 'natural,' are being called into question. And human consciousness — thinking — is precisely our area of expertise. What we traditionally call 'culture' is collective consciousness; what we call communication skills are the techniques by which consciousness is expressed, exchanged, and changed.

Simply, the ecological crisis may be traced to three determining factors: (a) technological progress, (b) population increase, and (c) certain outmoded attitudes and thought-patterns.1 Together these three determinants form a vicious circle of growth. Given our present consciousness, technological progress allows and leads to increased population which causes shortages and other problems which we solve with more technological progress which leads to more population, etc. This vicious circle can be broken by a technological breakdown (pollution or depletions of raw materials), a population decrease (famine), or a change in consciousness. In other words, only a change in certain outmoded attitudes and thought-patterns can prevent disaster.

These attitudes and thought-patterns are outmoded not only because their practical consequence is an environmental crisis; they have also been found theoretically inadequate by scientists in diverse fields. Exceptional scientists — notably Wiener (cybernetics), Bertalanffy (biology), Boulding (economics), Batson (anthropology), and Buckley (sociology) — have detected a common direction which unites the most advanced trends in modern science, in Bertalanffy's phrase, a correspondence "of laws and conceptual schemes in different fields."2 It is this generalized direction, more than the particular discoveries of any particular discipline, which has implications for the future of the humanities in particular and human consciousness in general. It is because of this generalized shift that we who teach communications skills have an exceptionally significant service to offer.

At the 1971 NCTE convention, the popular futurist, Alvin Toffler, asserted the special potential of certain aspects of 'English' for helping people understand, cope with and even control the technological and social changes of our times. Even before our ecological problems, it was "clear" to the noted philosopher of science, Herbert Feigl, that "nothing is more urgent for education today than a social philosophy that will be appropriate and workable in an age of science."3 The Club of Rome executive committee lists first among the implications of its study of the limits to growth the need to initiate "new forms of thinking that will lead to a fundamental revision of human behavior."4 Various scientists have the data necessary for evolving these new forms of thinking; various humanists possess the necessary communicational and epistemological problem-solving skills. The trick will be to combine our resources by transcending traditional disciplinary boundaries.

The primary educational function of the humanities has always transcended content; however much data-memorization may incidentally be involved, students in the humanities learn mainly how to think. No one studies Hamlet or the history of the Roman Empire because the factual content has direct utility. The task of the humanities is to teach human-ness; the students' reward is not information so much as it is the raising or expansion of their consciousness such that they can better comprehend, order, evaluate and control their experience. The importance of learning to think and feel is central to the humanistic creed: in the Anglo-American tradition it dates back to Sir Philip Sidney's argument that poetry is an educator and mental nourisher because it enlarges the human mind and character. Even the 'lowly' freshman composition course, in addition to transmitting certain specific writing skills, has traditionally embodied this generalized humanistic function. In fact, composition has always been especially important because it teaches communications skills. Rhetoric includes invention and logic because perception and thinking cannot be totally separated from expression. That is why prewriting and logic are included in composition handbooks. By example, by indirection, and sometimes even intentionally, composition teachers have always taught thinking.

Of all the humanities, therefore, those of us whose subjects center on communications skills (speaking, writing, teaching and media) are in the best position to provide what Toffler, Feigl, and the Club of Rome request. Precisely because our subjects have the least formal content and the greatest emphasis on process, precisely because our usual backgrounds in art and literature make us (in McLuhan's words) less insensitive to the "diverse and discontinuous life of forms" and less "shut off from Blake's awareness or that of the Psalmist that we become what we behold,"5 precisely because we have not been too thoroughly indoctrinated in linear mechanistic thinking, it is in our power to make a contribution which may be crucial to the future of our species. Some of our innovative methods al-
ready begin to provide parts of the new integrative perspective; what we must do is to expand and order that contribution.

First we must facilitate communication by translating the various technical jargons into a commensurable and comprehensible language. This is a task for those of us with some scientific and mathematical ability working with scientific advisors, linguists and communica tions experts. Second we must learn which thought-patterns are not only practical (i.e., ecological), but correct. Third we must integrate the newly-accessible forms into the consciousness of our culture.

The preliminary work has been already sufficiently advanced by exceptional scientists and communications theorists that we can define the latter part of the project; we can even delineate broadly the content and methods of a composition course which would enable students to begin to comprehend the coming consciousness of the 21st century. It is important to note first that these changes are not dictated solely by science. A social awareness of the inadequacies of the old mode underlay the absurdist and existential literature of the 50's as surely as it had earlier been manifest in cubism and surrealism. The same awareness led American beat writers to seek outside our culture for alternate thought patterns. In the 60's hippies and the new left (in their very different ways) sought alternate social, ethical, and cognitive structures. Even materialistic corporations have restructured their channels of internal communications with the guidance of information and communication theorists. Although often undifferentiated, describable only vaguely as a generalized anxiety, this same awareness that certain traditional patterns are outmoded has filtered down to the general populace. The commensurable element throughout is the realization that basic thought- and behavior-patterns which have served the Occident well at least since the renaissance/ reformation are becoming obsolete; when we confront our most complicated, pressing, and confusing problems, these patterns no longer work with sufficient reliability. Certain "common sense" values no longer work, or work only within carefully limited contexts; 'common sense' often leads to precisely anti- ecological behavior. common sense is implicit in the logic of composition methods; to create the composition course of the future we will have to make explicit and reevaluate the values implicit in the traditional composition course.

Within academia, the coming of a new mode is foreshadowed by the increasing necessity to violate the old classifications and compartmentalizations of knowledge. The biologist has had to learn chemistry, physics, and cybernetic information theory to understand the simple cell. The psychologist has had to learn sociology, anthropology, biology, and sometimes even Buddhism to understand schizophrenia. Likewise we in the humanities will have to acquire an overview of the natural and social sciences in order to serve our function in this scientific century, a function which might well include a role as counterweight. Fortunately we will not need all the technical details: a generalized understanding together with a careful study of the conclusions will be more than adequate, especially since we can be assured of a plethora of scientists more than willing to criticize whenever we overreach ourselves. Our prejudices toward the diversion and classification of knowledge — prejudices not unrelated to our teaching of division and classification as standard modes of development — will be a much more serious obstacle.

Every major scientific advance has implied a shift of human consciousness. Scientific discoveries are accepted only after a shift in consciousness has begun to make them relevant, and their acceptance leads to further shifts. The Copernican revolution was much more than a recalculation of the movements of planets, even though its original goal had been merely the computation of a more accurate calendar; Copernicus' thesis had been argued as early as Ancient Greece. The Mendelian genetics we learned in high school was categorically rejected when Mendel proposed it. General relativity is more than an explanation of the three anomalies which were puzzling Einstein and his colleagues; certainly it has been interpolated well beyond the bounds of physics. Cybernetics likewise has implications far beyond computers.

The exceptional significance of the current shift is indicated by its parallel development in many diverse disciplines. The breadth of its manifestations, however, makes it much more difficult to comprehend: there are as many jargons as there are disciplines. The same breadth of its manifestations, on the other hand, makes it that much more exciting and world-shaking: once comprehended it can be applied everywhere. One could adopt the language of quantum physics, gestalt psychology, dialectics, cybernetics, general system theory, or half a dozen other disciplines. One could describe a shift of emphasis from stasis to process, entity to relationship, atom to gesalt, scaler to tensor, component to stream, analytics to dialectics, causality to constraint, biomeregenetics to communication, or at least a dozen other parallel shifts. This shift (and it is one shift, despite the all the varied jargon) reflects the transition from the Machine Age to the Computer Age, the transition from an age characterized by an energy explosion to an age characterized by an information explosion. For the non-specialist, therefore, it is easiest to comprehend as a movement from mechanistic to cybernetic thinking. This movement is clear in both the 'hard' and the social sciences. It has had little impact in the humanities, although parallel tendencies are occasionally observable. It has had virtually no impact on common sense — yet.

Common sense includes the laws of arithmetic: e.g., summativity (the whole is equal to the sum of its parts, 1+1=2). In 1881 a physicist named Michelson did an experiment which seemed to demonstrate that light did not obey the law of simple addition. For several decades the physicists, who like everybody else believed in arithmetic, tried to find his mistake. Much like undergraduates in the laboratory who get the 'wrong' results, they repeated his experiment, trying to get different results or to find alternate inductions. Finally Einstein assumed that Michelson's experiment was accurate and that the laws of arithmetic needed revision. (In order to do so, he adopted a non-Euclidean geometry which postulates that no line can be drawn parallel to a given line — another assumption which contradicts common sense and experience.) The result was atomic power — and the knowledge that ordinary arithmetic and geometry are accurate only below certain speeds and within certain relatively small spaces.

This example from physics is appropriate because what is here is called mechanistic thinking operates according to a set of energy analogies derived from the 19th century physics, sometimes characterized as the billiard ball model of the universe. Despite what most of us don't know about Newtonian physics, mechanistic conceptions underlie much of our ordinary thinking. Even those of us who have never heard of the law of conservation of energy apply it regularly far beyond the bounds of physics. It is true that once a billiard ball of a certain weight has obtained a certain speed, it has a measurable momentum which must be expended. By analogy we think of psychological energy as behaving similarly. We assume that a psychological drive has momentum and that if it is diverted it will find an outlet elsewhere: if you stop smoking cigarettes, you will start biting your nails; if you stop biting your nails you had best start chewing gum or you will expend that repressed energy by beating your children. The analogy is so pervasive because it is only partially untrue, that we seem to see it confirmed everywhere. And yet we all know people who (perhaps after an initial 'cold turkey' period) have stopped smoking without either chewing gum or becoming aggressive monsters. Upon reflection we must admit that psychological energies are not quantifiable in such a way as to either prove or disprove a law of
conservation of psychic energy and that sometimes psychic energy seems to just disappear.

(To assume that it has then always been repressed is tautological.) The great danger of common sense is that it is usually not subject to reflection.

Here the system theorist can help us. System theory postulates two sets: in one (closed systems) physical energy, analogies do work, effects equal causes, summativity applies; in the other (open systems) information dominates and an entirely new group of analogies explains the behavior much more accurately. This distinction can be made clear, even to those who know nothing about system theory, by the following example.

If you kick a stone its reaction is predictable. A careful measurement of the force and direction of your kick, of the weight and shape of the stone, and of the obstacles in its path will enable you to perfectly predict its motion. Effect equals cause. If, however, you kick a dog instead of a stone, the situation is more complicated. When you kick a dog you are conveying not energy, but information. Certainly it takes some energy to carry that information, but measurements of that energy often vary very little. As in many other cases, a small amount of energy can convey a great deal of information. The dog may cringe, run away, attack, whine or react in any number of other ways. In any event, it takes the energy for its response from its own energy system. It evaluates the information received from the kick in terms of its own consciousness and has a certain freedom from deterministic causality in choosing its response. To predict that response you need to know not about the dog’s energy system, but about its information system: what memories does it have of you? of kicks? of previous attacks on human beings? does it regard the ground upon which you stand as part of its territory?

Clearly, information systems are no more complicated than energy systems. What is being asserted here, however, is something more than that: information systems operate on an entirely different logical order than energy systems and by a distinct set of rules. If this is true, it follows that applying (conscious or unconscious) energy analogies to an information-dominated situation is a type of logical fallacy. Like any other logical fallacy it may lead to either true or false conclusions. What then are the alternatives?

* * * * *

Computer specialists, in order to solve concrete problems, have worked out laws for their information-oriented computers. These laws have demonstrably broader applications; the thought-patterns implicit in these laws are commensurable with the general direction of modern science. They have implications even for that very common information-oriented system, expository writing. And, most interestingly, they are much more commensurable with traditional humanistic principles than were the laws of 19th century empirical science. Although there are a few crucial concepts which defy easy translation and force us to learn a few new words, most of the cybernetic laws can be expressed in ordinary language. Some of them will turn out to be familiar; after all, we do live in this world and are far from impervious to it. Most of us believe that, except in certain relatively simple learning situations, human behavior is more complicated than stimulus-response (i.e., cause-effect).

What then is the alternative to causality? And what does it have to do with freshman composition? The second question is easier to answer. One way or another, most of us teach causal modes of development. The text which was assigned to me together with my first composition courses actually had a section on cause-to-effect development. More commonly, we teach this mode of development simply by asking "WHY?" and demanding a "logical" explanation. It is good that we do so. A causal explanation is one step beyond an analogical explanation and two steps beyond an illogical explanation or non-explanation. In teaching this mode, or any other, however, we should make clear its limitations and alternatives. Most of us (I for one) have not been precisely aware of the limitations and alternatives to causality. How else does one answer the question "WHY?"

The key word for understanding the cybernetic alternative to causality is overdetermination, a word invented by Freud to explain dream symbol formation. Overdetermination implies an overabundance of causes, a superfluity of reasons. Overdetermination is how, in fact, biological systems most commonly operate — and with good reason: a human being’s urge to eat, for example, is regulated by appetite, habit, social convention and various other factors; if low blood sugar were the only motivation, any disturbance in this single line of control could result in death. Thus an excess of motivating factors has survival value. Evolutionary processes have, therefore, constrained all life forms toward overdetermination.

To seek a cause in such a situation is an oversimplification, a logical fallacy which may lead to false conclusions. If I see a person eating a hot dog the determinants may include low blood sugar, coincidental convenience, cultural eating habits, ignorance of the ingredients, being in a hurry, and perhaps even complicated oddiopal symbols. There is no way to ‘add up’ this diverse set of determinants into anything resembling a ‘cause.’

Instead of asking "WHY?" cybernetic explanation therefore asks "WHY NOT?" Cybernetic explanation assumes first that anything is possible (governed only by the laws of probability) and then asks what factors prevented all the things which did not happen. That person ate that hot dog because low blood sugar and habit prevented non-eating, cultural eating patterns prevented teriyaki, being in a hurry prevented glazed duck, lack of money prevented steak, etc. This type of cybernetic logic is equivalent to reductio ad absurdum. It is the same mode Darwin used for his theory of evolution.

Darwin began by assuming that, everything else being equal, only probability would explain the fauna and flora. Since many existing species seemed non-probable, he asked what was not equal, what factors prevented the alternatives from surviving. His answer was that environmental determinants made the potential alternatives less viable than the species which survived. The slogan “survival of the fittest” is not Darwin’s, nor that of any other biologist; it was invented by social philosopher Herbert Spencer. Darwinian natural selection means merely the extinction of the unfit: "In nature we find . . . everything which is not so inexpedient as to endanger the existence of the species." This is how the Argus pheasant survives his cumbersome tail feathers. The grossly unfit mutants die, but, because natural selection does not operate according to linear causality, the survivors embody a great deal of genetic variation. And since it is precisely the variants who survive when the environment changes, evolution would not work were it not an overdetermined process.

Simple causality is the appropriate explanation for physical systems, like kicking the stone. Overdetermination is the appropriate explanation for information systems, like kicking the dog. Freshman composition teachers should not stop teaching cause-to-effect development; but they should start teaching overdetermination (or reductio ad absurdum) as well — and explaining which mode is appropriate for which type of situation.

Linear causality forms part of the general pattern of perception of anyone raised in our culture. Experimental evidence indicates that it is much easier for students to learn material which fits into that pattern than material which challenges it. Consequently, I proceed very carefully. I begin with demonstration and discussion, move on to collection of further examples by the students, then ask for utilization and development of those examples in explanation, and only finally do I assign application in argument.
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Virtually any content involving human motivation or social behavior can be used for the initial demonstration. I have even begun with the material which forced Freud to invent the word overdetermination: dream analysis. I use dreams from Freud's texts, my own dreams, and dreams the students have been collecting in their journals. I do not mention overdetermination until after the students understand how dream symbols work; then I use what they have come to understand about dreams as a means to introduce the concept of overdetermination. Examples from film and literature could equally well be used as a basis since (as Freud recognized) they utilize similar types of symbols. A short like "Frank Film" (Pyramid) is especially good because both its thesis and its techniques deal with the complexity of human behavior.

It would also be possible to begin with problem-examples, such as the following:

A student is studying late on the last night of finals week because he has three examinations on the last day. He runs out of cigarettes. Tired and grumpy, he goes downstairs to buy some more. He cuts across an alley to an all-night store. A car with one headlight and bad brakes comes down the alley. The driver, who had taken his last final that day and had been celebrating, tries to stop, but cannot. The police form which must be filled out asks, "What was the cause of the accident?"

Remove almost any single element from the story and the accident does not occur, for example if the student did not smoke or if the finals schedule had been rationalized so that no one had more than one final on any given day. At the very least, an analysis of this problem must consider multiple causality. If it is extended to include questions like "what motivates so many of us to smoke despite clear evidence that tobacco fumes are detrimental to our health?" or "why do we drink and drive?" then the analysis must consider overdetermined social behavior and motivation. It must involve discussion of many levels of reality. On one level the determinants of smoking, for example, are psychological: parental example, peer pressure, need for oral stimulation in tense situations, etc. That level alone is overdetermined. If we add to it explanations of why students are tense during finals, why tobacco is legal and available in our society, and so on, we add another set of overdetermined levels. One could continue ad infinitum. In the classroom, I stop when it is clearly impossible to isolate a single cause or even a single level of causality.

Since overdetermination is a quality of all human motivation, it is possible to move easily from posed examples to more real examples. One could raise, for example, the question of why each student (or the teacher) has come to class. The combination of economic (money), social (status), and psychological (identity) reasons is bound to be overdetermined.

Having explained the concept of overdetermination and how is it distinct from simple causality, I then send the students out to collect examples. Essentially I am using the collection technique I learned from Ken Macrorie; the only difference is that the students are collecting examples of overdetermination instead of "fabulous realities" or bits of interesting dialog.

Collection leads into writing. An example of overdetermination usually takes a paragraph just to present. The next step, just as with any other collected material, is to ask for a longer piece of writing based on or utilizing what was collected. Overdetermined explanations flow naturally into argument, if only because there is usually an implicit assertion that the overdetermined explanation is more accurate than oversimplified alternatives. A final assignment might begin with the statement that it is a logical fallacy to seek simple causal explanations for overdetermined situations and proceed by comparison/contrast and examples to substantiate that thesis. If the examples come from within one general subject (e.g., ecology, education, or parent-child relations), this assignment can produce a very tight argumentative essay. One of its virtues is that it includes both causal and overdetermined explanation and a statement about the circumstances under which each is appropriate. Thus the students' ability to produce explanation is both improved and expanded.

The modes of analysis we teach should be similarly revamped. One rule of ordinary Western thought asserts that a whole is equal to the sum of its parts. (People who read and teach poems have always doubted this one.) A methodological corollary has been that one takes apart what one would understand, analyzes each of the parts (or variables) separately, and then arranges the analyzed parts in a logical series. This procedure is an example of mechanical thinking; it is very effective if you want to understand how a gasoline engine produces power. It does not work as well when you are trying to understand a person or a poem. Although this mode can be traced to ancient Greece and elsewhere, it obtained dominance in 17th century Europe. Descartes, one of the fathers of this approach, determined to "divide each of the difficulties . . . into as many parts as possible" and to "think in an orderly fashion, beginning with the things which were simplest and easiest to understand and gradually and by degrees reaching toward more complex knowledge, even treating as though ordered materials were not necessarily so." As McLuhan notes, "rational" has for the West long meant uniform and sequential; consequently "mechanization is achieved by fragmentation of any process and by putting the fragmented parts in a series." 10

If, however, what you would understand is not in reality fragmented, divisible, or serial, if in fact its characteristic qualities are based on the simultaneous existence and interrelation of its parts, then a falsification follows from mechanical analysis. Mechanical analysis can then be retained only if its reductive falsification is compensated for within a larger methodological schema. Failure to do so is one of the reasons for the ecological crisis. Western culture especially has a pathological tendency to look only at the parts, to see the forest for the trees. We tend to think it is the individual (or individual corporation, or individual nation) that matters; we think in terms of 'us' against 'them,' 'us' against the environment. Actually the unit of evolutionary survival is organism-plus-environment; that organism which 'wins against' its environment becomes extinct. Until recently there was a seemingly infinite frontier because we did not have the power to defeat the whole ecosystem; until recently therefore these thinking patterns were not so very destructive to the survival of the human race. Now these same patterns have become a liability.

It would be ridiculous, of course, to blame freshman composition for the forms of thinking which pervade the communication of our society. Such modes of development as classification, division, mechanical analysis, definition by genus + differentia, and either/or deduction merely reinforce the socially dominant forms. These modes are, moreover, useful, and we should continue to teach them; but we should do so in the context of heavily-emphasized integrative modes for which we will have to develop pedagogies. As the Club of Rome study points out, "it is through knowledge of wholes that we gain understanding of components, and not vice versa." 11

Even with the gasoline engine, where mechanical analysis is appropriate, we cannot understand the function of the components without knowing the structure and purpose of the whole. When what we must repair is not an engine, but an ecosystem, a holistic approach is that much more vital.
Boulding asserts that "at the present stage of human knowledge our theoretical constructs are fairly adequate at the lower levels (of complexity and organization), but become increasingly inadequate as we proceed to higher levels." The system theorist will confirm this statement: our ordinary modes are adequate for closed systems, but become increasingly inadequate for systems which are increasingly 'open' to their 'environments.' Nonsummativity — the whole being other than the sum of its parts — is one of the first principles of open systems analysis. As a system increases in complexity, its behavior is determined more by its entire pattern of interrelationships and less by the 'nature' of its components.

For centuries western science concentrated on systems in which this principle is not important. As Warren Weaver noted in 1948, classical science was concerned with either linear causality or unorganized complexity. Linear causality can be handled by the Cartesian principle of independent variables: the scientist varies the causal factors one at a time while holding the rest of the system constant; in effect he deals with one part at a time as Descartes advocated. Unorganized complexity is handled by statistical methods which effectively reduce the problem to probable causality.

In the 1920s, however, science began to run into systems so dynamic and interconnected that varying one factor at a time was impossible. Over the intervening decades, methods based on independent variables have been increasingly less useful. Attempts to discover which genes control which hereditary traits, for example, are being abandoned in face of evidence that the configuration of entire chromosomes is in most cases more significant than the 'nature' of any individual gene. This type of finding parallels the gestalt psychologists' assertion that perception is determined not by the individual stimulus, but by the overall pattern of stimulation. The parallel extends to all fields dealing with organized complexity.

Attempts to deal with only one part of an organized complexity are sometimes harmless, but they can also be disastrous. For several decades DDT did increase agricultural yields and save people from malaria; it is now exterminating the animals which eat the affected insects. It has been found in the flesh of arctic polar bears and other fish-eating mammals. DDT is now approaching danger levels at the top of the food chain (us). A similarly interrelated system has been found in family therapy. Psychiatrists treating schizophrenic children often find that a child cured in the hospital relapses shortly after returning home. Analyzing the family as a system, they find that maintenance of the family's status quo often requires one member to be 'crazy.' To use an oversimplified example, the children might be growing up and the parents, to maintain their accustomed roles, might 'need' one child to remain dependent. Often it is the behavior of some person other than the one manifesting symptoms which must be changed to allow a permanent cure. Parallels in the behavior of larger groups are such that Buckley uses system theory as a model for sociology.

The non-summativity of open systems has implications not only for the teaching of composition, but for research in composition and composition pedagogy as well. Empirical research has begun to be extremely useful in our field. It has, however, failed to isolate the independent variables which define good writing or those which define good pedagogy. As we all know, moreover, there is a contradiction between our sense that we sometimes succeed in teaching people to write better and research findings.

Human communication is a highly open system. It is therefore overdetermined and characterized by great non-summativity. Consequently one should not expect to be able to fully isolate independent variables. Empirical approaches, moreover, must delete from consideration anything which cannot be quantified or regularized. It is precisely what cannot be quantified or regularized which is most important in developing those sensitivities which make for good writing. I do not think it is necessary to defend the value of empirical research in our field; its accomplishments and potential are evident. On the other hand, we must recognize that no amount of empirical research will ever totally succeed in isolating the 'parts' of good writing or the 'causes' of student improvement.

As this discussion indicates, non-summativity and overdetermination are closely related concepts: both are characteristics of the same type of systems. They can be taught similarly, with some students perhaps even simultaneously. That both contradict the students' socialized 'common sense' can be partially overcome by showing how they support such values as individual diversity and free will, values which do form part of most students' systems of belief. My basic teaching methods remain demonstration and discussion, collection of examples, utilization and development of those examples in explanation, and then application in argument.

Visual approaches can also be extremely useful. Escher drawings and other visual illusions demonstrate graphically that the students' own perceptions are both conventional and characterized by immediate perception of whole images, not construction from parts. I also use collages. My assumption is that the process of composing bits of information into a whole statement is essentially similar whether those bits are pictures or phrases. Because collage-making is a more unusual process than sentence building, students can often recognize principles of organization more easily while creating collage compositions. The potential for visual illustration of generalizations about composition and communication is by itself a subject for an essay. The point to be made here is that because the images of a collage are not arranged in linear order like the words in a sentence, they exemplify quite obviously a complexity-intersecting whole.

Various other concepts from cybernetic communication theory have implication for composition and other communication skills courses. Other philosophical and scientific advances also have important implications. The preceding discussion of overdetermination and non-summativity was intended to be exemplary. Other concepts could have been used and the full import of any one concept will probably not be totally clear except in the context of the entire set of interrelated theories.

The more important point has to do with models and model-building.

The concept of model-building is a commonplace among scientists, but is not well-known among composition teachers. Implicit in contemporary scientific method is the recognition that models underlie all of our perceptions, thoughts, and communications. This paper, for example, is an argument that a mechanical model underlies the traditional freshman composition rhetoric. A model then is a gestalt, a paradigm, a set of metaphors or analogies. It is impossible to perceive, think, or communicate without using models; consciously or unconsciously we make our choices about which models to use. Just as one may apply various metaphors to the same object, one may use various models — in both cases to very different effect.

One of the categorical syllogisms of traditional logic is sometimes presented in rhetorics as the alternative syllogism: A is B, B is not equal to C, A therefore is not C; an elephant is an animal, an animal cannot be a flower, an elephant therefore is not a flower. Within bounds that is a very excellent syllogism. Outside those bounds there are two sets of cases in which its application would be detrimental. The narrower set
is illustrated by the behavior of light. The syllogism and common sense both indicate that if light is a particle it cannot be a wave and if light is a wave it cannot be a particle. And yet, as any undergraduate physics major will testify, light must be thought of as both wave and particle. From some perspectives light behaves like a particle, from others like a wave; for some purposes one must use one model, for some the other. Although the physicists (who also have common sense) would very much like to overturn them, such paradoxes have become part of even the most conservative science. In this set of cases, however, there is always the hope that some brilliant mind will discover a third model which avoids the contradiction.

In the broader set there is no such hope. One can avoid contradiction only by differentiating distinct logical levels or by applying some kind of psychological relativity. If I am trying to figure out why my car won’t start, I should think of a gasoline engine mechanically and test each component independently. If, however, I am trying to design a new engine for that same car, I must think of a gasoline engine as an interrelated system. If I am trying to understand schizophrenia’s family, I should think of it as an interrelated system. If I am providing therapy for one member of that family perhaps I should hold that person individually responsible for his or her actions. If I am trying to maximize the profits of the corporation for which I work, I should think in an ‘us’ vs. ‘them’ dichotomy. If I am trying to avoid ecological disaster, I should think of an interrelated world system. In all these cases the models are obviously just that — models. One chooses the model which is most appropriate to his purpose, just as scientists choose the experimental model which will best answer their questions and just as a computer programmer chooses the model which will allow the computer to perform the relevant computations.

When we teach writing we inevitably teach various kinds of models. When we teach narration and description the models and their implications are relatively simple. In these forms, as in any kind of reportage, the writer’s main problem is selectivity. No matter what is being narrated or described, completeness is impossible. So the writer must make a set of decisions about what is relevant and what is irrelevant and then another set of decisions about what is more important and what less important. To make these decisions the writer clearly must have a sense of purpose, and, of course, different purposes will yield different selections.

When, however, we get beyond reportage we are inevitably teaching our students to think; that is, we are inevitably presenting models of logic.

We are teaching them how to move from the particular to the general and from the general to the particular. We are teaching them how to connect bits of information. And inevitably we are teaching them that certain connections are permissible while other connections are not. In short, we are one significant influence supplying them with the models by which they will do their future thinking.

In ordinary times all this might not be very important. But these are extraordinary times. The world is changing, and human consciousness is changing with it. This revolution in consciousness includes significant alternatives to our ordinary modes of thought. Some of our traditional modes, moreover, are inappropriate when applied to certain aspects of our changed environment. Since such a situation exists, its investigation is properly a part of rhetorical study. And the fruits of that investigation belong in every communications skill course.

In periods when the environment is stable, it is useful for organisms to rely on instincts, habits, and other unconscious modes of decision-making. Every decision which can be made unconsciously frees the consciousness for other tasks. Unconscious decision-making is quicker, more efficient and more reliable. Touch typing by conditioned reflex, for example, is in these ways better than hunt-and-peck; it also leaves consciousness free to think about the content of the message being typed.

If, on the other hand, the environment is changing, all these unconscious patterns lose their reliability. Where they had allowed for more flexibility, they now provide only for more error. Because the world we live in is changing so quickly, many of the unconscious models by which we think have become error-producing mechanisms. The solution is to make the patterns conscious so that we may use them critically instead of habitually. One place in which some of this consciousness should be created is the composition classroom.

Restrasted as a rhetorical principle, the main point of the preceding paragraphs is that a symbol may have different meanings in different contexts and, conversely, that the meaning of a symbol cannot be determined out of context. Words (and certain other types of symbols) have definite denotations. In certain situations we try to be more concerned with these ‘objective’ denotations than with broader meanings; often this is what we mean by objectivity in the classroom and in professional communication. But the vast bulk of human communication (and the totality of animal communication) is primarily concerned with more subjective, relational meaning. That meaning varies with context. In the context of one relationship, saying ‘I’m sorry’ may mean ‘I don’t love you anymore.’ In another it may mean, ‘I love you;’ and in a third it may literally mean ‘I’m sorry.’

The survival of Homo sapiens has always been based on superior adaptability, on the ability to distinguish different contexts and choose the appropriate behavior.

Having no fur, we can choose the clothing appropriate to various contexts; thus we can live everywhere from the tropics to the arctic. There are absolutes on more abstract logical levels (e.g., the high value attached to survival), but those absolutes take various forms relative to various contexts or environments. For an inland Eskimo survival means a diet which is at least 25% fat; that same diet would mean heart attack to a professor in California.

The principle applies equally to the biological ecosystem and to the ecosystem of ideas. The Boy Scout who twenty years ago memorized the rule that one should always bury cans and other non-burnable garbage has had the environmental context shift out from under him. Most backpacking areas are so crowded these days that people would be burying cans faster than the earth could decompose them. Although the higher-level value of preserving for other hikers an undamaged natural environment, the specific rule has been totally inverted — now a good Boy Scout carries out his unburnable garbage. What this example illustrates is the tendency to memorize low-level rules instead of understanding higher-level principles. This tendency leads to inappropriate behavior when the context shifts. (Students will enjoy collecting illustrations of this pattern.)

In logic and rhetoric the absolute value is to use a system which best represents reality and which consequently allows us to best function in reality. Descartes’ method was the form that absolute value took on the lower logical level; relative to the historical period which the renaissance/reformation was a transition into (and which the 20th century seems to be a transition out of), Cartesian logic was a progressive development. In that context it meant ‘I will not be prejudiced by a religious dogma when I seek scientific knowledge;’ thus it produced an approach which was more functional than the approaches which had preceded it. In the latter half of the 20th century, however, Cartesian logic means ‘I refuse to recognize the complex interrelatedness of reality;’ thus it contradicts our desire to use the approach which best represents reality.
Likewise the (essentially Cartesian) rhetoric which was appropriate and was quite properly used as the basis for our composition courses in the past needs to be modified for the composition courses of the future. The higher level principle remains the same: we wish to teach our students to communicate with maximum effectiveness. Because the world is changing, however, the means to that maximum effectiveness are not quite the same as they were in the past.

The first axiom of the new rhetoric should be that writing skills and thinking skills are interrelated; the pedagogical consequence is that they should therefore be taught simultaneously. We see the validity of this axiom quite literally when we correct student papers. The style which uses ambiguous antecedents for demonstrative pronouns correlates highly with overgeneralized thinking; similarly, disorganized paragraphs can often be cured by helping the student to think more clearly. We see it when we write ourselves: nascent ideas become manifest and developed through the process of communicating them; similarly, unnoticed contradictions become apparent and are resolved. We see it in our pedagogy: premature formal and grammatical demands sometimes inhibit free thinking and creativity; similarly, instruction in prewriting and logic improve student drafts.

The focus of freshman composition must, of course, be on writing skills. But any communication skills course must embody a rhetoric and must utilize some content. At present that content may be personal experience, expository essays, literature, linguistics, or various other possibilities. Since a writer must begin with what he or she knows, personal experience will presumably continue to be the starting point. When students are ready to move beyond the personal, however, when we have helped them to develop an informed rather than a merely personal experience, then the content of freshman composition may as well be the human communications process itself. Freshman composition could then explicitly help to develop the consciousness called for above. It could supply whatever data and theory students need to understand the communications relationships in which they inevitably participate and to avoid the logical fallacies which are most prevalent and dangerous in our time.

The emphasis should be on communicative relationships, internal (perception-cognition-expression) as well as external (sender-message-receiver) — not on the isolated message. One uses standard spelling, for example, not because it is virtuous, but because nonstandard spelling usually produces undesired reactions in the reader.

Sometimes we may use literature, e.g., for models of non-Cartesian, holistic modes. Sometimes we may use media study, e.g., to build awareness of audience or to explicate the differences between mass and individual modes. Sometimes we may use linguistics, e.g., to explain the effects of cultural relativity on certain communication processes or to explain why a certain sentence pattern sounds "awkward." Undoubtedly we shall have to call material from diverse disciplines and diverse aspects of reality. But always the read content should be the communications process and always the student should be gaining a clearer consciousness of that process.

More important than the content, however, is the rhetoric. On the freshman level, rhetorics are often not discussed explicitly, but there is always a rhetoric implicit in the skills being taught. The rhetoric embodied in our freshman composition courses should be appropriate for the world in which we are and will be living. It should be a rhetoric of the Computer Age, not of the Machine Age. It should be a rhetoric for an age approaching the limits to material growth. It should not hinder, but help people to understand, cope with, and control the social and technological changes of our times. It should, moreover, be sufficiently holistic and integrative for a world on the brink of ecological disaster.

This paper is tentative in all but its general theme. Its goal is to define a task and to set off a discussion. From that discussion we should emerge with an appropriate rhetoric. The very process of discussion will force us to discover the content which best matches that rhetoric and to devise the concrete modes which embody its principles. We will also need to develop (largely I suspect from innovative techniques we are already using) a pedagogy appropriate to that rhetoric.

When we have that rhetoric, that content, those concrete modes, and that pedagogy, we will be ready to teach our students cognitive and communication skills appropriate to contemporary reality and to the reality of the foreseeable future. We will have composition programs which lead rather than follow the consciousness of their time. We shall also be able to provide a significant service to our colleagues in other disciplines who are striving to convey similar systemic concepts and skills. And perhaps, in a small way, we shall help improve the survival chances of humanity.

May it be so.

NOTES

1. Gregory Bateson, Steps to an Ecology of Mind (New York: Ballantine, 1972), pp. 490 ff. Bateson's model is useful because of its extreme simplicity. When using it, however, one should be aware that it identifies each of the three factors. Thus they seem to be independent forces rather than interactive processes and the crucial question of who controls them never arises.


7. See, for example, Bertalanffy on free will, pp. 114-116, 221; Bateson on teleology, pp. 426-439.


10. Understanding Media, pp. 30 and 27.
15. Buckley, op. cit.
16. Isabella Halseed and Patricia Lawrence are working on one such essay, foreshadowed by their demonstration, "Perception and Writing: A Media Approach for Open Admissions Students," at the 1974 CCCC meeting. A former graduate assistant, Jerry Baker, introduced me to the technique of collage self-portraits which can be used to show students the connections between self-image and communications and from that 'self.' They are also useful when discussing the differences between verbal and non-verbal communication and for illustrating virtually any principle of organization.

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