Physics and Language—Science and Rhetoric: Reviewing the Parallel Evolution of Theory on Motion and Meaning in the Aftermath of the Sokal Hoax

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Alan Sokal's concern about a decline in intellectual standards includes an indictment of what he calls current "subjectivist" trends accompanying a general erosion of "objectivity" stemming from postmodern views such as deconstruction. This erosion is identified most importantly in postmodern claims about the instability of rigorous distinctions between opposites. This study argues that the deconstructive practice of disturbing the status quo between opposites extends as far back as Newton and constitutes one of the central themes of physics since the Enlightenment. Parallel developments in physics and language studies are summarized from Aristotle to Einstein and quantum theory—all in support of the contention that to question postmodern language theory exemplified in deconstruction necessitates questioning also the parallel developments in physics from Newton to the present time.

Both physics and language theory make rigorous distinctions between opposites a thing of the past. This circumstance necessitates, contrary to what Sokal argues and consistent with current themes in the rhetoric of science, a construction of reality in language and experience which is nevertheless not essentially subjectivist, objectivist, nor relativist. **Key words:** deconstruction, postmodern, construction, relativity, objectivity, language, physics, rhetoric, science

A LAN Sokal of the Department of Physics at New York University explains that he read *Higher Superstition: The Academic Left and Its Quarrels with Science* (P.R. Gross and Levitt, 1994) because he was not aware that the academic left, within which he included himself, had a “quarrel” with science (Sokal, 1998). He was surprised to discover, by way of Gross and Levitt’s account, a whole “genre” of writing about science by non-scientists—much of which contained laughably erroneous renderings and applications of various scientific theories. Skeptical of their accusations, Sokal set about investigating this phenomenon himself. In the course of confirming that Gross and Levitt were indeed correct, he amassed a thick file of similar examples. Not wanting to waste this fresh collection of interpretive rail accidents and thinking it “would be boring to write a straight refutation of these people,” Sokal decided it would be more deliciously wicked and potentially devastating to come from the inside, to write a paper *in praise* of these academics. So he devised the rhetorical equivalent of a Trojan horse as his contribution to the so called “quarrel” that has now escalated into what is commonly known as the “science wars.”

Three weeks after the publication of “Transgressing the Boundaries: Toward a Transformative Hermeneutics of Quantum Gravity” in the 1996 Spring/Summer issue
of Social Text, Sokal revealed in the journal Lingua Franca that his essay was in fact a parody filled with “solecisms” and “dubious reasoning” and not a work to be taken seriously by anyone informed in the basics of contemporary physics. Members of the editorial review board at Social Text were stunned. Sokal had, to borrow a phrase from Thomas Dolby, “blinded them with science.” But that was not the worst of it. He had also blinded them with the tool of their trade—appealing rhetoric. The controversy arising from this coup has launched debates in every direction ranging from the ethics of submitting papers for publication to the legitimacy of non-scientists writing on scientific theory. To his credit, Sokal has attempted to keep the debate focused on what he believes to be the two major issues: the problem of standards and the nature of truth, reason, and objectivity. Toward this end he has recently renewed the debate by publishing in France (since the French are among the most prominent offenders) a book co-authored with Belgian physicist Jean Bricmont entitled Impostures Intellectuelles (1997) and now published in the United States under the title Fashionable Nonsense: Postmodern Intellectuals’ Abuse of Science (1998).

That the editors of Social Text published his essay as a genuine interdisciplinary contribution Sokal takes as evidence of an “apparent decline in the standards of rigor in certain precincts of the academic humanities (Sokal 1996b, 62). The journal Social Text, as well as the content of his essay and continued presentations and exchanges (Sokal 1998), make it clear that he sees the “subjectivist” trend among various postmodern literary, science, and cultural studies theorists as a significant threat to rigorous science and objectivity. Sokal finds it especially galling when such theorists use science, particularly contemporary physics, to support claims that put into question “objective reality” in favor of various “subjectivist” excesses. In the sphere of rhetorical theory this debate has taken explicit form in the rhetoric of science studies in its different forums where the claims of scientific objectivity are mitigated, in various degrees, by demonstrations of the intrusion of rhetoric—an intrusion very much in harmony with trends in postmodern language and literary theory.

However, Sokal’s characterization of “postmodernist literary theory,” exemplified in writers such as Jacques Derrida (a segment from Derrida is box highlighted in the Lingua Franca piece), as preaching “epistemic relativism” and fostering “the spread of subjectivist thinking” sets up a straw man argument. In opposition to this, as the Social Text editors rightly say, “caricature” of postmodernism, he puts forth claims such as “there is a real world; its properties are not merely social constructions; facts and evidence do matter” (Sokal 1996b, 63). These simplistic assertions obscure not only the nonsubjectivist thrust of postmodern theory but also the complex state of affairs in his own backyard.

In his zeal to hold the line on objectivity, Sokal has sided with those who argue that the line between objective reality and constructed fiction is and must be a singularly clear line (e.g., Sokal 1998, 11). Yet contemporary physics, not to mention contemporary language theory, does not support the notion that a singularly clear line can be drawn. Had Sokal made a fairer presentation of how “reality” and “objectivity” have become problematic in physics, he would have been less tempted to parody connections or misconceptions between physics and language theory and more inclined to explore how the postmodern orientation, common to both these disciplines, disturbs and displaces the notion of “objective reality” short of dispensing with it.

Disturbance in the status quo between opposites—of which the problematizing of objectivity is one of many examples—constitutes the signature trait of the 20th century
and is, surprisingly, passed over in Sokal’s concern with standards. The increasing vulnerability of various seemingly stable oppositions has corresponding developments in physics and language theory. This similarity is not so much a result of a desire on the part of those in language theory to imitate physicists nor a result of diffusion as it is a consequence of both pursuits having to confront the same issue: the problem of difference. How is difference possible? In physics this question takes the form: how is movement or change possible? In language theory it takes the form: how is meaning possible? That physicists and language theorists could be asking similar questions in different contexts suggests the possibility of a region of common study between the sciences and the humanities: a theory of difference, or, more traditionally expressed, a “logic” of opposites. Establishing such an area of common study could promote the kind of communication between these academic communities that Sokal’s hoax impedes while perhaps improving theory on both sides.

Contradicting Sokal’s claims of crucial differences in theory and standards between physical sciences and “certain precincts” in the humanities, this study will argue that physics has led its own challenge to notions of “objectivity,” “fact,” and “reality” in ways that resemble similar challenges in language theory, and has done so with a measured caution and reluctance that nevertheless amounts to an ever more thorough extension of the basic insight of Enlightenment science. In this respect Enlightenment science contains within it the seed of its own deconstruction which can, ironically, also be seen as its own fulfillment. It will also argue that appreciation for the phenomenon of difference requires greater appreciation for the paradoxical position of the observer (or subject)—or what may be called, using Derrida’s term, the subject’s “quasi-transcendental” predicament. The issue then becomes how this “quasi” state of affairs, as a logic of difference, can be understood and articulated in a way that holds to a standard other than subjectivity, objectivity, or relativity.

Requiring some historical reference for illustrating the argument, this comparison between physics and language theory will open with an abbreviated rendering of Aristotelian and Galilean physics. Relevant features of Newtonian physics will then be highlighted, drawing comparisons to language theory and the transition from classical to modern theory. Shifting to the counter-intuitive world of contemporary physics, parallels will be drawn with postmodern language theory along with what the best expressions of theory in both these fields suggest for current attitudes toward “objectivity,” “facts,” and the “real world.” The concluding section will apply these findings directly to rhetorical theory as it has been debated in recent forums addressing the question of the rhetorical nature of science.

The Parallel Evolution of Theory on Motion and Meaning

Kurt Lewin’s 1935 essay “A Dynamic Theory of Personality” and Martin Heidegger’s 1962 essay “Modern Science, Metaphysics, and Mathematics” represent two of the more significant contributions to interdisciplinary connections between theory in the physical sciences and the human sciences. Although Lewin’s work treats of the relation between physics and psychology and Heidegger’s the relation between physics and philosophy, each illustrates the usefulness of the connection and the two combined provide an instructive blueprint for how, in general, to approach such integrations. And, considering the difficulty in making analogies between theory in different disciplines, approach—much as in the case of landing an airplane—is everything. Building on their success, this study
will imitate their approach—which centers on the understanding of oppositional relation—in finding connections between theory in physics and language and rhetorical theory. However, only the briefest summary of the key point of each of these two works as they relate to the argument herein will be possible.

Lewin explains that in Aristotelian physics two basic types of movement are observed: the highly regular circular paths of heavenly bodies and the linear or downward paths of earthly bodies such as the free falling stone. These two classes of movement, each regular and predictable in its own way, are nevertheless discretely different and belong to essentially different types of bodies.

According to Lewin, the area of detail relevant to Aristotle’s method of observation concerns repetition as the regularity of occurrence of similar events within a particular field of phenomena. Aristotle’s method for discovering lawful events amounts to abstracting what is common from a related series of events. Thus, the Aristotelian system will account for shared features among a series but will not account for the particulars of individual events. As Lewin explains, “In these Aristotelian classes individual differences disappear” (5).

The identification of commonalities corresponds to an essentialist model of understanding whereby the primary meaning of a thing centers in properties unique and intrinsic to it as a member of a class. This essentialist approach also provides the model for understanding how meaning works in the classical view of language. The particular use of a word has meaning by way of association with the class represented by the word. The understanding of oppositional relation as primarily one of discrete division is symptomatic of, perhaps even generative of, this view of class and essence—generative in the sense that opposition serves as the paradigmatic instance of discrete division.

With the work of Galileo, Lewin continues, a very different approach to observation becomes prominent—one that places a higher value on ways of seeing that will account for every individual event within a field of phenomena. The Aristotelian focus on collections of regularities derived from careful examination of particular temporal-geographic contexts is replaced by the assumption that every particular case is, without exception, lawful. The challenge for the researcher turns from the search for lawfulness in the discovery of regularities that might increase predictability for some types of events within a field to the search for a theory of the interaction of a set of forces which could be used to account for the lawfulness of every event within a field. This search is of the essence of the mathematical, because, like Euclidian geometry, it proceeds by way of deduction from initial axioms or assumptions. For Galileo, whether an event “occurs rarely or often has nothing to do with the law” (Lewin, 12). Lewin goes on to note that this shift in the way in which lawfulness is understood necessitates a corresponding shift in the way in which oppositional relation is understood, leading to a breach in the discrete separation of opposites. This shift becomes a central theme in Heidegger’s essay.

What Galileo discovered about motion received more thorough formulation by Newton. Featuring Newton rather than Galileo, Heidegger explores in considerable detail the transition from Aristotle to Newton. In the section titled “Newton’s doctrine of motion,” he discusses eight points of difference with Aristotle. These points remarkably parallel developments in the transition from classical (essentialist) to modern language theory. Only the first three of these points will be discussed here. For purposes of this analysis, structuralism will serve as the model for a modern approach to language—bearing in mind that in certain respects structuralism overlaps with poststructuralist
views such as deconstruction, which serves as the exemplary case of a postmodern approach to language.

Heidegger begins by considering Newton's first law of motion, the principle of inertia, which states: "Every body continues in its state of rest, or uniform motion in a straight line, unless it is compelled to change that state by force impressed upon it" (256). Eventually Newton's law took on a more concise formulation which Heidegger states as follows: "Every body left to itself moves uniformly in a straight line" (262).

Following this statement of the principle of inertia, Heidegger offers the first of his eight points: "Newton's axiom begins with corpus omne, 'every body.' That means that the distinction between earthly and celestial bodies has become obsolete. The universe is no longer divided into two well-separated realms. All natural bodies are essentially of the same kind" [emphasis added] (262).

It is worth repeating: "All natural bodies are essentially of the same kind." This simple assertion sets in motion the collapse not only of the rigid separation of the Aristotelian realms of the earthly and the celestial but also initiates something broader and deeper: an alternative to the classical Aristotelian dualistic conception of discrete opposites and essences.

Heidegger's second point elaborates on the first. The collapse of the opposition of celestial and earthly bodies includes also their respective motions: "In accord with this, the priority of circular motion over motion in a straight line also disappears. And although now, on the contrary, motion in a straight line becomes decisive, still this does not lead to a division of bodies and of different domains according to their kind of motion" [emphasis added] (262–263).

Where all natural bodies are of the same kind, it follows that all motion is of the same kind. To conceive of all motion and all natural bodies as being the same in kind may seem like a gross generalization. The difficulty, however, lies not in seeing a difference between the cyclical motion of the moon moving around the earth and the linear motion of an apple falling from a tree but rather in seeing a way in which these different motions are also the same. For Newton varieties of motion are all gradations or differences of the same: sameness differed. Or, to put it in a word, motion and its gradations of difference constitute what may be called a continuum.

This new understanding of motion provided a model for every opposition, polarity, and dialectic: the contrast can be seen not as an agon between two discrete and separate entities or qualities but as a continuum between two extremes. Here it is important to appreciate the paradoxical quality of the continuum which, following the OED, may be defined as "a set or series of elements passing into each other, the parts of which cannot be distinguished clearly except by arbitrary division." The word "elements" alludes to something discrete or elemental which, nevertheless, cannot be separated from other elements. Expressed in another way, the continuum is both one differing itself in multiple ways and two always participating in each other—paradoxically both two and one, both the many and the one.

It would be difficult to overestimate the importance of understanding opposition as a continuum. It is one of the most transformative and consequential shifts in understanding in human history. It is the foundation of everything modern but also the anti-foundation of everything postmodern. This way of thinking was not unknown even to Aristotle who was familiar with the puzzle of the continuum as expressed in the paradoxes of Zeno of Elea. But, as will be discussed more fully, the counter-intuitive ways in which the
continuum can be applied to understanding the physical and linguistic realms does not become widely recognized until the modern and postmodern eras.

In his third point Heidegger explains: “Accordingly, the distinguishing of certain places also disappears. Each body can in principle be in any place. The concept of place itself is changed: place no longer is where the body belongs according to its inner nature, but only a position in relation to other positions” [emphasis added] (263). Consequently no body can move unnaturally or against its inner nature because it is no longer understood to have an inner nature.

Just as “each body can in principle be in any place,” in the case of language each word can in principle have any meaning. Its meaning is a function of its relation to the positioning of other words. This view is one of the defining characteristics of structural linguistics: “The elements of linguistic systems . . . do not have a value (or meaning) in themselves, but are meaningful only by virtue of the relations they have with each other” (Frank, lecture 3, 42, cf. Saussure, 120). The relation is the structure, and it is only through the structure that the elements take on a coherence that can produce meaning. Parallel to the case of motion in Newtonian physics, the key move in structuralism consists of seeing signification as a consequence of context, an effect of the position of a sign within a field or system of signs rather than a property intrinsic to the sign itself. This structuralist approach to the sign, like the Newtonian view of motion, prepares the way for a calculus of meaning.

Understanding the role of context operating on the complexity of motion and meaning yields a sense of precision and control beyond all previous dreams. But where the celebration of this sense of power in physics commences in the wake of Newton, the signs of new constraints soon begin to appear on the horizon. The possibility for multiple paths of measurement and calculation, imposing a condition of relativity, is implicit even in Newton’s work, as Stephen Hawking has indicated:

The big difference between the ideas of Aristotle and those of Galileo and Newton is that Aristotle believed in a preferred state of rest, which any body would take up if it were not driven by some force or impulse. In particular, he thought that the earth was at rest. But it follows from Newton’s laws that there is no unique standard of rest. . . . The nonexistence of absolute rest therefore meant that one could not give an event an absolute position in space, as Aristotle had believed (17–18).

Hawking’s account of this problem reveals how the desire for absolute calculation and control driving Enlightenment science contains within its own deconstruction—a contamination in the form of relativity. This contamination becomes the foundation upon which Einstein builds.

The pattern of transformation whereby the boundaries between opposites break—opening up a new context and exposing a different law of relation between former opposites—replicates itself among all the major oppositions in modern thinking, eventually achieving the critical mass that erupts into postmodern thinking. The move into the postmodern era, then, is not so much a departure from the modern as an acceleration in the same direction; it gains momentum when the modern way of understanding opposition is applied to other dualities in a thoroughly reorienting way.

In the preface of Of Grammatology Gayatri Spivak, quoting Derrida, gives one of the more widely cited summaries of the methodological moments of deconstruction:

His method . . . is reversal and displacement. . . . We must recognize that, within the familiar philosophical oppositions, there is always “a violent hierarchy. One of the two terms controls the
other. . . To deconstruct the opposition is first . . . to overthrow [renverser] the hierarchy." . . . But in the next phase . . . this reversal must be displaced, the winning term put under erasure. The critic must make room for "the irruptive emergence of a new 'concept,' a concept which no longer allows itself to be understood in terms of the previous regime [system of oppositions]" (1974, bxxvi–bxxvii).

This account of deconstruction nicely describes what Newton's laws accomplish with respect to Aristotle's understanding of the motions of bodies. Lewin has indicated the value weighting Aristotle imposes on the distinction between earthly and celestial bodies: "the earthly sublunar world is endowed with motion of inferior types" [emphasis added] (3). Newton's first law, as Heidegger explains, reverses this hierarchy: "The priority of circular motion over motion in a straight line . . . disappears . . . Now, on the contrary, motion in a straight line becomes decisive" (262). But, as Heidegger also notes, this reversal is not simply a reversal: " . . . still this does not lead to a division of bodies and of different domains according to their kind of motion" (263). A new understanding of motion, "a concept which no longer allows itself to be understood in terms of the previous regime," displaces the old opposition by way of a disarming recontextualization. A similar displacement occurs in the opposition between the natural and the unnatural as all motion becomes natural.

The entire process resulting in displacement can be understood as a double movement. Displacement occurs on one level as unification: what were two types of motion become one; on another level it occurs as multiplication: the unity of the one reveals itself to be also an infinite variation of particulars as unique expressions of fundamental laws—laws that are conceptualized (mathematically in physics) as the interplay of contextual forces. Displacement involves the double movement from the two to the one and from the one to the many. Clearly, deconstruction as the signature of a particular way of approaching phenomena does not begin with Derrida. It remained, however, for someone other than Newton to push this approach further in physics.

Relativity theory thoroughly transforms the way in which context is understood. It does this, deconstructively, through profound displacements. It merges the Aristotelian discrete dimensions of absolute space and universal time, which Newton continued to impose upon his non-Aristotelian cosmology, into a continuum of multiple spacetime realities. It also combines the formerly discrete realms of matter and space, body and context, into the continuum of field theory. It does so first through the theory of special relativity (Einstein, 1905b) which shows time to be a function of motion and secondly with the theory of general relativity (Einstein, 1916) which shows the gravitational effects of matter to be a consequence of the curvature of space.

In Aristotelian physics, absolute space and universal time are consistent with the essential separation of space from time. With the theory of special relativity Einstein shows how motion necessarily breaks down this essential separation as it effectively stretches the passing of time as well as the distance an object moves all in relation to an observer outside a given inertial frame. The faster the motion the greater the spatial/temporal dilation effects. The possibility of time dilation demonstrates that difference precedes time itself. Difference splits the moment and is thereby more fundamental than time because time dilation necessitates the shift from time to times and from time to spacetimes. Neither universal time nor absolute space is immune to difference.

Furthermore, the notion of universal time requires simultaneity or instantaneous effects. Such effects are necessary in order to make possible the simultaneous experience
or perception of all events throughout an absolute space. The theory of special relativity not only precludes simultaneous effects but also sets the speed of light as a limit for the rate at which effects can travel. Since special relativity requires that every experience of space and time must be relative, the universal frame is compromised and, along with it, the imagined panoptical center as a position of absolute rest (cf. Merrell, 63–64). Simultaneity and the panoptical vantage point of a transcendental subject are squeezed out of the known universe.

By exposing the differences in inertial frames, relativity theory uncovers the sense in which what is observed is a function of the observer by way of the observer’s relative motion. This functional linking of the observer’s inertial frame with differences in the inertial frame of the observed reveals the particular way in which relativity theory transforms the observer/observed or subject/object duality into a continuum. Effects of the observer’s inertial frame place the observer in an emergent context or reality from which what is observed takes on qualities neither purely “objective” nor “constructed” (or, if preferred, both “objective” and “constructed”); in this emergent reality all measurements of time, space, motion, force, etc. become artifacts of the inertial frame of the observer. Reality is (becomes) the particular contextualization or experience of spacetime emerging with and through the inertial frame of the observer. In this sense, reality is as it is experienced (contextualized) to be.

Similar to Newton’s retention of the notion of absolute space, Derrida argues that structuralists retain a key assumption of the essentialist orientation even though it is precluded by the understanding of language as a system of differences. Where relativity theory argues that difference has no predecessor, dividing time and space at the origin, Derrida argues similarly that the center, as the point of absolute rest in structure, is itself split by difference in its essence and at its origin. Structure and center are effects—effects of something else—effects of what, for lack of adequate words, Derrida indicates with the neologism “difference.” Difference, about which more will be said, takes up the task of what so far has been assigned to the word “difference.”

The primary argument Derrida gives in support of his claims about the fragmentation or multiplication of center and structure concerns the issue of difference—initially considered as an effect of time. The repetition of any word can occur only in and through the emergence of the new context brought with and necessitated by each passing moment of time. In the context of any given moment, a word does not give voice to a totality of meaning; it defers and postpones what would seem to be its promise of completion—delivering only a part of itself with every contextualization. As such, a word never expends itself. But rather than being an inexhaustible well, a word is continually renewed and remade with the additions of every new context while also trimmed and pruned by the subtractions of passing and fading contexts. No core persists as an unviolated whole. In this respect words resemble the phenomenon of waves. A wave is not composed of the same “thing” from moment to moment; as such it is not a thing at all in the traditional understanding of a thing.

However, as with relativity theory, difference in language theory is not fundamentally driven by time. The opening for relation, the difference or interval that separates while not separating one word from others, splits the identity or self-sameness of a word between multiple relations to what it is not, to other words, in what Derrida calls “the becoming-space of time [spacing] or the becoming-time of space (temporization)” (1982, 13). The ontology of relation implies the inseparability of space and time where both
spatial difference and temporal difference are two aspects of the same thing—difference or difference. Derrida’s use of difference reflects this connection and law of relation by evoking both the spatial and temporal in the senses of “differ” and “defer.” These effects of difference apply equally well to word, text, and structure.

Although antedated deconstruction, special relativity nevertheless conforms to the methodological moments of deconstruction. It reverses the implicit dominance of space over time—in the immunity of absolute space from difference—by showing time to be everywhere a contamination of, indeed, an integral feature of space. And, in the same stroke, it displaces the essential opposition of absolute space and universal time with the merged multiplicity of spacetimes. This process also follows deconstruction by granting the equiprimordiality of difference in relation to original unity.

With the theory of general relativity, Einstein accomplishes yet another deconstruction. He understands gravitation not as “action at a distance,” as Newton had theorized, but rather as an effect of the curvature of space. Bodies warp the space in which bodies themselves move because space is an extension of the body as the body is a contraction of space. In other words, matter and space are no longer viewed as discretely separate; space is not simply a container for matter. In general relativity, “the concept of space detached from any physical content does not exist” (Einstein, 1950, 5). Once again Einstein reverses the dominant role of one member of an essential opposition. Instead of matter swimming in the engulfing context of spacetime, spacetime is revealed to be nothing more than an extension of matter. The merging together of the former opposition of matter and spacetime gives rise to the continuum of field theory and the multiplicity of matter/energy fields.

Similarly, deconstruction reverses then displaces the hierarchical dominance of context found in structuralism. Context becomes an extension of the words of the text (the reversal) but, more precisely, text and context merge into one fabric (the displacement)—a weave of the more fundamental movement of difference or difference. In Derrida’s often quoted maxim “il n’y a pas de hors-texte” (1974, 158) the word texte serves to indicate textuality as text/context. The mere possibility of meaning precludes an “outside” just as the possibility of motion in Einsteinian physics precludes an “outside” independent of difference through space and time. There is no way to the outside of a text because the text, as a network of relations, opens out limitlessly upon textuality not only as other words and texts but also, by reference, onto the network of relations of the non-linguistic realm (cf. Derrida, 1988, 137). As a result of this textuality, a given text cannot be confined to a set of internal or narrowly circumscribed relations any more than the word “cold” can be prevented association with the word “hot” or various associations with experience even though “hot” may not appear in the given text. Because of the relational nature of language, a given text immediately becomes an unbounded context.

This limitless weave of linguistic contexts, for which there is no “outside,” does not mean that there is only language but rather that language is inextricable from experience. The users of language are in this or that textual context but never free from all textual context. For those who possess language there is no way to the outside of language, no way to experience the world as beings who do not possess language. Consequently, text/context also becomes language/experience.

In relativity theory the two (space and time, space and matter) become one and the one (spacetime field) becomes many in the multiplicity of spacetime fields. This double movement of the merging of what was separate accompanied by the multiplication of the
whole constitutes the methodological theme of postmodern physics as well as postmodern language theory. Perhaps the grand finale of this theme for physics in the 20th century has been the discovery, once again, of an essential unity between what were thought to be two separate and distinct phenomena resulting in a new understanding of matter. The theory dealing with the mysterious quality of subatomic matter has come to be called quantum theory. Einstein plays a significant role in the development of quantum theory, but, like Newton, he finds a limit to how far he can apply the model of the continuum.

Quantum theory evolved as a necessary addition to relativity theory because neither of the relevant theories of motion—Newtonian mechanics nor Einsteinian physics—could account for the kind of movement observed to occur in the microcosmic realm of subatomic particles. With Einstein’s discovery of the photon (Einstein, 1905a), what was thought to be strictly a wave phenomenon—visible light—also turns out to display particle behavior. And it was discovered within the next few years that what were thought to be strictly particles—subatomic phenomena such as electrons—also display wave behavior. The dual and contradictory traits of such phenomena led physicists to ask what might really be the case: wave or particle? The answer that keeps coming back is: both wave and particle. Attempts to resolve this question continue to indicate that at bottom nature in general seems to be a superposition of both wave and particle yet in such a way that, when measured in particular situations, only one or the other aspect will be displayed.

This anomalous behavior of subatomic phenomena has been understood to mean that a quantum system exists in an undecidable both/and state (both wave and particle) until a specific context is devised in which, through the mere intrusion of measurement, the seemingly precarious superposition “collapses” into a specific reality (particle only or wave only). This understanding of the quantum phenomenon in effect links “objective reality” to the context of observation. Stated in another way, the context of the observer, as the specific manner or act of observation itself, is inextricably linked to the context of what is being observed. According to Niels Bohr, one of the originators of quantum theory, in order to understand a quantum system, it is necessary to define a “total experimental context” (Davies and Brown, 12). The observer provides this definition even inadvertently through the action of observing or measuring the phenomenon. The experienced reality will take on different features in accordance with the nature of the total context through which it emerges.

In Einstein’s last years he attempted to expand the theory of general relativity to include a solution to the wave/particle puzzle. However, Einstein, like Newton, reached a point where he could not accept certain conclusions implicit in the application of the continuum model to the understanding of natural phenomena. Einstein could not accept what physicists refer to as nonlocality—divided or multiple presence—even though it is consistent with the theoretical predictions of quantum theory.

Nonlocality may be briefly explained as follows: In certain experiments a particle, such as an electron, behaves as if, when presented with alternate paths, it takes both paths. One of the consequences of the electron’s superposition as particle/wave is that it occupies two regions of space at the same time; its superposition as particle/wave is also a superposition of one region and another. Or, as another way of conceptualizing the experiment, each electron splits into two components which remain in communication with each other (Davies and Brown, 8 and Albert, 67). Even more extraordinary, this “communication,” in order to account for the experimental results, must be instantaneous—that is,
even faster than the speed of light. The term "nonlocality" makes reference to this "communication" or "effect" as being nonlocal—that is capable of spanning any distance. To accept this conclusion, however, one of the assumptions of relativity theory—that nothing can exceed the speed of light—must be abandoned.

The possibility of instantaneous effects opens the door again to the notion of simultaneity that relativity theory had foreclosed. Within the rules of relativity, faster than light effects require time to travel in reverse; in short, nonlocality makes nonsense of the relativistic understanding of time. Yet, as David Albert has observed, nonlocality seems indispensable to current theory: "Any theory that can reproduce those statistical predictions of quantum mechanics already known to be correct and that satisfies a few extremely reasonable assumptions about the physical nature of the world must necessarily be nonlocal" (67). The possibility of nonlocality must have appeared to Einstein to be as bizarre as relativity theory would have seemed to Newton.

The "divided presence" implicit in nonlocality unhooks the functional linking of space and time consistent with relativity theory, introducing a renewed separation of space and time, yet without entirely unhooking their previous merger. In this respect the addition of nonlocality plays into the counter-intuitive tension accompanying the paradox of the continuum. As both the one and the many, the continuum does not require—and in fact precludes—a thorough merging of opposites. Where there is a tendency to see unity as fundamental, the continuum asserts that difference is equiprimordial with unity.

Oddly enough, the consequences of quantum theory that disturb the unification of space and time peculiar to relativity theory are consistent with descriptions Derrida gives for the term "difference." In this connection consider part of Derrida's explanation for why he devised a new term:

Could not this (active) movement of (the production of) difference without origin be called simply, and without neographism, differentiation? Such a word, among other confusions, would have left open the possibility of an organic, original, and homogeneous unity that eventually would come to be divided, to receive difference as an event (1982, 13).

The term "differentiation" implies "differentiation of ..." whereas the term "difference" does not imply an original unity but rather division without origin in unity. In this case the "origin"—insofar as origins are needed—is free to be neither unity nor division. With the concept (or nonconcept) of difference Derrida attempts to understand a difference that cannot be fenced off from any origin or unity. Derrida goes on to argue that this difference inhabits the most fundamental category of unity in Western philosophical tradition—being as presence. Difference divides the being or "itness" of what is.

The identity problems of superposition and nonlocality that beset microcosmic units of matter also afflict units of language. Particles, as the smallest bits of matter, are not individual but multiple in the sense of manifesting presence in more than one place at the same time; particles are never fully present in this here and now. Similarly, and as previously discussed, the word (read also "text") is thoroughly slit by difference—with each passing moment (temporally) and within each passing moment (spatially). What it "is"—this word—is essentially caught up in relations to what it is not—other words. What the word is not—what it stands in relation to—has no natural boundary. The lack of closure creates the possibility, even necessity, of a multiplication of meanings or relations—identities and presences. Like the particle/wave, its "position" is divided; it is both this and that, both here and there, both present and absent, both now and not now.
This multiplication of meaning or presence is spatial/temporal repetition with a difference.

Repetition with a difference—what Derrida calls iterability—achieves the status of what Newton would call a law. It follows as a corollary of this law that language, through the structure of particular sign configurations, cannot convey unaltered intention or meaning. This law of repetition essentially says that the word (also “text”) is split; it both is and is not what it is. Such a law contradicts the Aristotelian law of noncontradiction. It also places a different emphasis upon the phenomenon of repetition itself. Where for Aristotle repetition becomes the measure of lawfulness, for Derrida it becomes the law that preempts lawfulness. Derrida claims that this law of repetition initiates “another general logic.”

As repetition with a difference, iterability everywhere effects a decentering of what would pose as a center. Nevertheless, iterability, by displacing the center, turns out to be itself a kind of center—the rock, or rather current, upon which deconstruction lives. In the case of deconstruction the “center” consists of the revelation that there can be no center. In the move referred to as displacement, a new way of thinking replaces the old while serving a similar, although not the same, function. Since it harbors duplicity, this new “center” does not so much provide a basis for knowledge as a means for understanding the limits of knowledge.

If, as Derrida argues, the text has no center—no singular and abiding structure to give it meaning—then what is called “the text” becomes, like matter in quantum theory, a superposition. With respect to exactly what it is, it is undecidable—until it emerges in the specific contextualization brought about by a particular reading. Even then it does not present itself as a totality; like subatomic quanta, it offers only a perspectival glimpse of itself and then recedes again into the multiplicity—until the next reading.

Since alternative readings cannot be thoroughly distinguished in material expression as signs, all that remains to distinguish them is how these readings are situated—the way in which the parts of the text become related through text, context, and reader. This “way” of relating, as contextualization, cannot be reduced to calculation; at the most fundamental level it will require judgment or what Derrida calls “passage by way of the undecidable”—a passage that reaches the point where signs are essential to convey meaning but are not sufficient in themselves to guarantee meaning (cf. Derrida, 1988, 116). Such a guarantee could only come from a vantage point totally “outside” the context of the text. Or, looking at the problem from a reversed direction, it would be possible to say that the “outside”—as material expression—is all that is available and that the “inside”—as the way in which the parts of the text are related—is precisely what remains unavailable and hidden. This “inner” way of relation becomes available to inquiry only through further additions to “outer” context—by adding more text, thereby expanding context without getting inside/outside it. Einstein’s watch metaphor offers one of the better ways of understanding this puzzling state of affairs that everywhere constrains inquiry.

In our endeavor to understand reality we are somewhat like a man trying to understand the mechanism of a closed watch. He sees the face and the moving hands, even hears it ticking, but he has no way of opening the case. If he is ingenious he may form some picture of the mechanism which could be responsible for all the things he observes, but he may never be quite sure his picture is the only one which could explain his observations. He will never be able to compare his picture with the real mechanism and he cannot even imagine the possibility of the meaning of such a comparison [emphasis added]. (Einstein and Infeld, 1938, as cited in Gregory, 1988, 189).
This inability to "compare," this inability to "even imagine the possibility of the meaning of such a comparison," is exactly the problem of the inability to get outside context. Try to imagine, for example, what it might mean to get outside the universe and look in. It is similarly unimaginable to get outside a text and look in. Offering only an "inside" posing as an "outside" within the relations of a particular context, the quasi-transcendental displaces the transcendental. Postmodern theory thereby "situates" the classical "outside"—the absolute and transcendental concepts.

This "situating" or contextualized rebirth of concepts relates to the central point in the perpetration of Sokal's hoax and discussions following it: the belief that postmodern theory teaches the collapse of distinctions between true and false, fact and fiction, fact and interpretation—where the latter are understood as constructions or as additions to reality and text. The consequences that follow from such a belief are thought to be disastrous—especially with respect to standards of education.

Sokal argues that not only can clear distinctions be drawn between facts and fictions but that rigorous argument and scientific endeavor fundamentally depend upon being able to do so. Sokal has approvingly quoted Eric Hobsbawm in response to those postmodern theorists who claim there is no essential difference between fact and fiction: "But there is [a clear difference], and for historians, even for the most militantly antipositivist ones among us, the ability to distinguish between the two is absolutely fundamental" (1998, 11). Derrida attempts to do nothing more than articulate a theoretical position from which it becomes possible to understand why such distinctions cannot be made rigorous and precise.

The confusion here can be explained by recalling the kind of transformation described above that occurred with the understanding of "motion" and "nature" in Newtonian science. It is surprising that a physicist such as Sokal should fail to make the analogical connection between what Newton does with the concept of motion (not to mention what Einstein does with space, time, matter) and what Derrida does with the concept of fiction. Derrida's transformation of this concept, as well as others, is as much in keeping with the tenor of scientific tradition since the Enlightenment as anything that can be imagined. Derrida is in this sense more a keeper of the scientific tradition than Sokal. Given the understanding of opposites implicit in his arguments, Sokal belongs more to the Aristotelian tradition.

Just as in Newton's recontextualization of nature such that every motion becomes natural, in postmodern theory fiction is understood in such a way that every meaning becomes fictional. This is a necessary consequence of the law of repetition—which, to express it again, means that language, by virtue of the iterability of words, is always and everywhere inadequate to fix meaning—inadequate to describe, represent, and communicate in a way that is automatic, in a way that eliminates the need for judgment. The processes of meaning and communication are only possible insofar as language is, in a significant sense, fictionalization—the saying of what is not the case. This, of course, constitutes a reversal of the traditional priority of fact over fiction.

As is the case, however, with all the displacements discussed herein, this reversal is not simply a reversal. With Newton the distinction between heavenly and earthly motion does not disappear; rather it is given a new meaning. Similarly, within the encompassing context of seeing all language as fiction emerges a new sense of the opposition fact/fiction which takes into consideration the necessary and essential contamination of one with the other. A fact no longer functions as nor is theorized as an autonomous empirical rock or atom of
reference, but is instead a description that attains, within established and defined contexts, to one degree or another of being convincing. If a fact ultimately counts as a fact on the basis of how convincing it is, then the last criterion, the court of final appeal, has become persuasiveness—the court of rhetoric and argument rather than the court of brute facts and objectivity. Now the displaced concept of “objectivity” emerges with new meaning as the “very persuasive.”

Inadvertently, and without sensing the magnitude of the capitulation, Sokal has, at least on one occasion, advocated such a view of facts (1998, 22n). But then he fails to see how such a view undermines his assertion about the essential separation of fact from fiction as well as his complaint about the postmodern inclination to view reality as a construction. For Sokal, the idea that a fact is, in some fundamental way, a construction, a fiction, continues to give pause.

Contexts situate and particularize every text and object in a merger that may be expressed as contextualization, as text/context or object/context. Since contexts are not absolute, are in motion and continually changing within an infinite relational net, the texts and objects that emerge through contexts are in some sense partial or incomplete encounters. As partial these contextualizations function as selections of reality—selections from a manifold of preselection oscillations or multiplicity, or what in some cases may be called the infinite context.

Even where contextualization is not fully elective it is nevertheless always selective—selective by default. This selection is also constructive by default in that the mix of what is included and what is left out or what is emphasized and what is obscured in various contextualizations is necessarily susceptible to being differently mixed, differently contextualized with each passing context. And the manner and extent of its selection or partiality as a contextualization can be appreciated only through additional information and future contextualizations.

The reality that emerges through particular contexts is not an objective reality in any traditional sense of the word. Reality as a superposition does not conform to the idea of objectness or thingness. This way of thinking reality places it in a conceptual category for which adequate metaphors are difficult to find—thereby necessitating terms such as “continuum,” “difference,” “superposition,” etc. The object has lost the fundamental autonomy of transcendence in favor of quasi-transcendence. In this respect “objectivity” undergoes a displacement similar to the concepts of “motion,” “nature,” “space,” and “time.”

Finding reality to be construction by default through selection by default need not mean that selection—whatever its origin—transpires without constraints. Because “facts” always emerge through existing particular contextualizations which are of varying ranges and varieties of selectiveness and stability, they do not admit any interpretation but they always admit some interpretation. Yet the contextualization that limits interpretation does not function with the closure of a totalization; its boundary remains open. This lack of closure entails, paradoxically, that reality both is and is not what it is interpreted to be. It is, at one level, what it is interpreted to be but also always exceeds, at another level, what it is interpreted to be. This “exceeding” means that at every possible point of capture reality escapes calculation and thereby admits construction.

Nevertheless, the standard response to the argument that there are only interpretations makes the point that interpretations must be interpretations of something (cf. Sokal 1996b, 62). And that “something” is what may be called the “real world.” A construction
of the understanding of reality is not a construction of reality itself. It is this distinction that Sokal and so many others believe to be the unshakable ground of the distinction between fact and fiction. Fact is grounded in brute factuality—the sacred text of reality.

But when it is understood that interpretation is contextualization it is easier to see that there can be only interpretations—for, as Derrida has argued, nothing can be out of context. Neither the text nor any of its parts (including its structure) is itself an “atomic fact” (presuming a prequantum sense of the atom). Just as with the photon or electron in quantum physics, what would pose as a limit, a boundary, a center, an “it,” is always more than itself. Since the text cannot be limited to “this set of words,” it has only a semblance of autonomy. As a semblance, it is only more or less stable. The text cannot be contrasted with interpretation because the “it” that it becomes in every contextualization is already interpretation. In short, “it”—the text (read “text/context”)—cannot be adequately theorized as an “it.” As has been discovered in physics, this is a difficult matter to conceptualize; yet, paradoxically, “reality” continues to serve up this difficulty.

The problematic of the multiplication of contexts suggests that, borrowing Derrida’s term, undecidability rules more so than relativity or subjectivity. No point of view is merely relative to a particular subject or context but neither can it be shown to be absolute to all subjects and contexts; it lies “between.” Being “between” is a condition of the “quasi-transcendence” that is the peculiar consequence of living in a continuum. This continuum extends to truth, justice, communication, intersubjectivity, and every region of human experience and endeavor that, in one way or another and in constantly more creative ways, finds itself being reduced to objectivity. “Objectivity” is a veiled way of saying “no need for judgment.” And undecidability is a veiled way of saying “judgment required.” In all human action and experience being “between” means that judgment, as insight into what is real, is irreducible. And where judgment is irreducible, rhetoric, as the art of argument and persuasion, also remains irreducible and will continue to insure that both science and reality will always function, in a subtle yet significant sense, as a construction—and a construction inseparable from language. This entrance, or as some would have it, intrusion of rhetoric into the realm of science is precisely the issue being actively contested across disciplines. Even within the academic halls of rhetoric itself, the question is asked: Does it really make sense to push rhetoric this far?

Rhetorical Ontology

Contrary to what Sokal and his supporters claim and true to the model of the continuum that has been fundamental in their evolution, physics and language studies are not essentially different—either in standards or theory. Based on the analyses herein, it may well be that this has always been the case—although certainly not always recognized as such. But what does it mean to argue that physics and language studies are not different in standards and theory? Obviously, for physicists such as Sokal, it means that the world has been turned upside down. This century commenced with a series of increasingly more refined attempts to establish and defend a clear line between scientific rationality and every other form of reasoning, between what philosophers of science regard as grounded statements about reality and ungrounded statements. Various philosophical construals of the relation between language and experience—anticipating, including, and expanding upon logical positivism and comprising key works by Wittgenstein (1921), Carnap (1935), Ayer (1936), Popper (1935), and Russell (1940)—all appeal to the possibility of a condition whereby descriptive statements (or propositions) can be
compared to the object-world (the world of sense experience) such that the object-world will provide a clear answer. Putting words to the test, requiring the object-world to “speak” and to pronounce on disputes between competing descriptions, has been the distinguishing criterion separating the scientific rationality of the voice of nature from the mere rhetoric of the voices between subjects.

In the 1960’s and 70’s, dissenting views such as those of Quine (1960),3 Kuhn (1970), and Feyerabend (1975) surfaced showing ways to question scientific rationality as an arbiter between language and reality. Interdisciplinary interest in this philosophy of science fueled a renewed examination of language in relation to scientific understanding and general knowledge. Advocates who have become associated with movements such as “rhetoric as epistemic” (e.g. Scott, 1967; Brummett, 1971; Orr, 1978), “rhetoric of inquiry” (e.g. Simons, 1985, 1990; Lyne, 1985), and “rhetoric of science” (e.g. Gross, 1990; Fuller, 1993) have argued, some more vigorously than others, that the scientifi
cally rational mind guided by scientific method may not serve so much as the tabula rasa for pronouncements from the object-world as scientists would like to imagine. According to these advocates, scientists are not merely listening to nature but are engaged in a dense and complex communication between themselves—as well as a more general public—in finding accommodation and winning support for various analyses and hypotheses concerning the object-world. Few would disagree that the practices of finding accommodation and winning support land scientists squarely in the realm of rhetoric. In a recent work on the rhetoric of science, Randy Allen Harris rightly points out that “The virtues of a scientific claim come not only from the way it is mapped against nature, but from the way it is mapped into the context of specific approaches and communities” [emphasis added] (1997, xxx).

However, this way of understanding the situation with regard to science prompts a further question that Harris is quick to pose: “How big is that not only? is the inevitable question for rhetoric of science. Does rhetoric add a little salt and pepper to the stew of science, which would be just as nourishing, if not so tasty, without it? Or is rhetoric the meat and potatoes and rutabagas of the stew, the very substance of science?” (1997, xxx).

This question reaches beyond the “rhetoric of science” to suggest the more encompassing possibilities of “science as rhetoric.” Understanding science as rhetoric entails taking up the view that all is rhetoric—that science and rhetoric are entirely in the same continuum and under the same standards of inquiry, evaluation, and critique. This more radical assessment of the relation between rhetoric and science has been most prominently argued by Alan G. Gross as, for example, when he calls for “a rhetoric of science without constraints, one that takes as a premise the possibility that the objects and events of science share a rhetorical ontology” (1997, 150). What Gross calls “rhetorical ontology” aligns closely with the view presented herein that physics and language studies have evolved similar theoretical responses to what would appear to be similar ontological ground. Gross’s “rhetorical ontology” complements the rhetoric as epistemic view implicit in the early rhetoric of science movement (cf. Gross, 1990b). The problem of inquiry becomes not only the epistemological problem of access to the real but also the ontological problem that while the real may be accessible it is not of the kind of being anticipated by modern theory.

This more radical view does not command wide approval as it is one not easily digested by scientists (e.g. P.R. Gross and Levitt, 1994; Sokal, 1997) or rhetoricians (e.g. McGuire and Melia, 1991; Gaonkar, 1997). In the early 70’s this view was generally
considered so radical that one of its most penetrating and elegant expressions could not get published. S. John Macsoud’s book Other Illusions: Inquiries Toward a Rhetorical Theory, a thought provoking work concerned extensively with making a case for science as rhetoric, was rejected by all publishers and Macsoud was forced to publish it himself in 1973. It was favorably reviewed in Philosophy and Rhetoric (Smith, 1974) and The Quarterly Journal of Speech (Smith, 1977), but eventually dropped from sight, having not found its way into many libraries. Gross’s prolific discourse is very different from Macsoud’s concise, almost ascetic style, but both argue a strong case for the rhetorical nature of science. Both agree that connecting rhetoric and science need not be taken to mean that science is as groundless as rhetoric is sometimes argued to be but instead that rhetoric and science share whatever grounds there may be for providing evidence of anything. For both Macsoud and Gross these “grounds” consist of argument and all argument is a form of argument by analogy. Even the argument by evidence which is thought to distinguish science is argued to be argument by analogy (cf. Macknoud 74–80 and Gross, 1990a, 21–32). Both Macsoud and Gross also fix upon the relations between prediction and truth and prediction and explanation as weak points in the justification for the unique quality of scientific rationality (cf. Macsoud 21–26 and Gross, 1991 285–289).

Gross’s work has stimulated a renewal of the science wars debate within the discipline of rhetorical scholarship exemplified notably in the recent exchange between Gross and Dilip Parameshwar Gaonkar (Gross and Keith, 1997). Gaonkar is Sokal’s analogue within the sphere of rhetorical theory in the sense that he becomes, as Dierdre McCloskey has rightly pointed out, “indignant when the conventional dichotomies of art/science, persuasion/proof, and rhetoric/knowledge are undermined” (1997, 105). Other contributors to this debate also take Gaonkar to task for the unnecessary dichotomies he makes between practice and interpretation (Leff, 1997), performance and criticism (Campbell, 1997), and production and theory (Gross, 1997). Of this group Gross appears to have attacked the dichotomies in the most aggressive way, especially those between science and rhetoric and rhetoric and the real. Gross has argued his case most extensively in The Rhetoric of Science wherein he also charts his position in the philosophical spectrum. Here Gross avoids every form of realism while describing his stance as “a radical rhetorical interpretation” that acknowledges fundamentally the “rhetorical construction of reality” (1990a, 194).

Gross’s view finds corroboration (and from a direction other than one concerned with science) in the work of Robert Wess on Kenneth Burke. Wess advocates what he calls “rhetorical realism” and argues that Burke contributes to the evolution of such a position while not fully developing or exemplifying it. While Wess uses the word “realism” which Gross wants to avoid, he uses it with the modifier “rhetorical” to indicate a position compatible with Gross’s—taking into consideration the problem Gross nicely identifies in the context of a discussion of Hilary Putnam’s work: “Putnam says that ‘objects’ themselves are as much made as discovered. ’ But the point is, we can never tell how much” [emphasis added] (1990, 198).

Wess uses the expression “rhetorical realism” in appreciation of Gross’s point that it is impossible to tell how much is discovery and how much is construction. Gross wants to use this impossibility to emphasize the consequence that every description is thereby necessarily imbued with construction or what Wess might call “fiction” while Wess’s use of “realism” recalls that every description may also be seen as necessarily imbued with the real or the “factual” (cf. Wess, 169–172). Neither can be faulted, and this tension
between extremes exposes again the paradox of the continuum. The construct and the real essentially contaminate each other all the way to the core just as do subject/object, fact/fiction, literal/metaphoric, heavenly/earthly, space/time, etc. On the basis of this essential contamination, Gross's desire to avoid the philosophical baggage surrounding the term "realism" and its extensive association with subject or mind independent entities is understandable. "Rhetorical ontology" is perhaps better disposed for his purposes insofar as it refers to "being," evoking the experience of existence rather than a relation to "the real."4

As already noted, a "rhetorical ontology" suggests a sense in which all is rhetoric. In the context of explaining "il n'y a pas de hors-texte" Derrida has argued that all the world is a text. The textual metaphor invites the notion that scientists are engaged in "reading" nature and that the possibilities and difficulties of reading the text of nature are not essentially different from those of the rhetorician when engaged in reading the text of a book. This radical rhetorical stance does not amount to the "textualization" of the natural world but consists rather of the acknowledgement of a predicament shared by investigators both of texts and of nature—the necessary recourse to judgment and evaluative choice, often between complex overdetermined alternatives. This need for judgment is precisely what opens the space for language, rhetoric, argument, and inquiry. To assert the rhetorical construction of reality is not to assert the wholesale invention of the world (cf. McGuire and Melia, 1991, 303) but rather to assert that invention (through contextualization and judgment) is an essential, inescapable, and unquantifiable part of the experience of that world. Conceived of as like a "text," when nature speaks she speaks with all the potential clarity and duplicity of rhetoric.

Where does this "rhetorical ontology" leave the inquirer with respect to the future of inquiry? Most importantly it suggests that, simultaneous with the action of inquiry, greater attention be given to understanding and circumscribing, as best as possible, the contexts emerging as part of the specific inquiries of "rhetoricians"—both of language studies and natural sciences varieties. Although helpful, it is not sufficient in this regard to do as, for example, McGee (1990) has done in calling for attention to context with respect to sources, culture, and influence or as Leff (1990) has done in emphasizing the "situated character" of texts. Underscoring the importance of context still leaves open the question: which contexts? For if context operates as postmodern theory would have it, the text has no "context" but only "contexts." "Situating" a text must go beyond attempts to capture the text's operative contextual reality to include addressing the selections made in the contextualization that is its interpretation. As a consequence, every reading owes an accounting for the selective contextualization through and around which it recommends the text be understood and evaluated.

Since, as argued herein, such choices cannot be grounded exclusively in the text or its context, they must include a grounding in human values. Which values are at stake in seeing one way rather than another? And this question immediately elicits the related question: whose values are at stake? This last question relates directly to issues of influence and power as these are played out in the collective sphere. This is not to say that inquiry must reduce to a struggle over power and values (because these are not always in conflict or only in apparent conflict) but that it must always be open to and cognizant of the thread of judgments and values in its fabric.

Issues of value, power, and community call for a complement to Gross's rhetorical ontology. Candidates for this complement would include a critical rhetoric along the
lines discussed by McKerrow (1989), a rhetoric of dialogic coherence as advocated by McPhail (1996), and even a renewal of political rhetoric as proposed by King (1997). Such rhetorics address the need, in partnership with inquiry, for judgment and the critique of judgments concerning which values are given or ought to be given priority in the tension between ontological and life quality assessments. This renewal of rhetoric grounded in a rhetorical ontology suggests finally that science can no longer fence itself off from politics and values any more than it can rhetoric. And if the evolution of theory in physics and language studies is any indication of the future, the continuum approach to opposites will continue to encroach upon every conceivable opposition—with potentially the same extraordinary and unpredictable power it has already shown. This continued encroachment cannot fail to have profound effects on the scientific, political, and academic communities of the 21st century.

Notes

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1 Terms such as “objectivity,” “subjectivity,” and “relativism” and their variants have various philosophical uses. In the texts cited, Sokal does not explicitly define his use of these terms. Their use in this text will follow roughly these distinctions: “objective” refers to that which remains apart from or “outside” every subject and “objectivity” implies that objects in the world are fundamentally autonomous and independent of subjects but nevertheless accessible or knowable by subjects; “subjective” refers to that which belongs to or is “within” a subject or subjects and “subjectivity” implies that subjects are essentially independent of objects and that the experience of objects is essentially dependent upon subjects; “relative” refers to that which is not absolute (i.e., true for all times and places) but dependent upon relation and “relativism” refers to the view that holds that truth is radically dependent upon particular temporal contexts and/or subjects. The use of the terms “modern” and “postmodern” will follow Lyotard’s (1979) distinction where “modern” indicates an orientation that legitimates itself with reference to a philosophical metadiscourse or grand narrative, in this case the grand narrative of scientific rationality inaugurated with contributions from Enlightenment figures such as Descartes and Newton. “Postmodern” corresponds, then, to what Lyotard calls an “incredulity” toward such metanarratives—an incredulity perhaps beginning with Nietzsche but commencing more recently in the wake of the critique of scientific rationality begun in the works of Kuhn (1970) and Feyerabend (1975) and the critique of modern rationality found in the works of Deleuze (1962) and Derrida (1967, 1970). The distinction between the classical and the modern turns upon the difference between the Aristotelian metanarrative of rationality linked with essentialism and the metanarrative of Enlightenment scientific rationality. However, these terms will take on a more precise use in accordance with the distinctions developed in the text regarding differences between how the relation of opposites is predominately understood within each of these “epochs.”

2 For example, consider Derrida in this passage: “The concept of iterability . . . seems to me indispensable for beginning, at least, to account for all the difficulties that we meet in this field [language theory] and in others . . . Doubtless the concept of iterability is not a concept like the others . . . That it might belong without belonging to the class of concepts of which it must render an accounting, to the theoretical space that it organizes in a (as I often say) ‘quasi’-transcendental manner, is doubtless a proposition that can appear paradoxical, even contradictory in the eyes of common sense or of a rigid classical logic. It is perhaps unthinkable in the logic of such good sense. It supposes that something happens by or to set theory: that a term might belong without belonging to a set” (1988, 127; cf. also Benninger, 268 on Derrida’s use of the term “quasi-transcendental”). Derrida’s other “general logic,” especially the notion that “something happens by or to set theory,” resembles certain aspects of what is called “fuzzy logic.” Compare, for example, Bart Kosko on fuzzy sets (Kosko, 1993, 121–155). Daniel McNeill and Paul Freiberger offer more on fuzzy logic (1993). Some computer scientists are beginning to believe that in order for computers to continue growing in capabilities, computer logic must make the transition from binary based logic to some other logic. Fuzzy logic counts as one step toward this transition.

Quine’s contribution in this direction is divided. His principle of indeterminacy of translation would appear to complicate scientific epistemology. This principle he states as follows: “Manuals for translating one language into another can be set up in divergent ways, all compatible with the totality of speech dispositions [utterances by native speakers], yet incompatible with each other” (1960, 27). Given the context of certain rules, some manuals can be excluded on the basis of the “facts” of speech dispositions, but many possible manuals will still remain. But Quine does not see any analogous situation obtaining with respect to the “translation” or understanding of the physical world. As Christopher Hookway notes, for Quine “translation is indeterminate if correctness of translation is not fixed by physics; and naturalized epistemology is best viewed as the physics of inquiry . . . Why this special deference to
physical theory? Goodman . . . treats all ‘versions’ as on a par, with no favour for physics or even for science” (1988, 212). Since translation is not fixed by physics (as Quine acknowledges), Quine marks off the linguistic problems of translation as peculiar to linguistic contexts and as having no applicability to inquiry in physics. According to Hookway, Goodman rightly finds this arbitrary and puzzling. Einstein’s watch metaphor, discussed above reveals the way in which these problems do have analogous applicability in physics.

This difficulty concerning the word “realism” is another instance of reversal and displacement previously discussed where the notion of “the real,” traditionally conceived, no longer makes sense in the postmodern context and, with continued use, will take on a new meaning consistent with the new approach to oppositions characteristic of that context—an approach where nothing is essentially independent or autonomous. In comparing a postmodern or deconstructionist orientation to realism and implied possibilities for objectivity it is important to keep in mind that deconstruction assumes the essential relatedness [incursion of one in the other] of traditional opposites such that in the opposition of subject and object one side is not essentially separate from the other (yet without constituting an essential unity). This essential relatedness, however, breaches autonomy and thereby the effects of relativity. No point of view can be merely relative to a particular place, time, or subject because it suffers the incursion of the “other” through necessary relation to other contexts, times, and subjects, thereby providing an unknown universalizing element. The “relative” yields to displacement and the “relative/absolute.”

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