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CLOSED SYSTEM COMPOSITION

RICHARD M. COE*

It has been suggested from various quarters that the basic conceptual models and methodological assumptions of Western industrial culture are maladapted to the accurate investigation of phenomena which have recently become crucially relevant to the survival of *Homo sapiens* and the expansion of human freedom. Many of the critics who make such assertions do so from the perspective of general system theory.¹ They argue that certain contemporary phenomena — e.g., the world economic-ecological situation and the social behavior of mass societies — are characterized by such a high degree of openness that they can be accurately perceived, evaluated, and manipulated only if they are conceived in terms of an open system model. Unfortunately ordinary “common sense” thinking, at least in Western and Westernized societies, is based on closed system assumptions such as summativity, linear causality, and the applicability of (Newtonian) mass-energy analogies. Most people simply do not know any other way to think, and many of those who can, function only non-rigorously (i.e., mystically) or only within narrowly-limited disciplines.

This ought to be of great concern to educators. Many basic courses, especially in the humanities, are not, as has been charged, irrelevant — they are specifically counterproductive. The methodological values implicit in these courses specifically contradict rigorous conceptions of wholeness and interrelatedness. Students are taught to perceive, conceive and communicate in ways which can be judged appropriate only by assuming that they will be concerned almost exclusively with closed systems. That assumption turns out to be less than true not only when they get to their advanced science classes, but also when they try to evaluate the TV news or simply to interact with people in the context of rapidly changing social conventions. Increasingly, the methods taught in these basic courses are, when generalized, error-inducing. As best the students perceive the inadequacy and react with anti-intellectualism or mysticism;

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at worst they accept the methods, make the predictable errors, conclude that the world is incomprehensible and lapse into intellectual apathy.

If I see a man twisting a corkscrew, I may ordinarily infer that he is not trying to open a can of asparagus; if I hear historians explaining an event with linear causes, I may infer that they do not conceive of that historical situation as an open system. Any methodology implies a preexisting (though presumably modifiable) model of the phenomena being investigated. Given a methodology, therefore, one may infer a limited set of conceptual models: the inference remains valid even if the model is not explicit and the investigator apparently unconscious of using a model — because the methods are appropriate only so long as the phenomena fall within certain limits.

Conversely, the model underlying an investigation limits the methods likely to be used and the range of findings (and how those findings will be perceived and interpreted). This interrelation between conceptual model and methodology operates to some degree as a self-fulfilling prophesy. With the exception of such extremely odd cases as the perception of undifferentiated blurs (e.g., those seen by a person born blind whose sight has been surgically repaired after maturity) or pure hallucinations, the degree of self-fulfilling prophesy does not usually approach either zero or one hundred percent.

These propositions are commonly applied to scientific knowledge; they are equally true, and their implications are even more significant, for types of knowledge which are less testable and in disciplines characterized by less critical rigor. All human perception, cognition and behavior is knowledge-mediated: our sensations — the so-called “raw” data — are in fact syntheses of sensory input and preexisting conceptual models. The relationship of the model to reality, as R.L. Gregory asserts,² is essentially that of an hypothesis (perhaps to be likened eventually) to a theory whose usefulness in certain contexts has been established.

Methodology is especially important in the humanities because that is what they are all about. Content-learning may be incidentally involved in humane studies, but the use-value of that content is usually close to zero. The social function of the humanities is to teach students how to think, feel and communicate about people — to provide a common set of conceptual models in terms of which to perceive the social universe.

In the nineteenth century it was possible to conceive of the humanities as a bastion of holistic (if less than rigorous) thought protecting human culture from scientific reductionism. Slowly the

situation has been inverted: scientists, because they have been obliged to describe and explain phenomena of organized complexity, have developed conceptual models which are both rigorous and holistic; humanists, because they were striving for more rigor and objectivity, have slipped into increasingly reductive methodological assumptions.

My thesis is that the humanities (and all disciplines significantly concerned with communications skills) can benefit by a critical juxtaposition of certain holistic scientific models with the models implicit in currently standard humanistic methods. I have asserted this thesis, and will continue to assert it, in those humanistic sub-disciplines whose languages I speak well enough to communicate effectively. But I also think it is important for other educators and social planners, especially those who are scientists, to be made aware that specifically counterproductive education is occurring in courses which are presently conceived as value-free or irrelevant. I will use as my example freshman English because (a) more American students — three million each year — take this course than any other, (b) it often includes material from at least three diverse sub-disciplines, (c) it is usually considered a value-free “service” course providing skills to be used in all disciplines and professions, and (d) it happens to be the course I know most about.

At center, freshman English is a writing course. The standard textbooks are dominated by rhetorical modes which divide wholes into smaller units to be discussed individually or serially. The most common modes of arrangement are illustration, analogy, definition by genus + differentia, classification, division, comparison/contrast, process-analysis, and cause-to-effect analysis. Illustration and analogy are the rhetorical equivalents of induction and deduction. The remaining modes are techniques for breaking a subject into units to be treated separately and/or recombined in ways which implicitly assume summativity, linearity or static dichotomy. In process-analysis, for example, a whole and possibly complex process (e.g., teaching someone to swim) is broken down into a series of steps to be discussed in linear order.

The mechanistic assumption that one takes apart what one would understand and then analyzes each part in isolation can be traced to ancient Greece and elsewhere, but it obtained socio-cultural dominance in 17th century Europe. Descartes, whose name is associated with this methodology more closely than any other, 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 which were not necessarily so.*”³

For somewhat better than three centuries the bias of Western culture toward mechanistic analysis was a great technological and economic advantage. It did function as something of a blinder, but in ways which were of practical advantage. Many of our current crises, however, are symptoms revealing that this same bias has become dysfunctional because our social environment is characterized by increasingly complex interconnections and because we have by increasingly complex interconnections and because we have acquired the technical ability to interfere significantly with those open systems which form our natural environment.

We continue to think it is the individual (or the individual corporation or the individual nation) which matters despite clear evidence that the individual unit does not and could not exist independently. We continue to underestimate the complexity of determinants despite failure upon failure of solutions based on linear explanations.⁴ We continue to see static oppositions, like 'us' against 'them' or 'us' against the environment or the various polar pairs of eternal verities, despite the functional superiority of seeing interrelations like organism-plus-environment (as Bateson points out, that organism which 'wins' against its environment becomes extinct — a victory now within our power).⁵

The freshman English course reinforces these attitudes by giving students rhetorical tools for expressing them and not for expressing more complex interrelationships. Freshman English is most commonly thought of as a course in which one learns to write grammatical sentences; the most basic and significant part of the course, however, teaches rhetorical invention and arrangement, the set of processes whereby a person obtains and organizes the information which will be communicated. Making certain that information is expressed in "standard" sentences which will be understood by the audience is, of course, important,⁶ but it remains a secondary process (which, worse come to worst, can be performed by an editor).

The problem results from what is not taught: students are given rhetorical techniques for effecting separations of knowledge and none (save perhaps analogy) for making complex connections. As presently taught, classification, division and definition by genus + differentia lead to mechanical separation. Comparison/contrast encourages the expression of oppositions as synchronic dualities rather than as diachronic processes with potential for interaction, evolution, and possibly self-transformation. Process-analysis and cause-to-effect analysis encourage linear explanation. This bias toward atomistic closed system analysis is not inevitable: there are other modes of rhetorical invention; and the presently standard modes would have a very different cognitive meaning if they were taught in the context of a holistic larger system.

There exists, for example, a classical rhetorical mode which is precisely appropriate for representing the overdetermination of organized complexity and which should be taught side-by-side with cause-to-effect analysis.⁷ The explanation of organized complexity is formally negative. Instead of asking "why?" and obtaining a cause, one asks "why not?" and obtains a set of constraints which explain variation from entropy; the rhetorical equivalent of this negative logic is *reductio ad absurdum*, a mode (originally of argument) wherein one negates all alternatives save one. Highly open systems contain a superfluity of causes: this overdetermination allows the systems to continue to function even if a given line of control is disrupted and enables them to adapt to more complex situations; the survival value of this design has constrained biological evolution toward overdetermination especially as the environment (organic and inorganic) has grown more complex and variable. Evolutionary theory is, in fact, an excellent example of negative explanation in that it essentially explains not why some form survived, but why the alternative forms died out: "In nature we find," as Lorenz reminds us, "everything which is not so inexpedient as to endanger the existence of the species."⁸ Linear causality, as embodied in the simplistic understanding of "survival of the fittest" as a formula about maximization, will not account for the survival of the marsupials in Australia, nor for the complex interdependent evolution of interacting species.

Whether we are trying to explain evolution or the complexity of individual human motivation (it was Freud who coined the term, "overdetermination") or the behavior of any other highly open system, *reductio ad absurdum* is likely to be less reductive than cause-to-effect analysis. Students should be taught to distinguish relatively closed from highly open systems and to apply the appropriate logical and rhetorical modes. Where those modes do not yet exist, they should be invented (or, more probably, translated from those technical or mathematical languages in which they do exist).

Insofar as it is a writing course, freshman English is a skills course with a logic, a rhetoric, and a pedagogy, but no specific content. Perhaps for this reason, freshman English often includes some study of language and literature. Indeed, it is my opinion, shared by a significant minority of English teachers, that the study of human communication should be a major part of the overt content of the course. The students must write about something — preferably something which demands more rigor and analysis than narrations of their summer vacations — and to write about communication in a communication skills course is supportive of both the specific and the humanistic goals of the course.

In the study of human communication, as in the study of any highly open system, it is important to distinguish between energy and information. Highly open systems are able to maintain goal-seeking behavior precisely because they respond to information. Even a low-level open system like a thermostat can be goal-oriented because it responds to information about energy rather than directly to energy. To say this is, on one level, merely to reassert in cybernetic terms Gregory's model of human perception. On another level, the distinction between the goal-directed behavior of a bullet, the goal-oriented behavior of a thermostat and the goal-seeking behavior of a person is the distinction between levels of flexibility and types of determination (and hence provides the metaphysical basis of human freedom⁹).

If I strike a billiard ball with a cue-stick, I effect a transfer of energy. Careful measurements of the mass-energy involved will allow an accurate linear prediction of that effect. If I make exactly the same motion with the same stick, but strike a person, the predictive process becomes more complex. Unlike a billiard ball, the person will respond not to the transfer of energy, but to the information which is carried by that energy. The energy for the response will come from that person's own energy system and the nature of the response will depend primarily on how that information is evaluated (i.e., on its perceived meaning).

In the case of the billiard cue, the energy/information distinction seems obvious; nonetheless, failure to make this distinction is one of the most common communicational fallacies. The disparagement by American men of the inefficiency with which housewives work is an interesting example. A recent study by Joann Vanek indicates that, despite all the labor-saving devices which have been introduced, women who do not work outside the home spend slightly more time on housework than their mothers and grandmothers did. In part this represents a modification of the job-description (higher standards of cleanliness, child-care, etc.) But Vanek is able, by manipulating the data, to demonstrate that neither this nor the other apparent explanations make sense of "the 55 hours per week that nonemployed women spend in housework." She concludes that the time spent in housework serves to communicate a sense of worth (to the housewife herself and, even more so, to those around her) and thereby to compensate for what is socially communicated by the fact that she does not contribute income to the family.¹⁰ Only by considering the information conveyed by long hours of housework can one make sense of the apparent inefficiency. Those who disparage the inefficient use of time and energy by the housewives are in general fallaciously evaluating a communication system in terms of energy-expenditure while overlooking the informational

determinants which are more important in constraining the behavior of the system.

The marker/meaning distinction (i.e., the distinction between the mass-energy or absence thereof and the information it carries) is especially complex in human communication. The marker/meaning relationship is there overdetermined itself. As Freud's analysis of dream-symbol formation demonstrates, a single marker can represent more than one meaning and a single meaning can be represented by more than one marker. As the dream-image further suggests, and as Gregory's model confirms, human communication is further complex because it usually operates on the next level of logical type where the marker itself is not mass-energy (i.e., not an object), but a concept (i.e., information about an object), and the meaning is information about information (i.e., metainformation). Human communication is still further complicated when the marker which carries information in one person's system of meaning happens to be simultaneously a free subject (i.e., another person).

Language study in freshman English is usually based in the Anglo-American tradition of semantics and makes the marker/meaning distinction by distinguishing the symbol from what it symbolizes.¹¹ In the latter terms, at least as they are conveyed in basic courses, it is often unclear whether 'what is symbolized' is a thing or a concept. For this reason the semiotic signifier/signified model is preferable because it explicitly represents the signified as information, the signifier/signified relationship as overdetermined, and, consequently, the full complexity of human communication as a very highly open system.

When human language or human communication in general is implicitly (or by omission) represented as a relatively closed system, the epistemological error is precisely parallel to the reductiveness of the closed system rhetoric described above.

If human communication in general is a highly open system, artistic communication is even more so. Literature is precisely that type of verbal discourse which uses words in such a way as to attempt to transcend the linear limitations of syntax; its special function is to represent those aspects of reality which are falsified when abstracted and quantified, broken into their parts, or spread serially. It seeks to effect its audience by mimicking the fullness of detail of the real world instead of explicitly abstracting from it; it functions more by creating tensions (e.g., between how we ordinarily perceive and how we might, between *what is* and *what ought to be*) than by explicit statements.

Nonetheless, the implicit assumptions of the dominant literary critical methodology are mechanistic and that is ironic because they

were developed by a school of critics determined to defend literature (and the humanities and humanity) from scientific reductionism.¹² These critics set out to prove that a literary text is a bundle of meanings expressed simultaneously, that what makes it poetic is precisely what gets lost when it is paraphrased or translated. The highest aesthetic valuation within this critical system goes to texts which are demonstrated to be the most complex harmonies. But the critical method is empiricist in the narrow, older sense of the term: the text is treated as an object and its complexity is proven by isolating so many "intrinsic" patterns as to refute any attempt to reduce the text to any one of them.

The particular theoretical debate is now *passé*, but the empiricist methodology continues to dominate criticism in the literary journals and classrooms.¹³ The most common critical technique selectively filters a particular element from a body of literary discourse: The easiest way to write a paper for an English literature class is to take a group of poems, go through them underlining all the images of *x*, find some pattern in the extracted images, and (perhaps) suggest a meaning. The same technique can also be applied to more abstract literary "elements." The implicit methodological assumption is always that the "element" can be thus mechanically separated from the text for analysis (just as the text itself has already been methodologically separated from the people who create and appreciate it, i.e., from the communication process.)

The other basic "intrinsic" technique is similar to simple microscopy: here the part is sliced from the continuum of the whole, much as one might prepare a slide. Often the critic's purpose is to explain away the apparent insignificance of some minor character or passage (and thereby to demonstrate the "true complexity" of the text). Here, as in "selective filtration," the critic assumes a stance of passive, disinterested objectivity and asserts that the pattern is entirely "in" the text, not at all in the eye of the beholder.

This school of criticism adopted such a simplistic and outdated form of empiricism, in part, because it perceived art and science as a synchronic opposition, a static and exclusive dichotomy. The error is parallel to the way definition by genus + differentia is used in composition. There is an implicit analogy between concepts and things and the consequent assumption of a false principle of exclusivity: *A* excludes non-*A* if *A* is apples and non-*A* the class of all things which are not apples; but this principle does not hold true if *A* is information, if *A* is an abstracted quality, emotion, or other concept (love does not exclude hate; *On The Origin of Species* has literary qualities).

This confusion leads to an attempt to seek complexity in the text itself rather than in the process of literary communication — thus

a subsystem is treated out of the context of the system which determined it, an object out of the context of the set of relations it objectifies.

The emphasis on close-reading has been valuable insofar as it has increased the rigor with which literary criticism is practiced; these techniques will presumably be conserved (albeit with their significance much transformed in a new context) by the critical paradigm which seems presently to be taking shape. But, as presently utilized in the English classroom, they generate error-inducing methods for decoding human communications: if what may be formally the most complex type of verbal communication can be understood without reference to sender, receiver or broad context, then the implication is that simpler forms can also be so understood. The common tendency of our culture to overemphasize the words themselves while underestimating the importance of who said them to whom in what set of contexts, the common tendency to give information which can be digitalized priority over analog information, and the common tendency to underestimate the environment (i.e., the natural context) when planning our actions are all reinforced by this critical methodology.

I do not mean to overemphasize the importance of freshman English or of the humanities (or even of formal education generally) in the formation of socially-dominant cognitive structures. Certainly our educational structures are constrained by the larger social structures more than *vice versa*. Nonetheless, the high potential for self-consciousness within the educational systems make them one priority entry point for initiating change.

Freshman English contains at least three significant and distinct subdisciplines; all three share the dominant tendency of our culture to encourage people to compose their perceptions by analogy to closed systems. To put it more crudely, we teach people to make separations rather than connections of knowledge at a time in history when our survival and our freedom may well depend upon our ability to perceive and respond to complex interrelations.

REFERENCES

1. See, for example, Gregory Bateson, *Steps to an Ecology of Mind* (New York: Ballantine, 1972), Meadows, et.al., *The Limits to Growth* (New York: Signet, 1972), and Ervine Laszlo, *A Strategy for the Future* (New York: Braziller, 1974).
2. "On how so little information controls so much behavior," in *Concepts and Mechanisms of Perception* (New York: Scribner, 1974).
3. Rene Descartes, *Discourse on Method*, trans. L. J. LaFleur (New York: Liberal Arts, 1956), 12 (italics added).
4. Failure can indicate that the remedy was inadequate in either quantity or quality. We tend to assume the former and to increase a remedy which fails. See Paul Watzlawick, John Weakland, and Richard Fisch, *Change* (New York: Norton, 1974), esp. Ch. III.

5. *op. cit.*, esp. 492-493.
6. See the "Background Statement" to the College Composition and Communication Conference resolution on the students' right to their own language (Illinois: National Conference of Teachers of English, 1974).
7. For a detailed discussion see my "Rhetoric 2001," *Freshman English News*, 3:1 (Spring 1974), esp. 3, and Bateson, *op. cit.*, esp. 399 ff.
8. Konrad Lorenz, *On Aggression* (New York: Bantam, 1967), 148.
9. Cf., Ludwig von Bertalanffy, *General System Theory* (New York: Braziller, 1968), esp., 221; and Bateson, *op. cit.*, esp. 426-439.
10. "Time Spent in Housework," *Scientific American*, 231:5 (November 1974), 116 ff.
11. See Fredric Jameson, *The Prison-House of Language* (New Jersey: Princeton, 1972), esp. 31-32.
12. This point is generally agreed upon by both those who defend and those who attack the school. See, for example, Gerald Graff, "What Was New Criticism?" *Salmagundi*, 27 (Summer-Fall 1974), esp. 76-77; and John Fekete, "The New Criticism," *Telos*, 20 (Summer 1974).
13. This and other generalizations about the methodology of contemporary criticism are based on my survey of the major journals in 1970, reported in "Contemporary Critical Method, Science, Ideology, and Reality," Diss., University of California, San Diego, 1972.

TO LYDIA

Your sweet sea
 Rolls like a sniffing obtrusive dog
 Across the beach
 Sticking its gentle menacing tongue
 Into the sandcastle
 I built to conceal my warmth.

And when I defend myself
 It is with a single wrought nerve
 That battles as a sword
 But melts; melts and lo
 You are inside my castle,
 Laughing at boldness.

Ah battle
 Is a pretext, dear Lydia
 A place to avoid
 The field where no one
 Stands apart.

JAMES CAMPOCCIO
 Hollywood, California