

Alan G. Gross

***Floppy-Eared Rhetorical Rabbit,
Redux***

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Poroi 10,2 (December 2014)



David Beard has asked me if POROI might reprint my critically celebratory *Perspectives on Science* review article on Alan Gross from five years back (Harris, 2009). I am happy to oblige. Johns Hopkins University Press, which holds the copyright, has kindly licensed a few pages of the article without charge, so I have selected some bits and pieces of it, stitched them together, with some slight emendations, and—five years is a long time in the career of the extraordinarily productive Alan Gross—added a few extra patches here and there to bring it somewhat up to date. I have made additions to the Works Cited list as relevant, but no deletions (so it's a Works Cited Plus list). I have not used a different indexing scheme between original endnotes and new ones. On the editors' recommendation, I have placed the excerpts from my 2009 article in brackets, with elision-dots to indicate substantive cuts (minor cuts and additions are unflagged). Please note that the cuts are considerable; in deference to JHUP's wishes, I refer the interested reader to the original review article, to reward JHUP's generosity as well as for further and deeper commentary on the remarkable career of Alan G. Gross.

[“The rhetoric of science? *C'est moi.*” That's what many of us took Alan G. Gross to be proclaiming with the title of his 1990 book, *The Rhetoric of Science*, when the subfield was barely underway (Harris, 1991; Myers, 2003, 374). Sure, Gross had published a flurry of significant articles in the late 80s exploring the suasive dimensions of scientific discourse, but several other rhetoricians had as well—Charles Bazerman, Greg Myers, Lawrence Prelli—and their resulting books had considerably more modest titles. Prelli's *A Rhetoric of Science* made a particularly instructive contrast (Prelli, 1989; see also Bazerman, 1989; Myers, 1990). And some of the more influential scholars—John Lyne, Carolyn Miller, John Angus Campbell—had not published books at all. Most gallingly to others in the field, Gross barely noticed any of this parallel work in

his book, attending rather more closely to the work of philosophers, sociologists, and historians. But now, nearly twenty-five, highly productive years later, it's almost true. Alan G. Gross? *C'est rhétorique de la science,—presque.*

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Gross's (1990a) *The Rhetoric of Science* is easily the best known book in the field—widely reviewed, widely cited, widely taught, widely attacked. Its first iteration (1996a) included a long preface, in equal parts feisty and inclusive, responding to criticisms and broadening his notice of other rhetorical research, but was otherwise unchanged. Now there is the major reconfiguration under review here, *Starring the Text*, altered not just in content and structure (by about fifty percent) but in creed as well; one of the more radical early theorists, Gross is now among the more reactionary (Gross, 2006). (We can quite coherently talk of Gross₁, to characterize his radical period, and Gross₂, to characterize his reactionary period, with one text in particular marking the dividing line, *Rhetorical Hermeneutics*—Gross and Keith, 1997.) In the prolific interim between the first and third renderings of his signature monographs, Gross engineered a watershed event, for his own work and for the field generally, including known provocateur Dilip Parameshwar Gaonkar in a session (co-organized with John Lyne) on rhetoric of science at a major conference. Gaonkar's long, unremittingly censorious essay on the hermeneutic assumptions underlying rhetorical analyses of science was quickly published, with several similarly polemical responses, in a special number of a national journal (Keith, 1993). Gross then published Gaonkar's essay as the opening chapter of *Rhetorical Hermeneutics: Invention and Interpretation in the Age of Science* (Gross and Keith, 1997), following it with more responses and capping it all with another lengthy essay by Gaonkar responding to the responders. In the wake of *Rhetorical Hermeneutics*, Gross collaborated with Joseph E. Harmon and Michael Reidy on *Communicating Science: The Scientific Article from the Seventeenth Century to the Present* (2002), which is also under review here, with a sketchy history of rhetorical criticism of science foregrounding what Gross sees as a second-wave paradigm for rhetoric of science. He collaborated with Harmon again on an exhibit of scientific texts and images held at the University of Chicago's Joseph Regenstein Library, an exhibit which grew into *The Scientific Literature: A Guided Tour*, the third book presently under review. With Laura Gurak, he edited a special journal number on *The State of Rhetoric of Science* (Gross and Gurak, 2005). Over the same period, Gross also produced an important

collection of essays reexamining the wellspring text of rhetorical theory, *Rereading Aristotle's Rhetoric* (Gross and Walzer, 2000) and a superb little book on one of the 20th century's major argumentation scholars, *Chaim Perelman* (Gross and Dearn, 2003). Both of these books were largely independent of his rhetoric of-science research—along with more than fifty articles and book chapters, some of which have been folded into the books under review, many of which have not.]

Gross has now taken up more fully his long interest in visual semiotics, generating several compelling papers and the soon-to-be-classic book on the topic, again with Joseph E. Harmon, *Science from Sight to Insight: How Scientists Illustrate Meaning*, on which, more below (Gross and Harmon, 2014). A collection with Jonathan Buehl entitled *Science and the Internet: Communicating Knowledge in a Digital Age* is currently in press, and a related book manuscript, with Harmon again, is in the final stages, *The Future is Already Here: The Internet Revolution on Science and Scholarship.*”

[Combine that textual fecundity with his conference attendance, his visiting fellowships, his teaching, and his tireless intra- and inter-disciplinary conviviality, and the conclusion is inescapable: Alan Gross has influenced rhetoric of science as has no one else. There are certainly other productive, front-rank scholars in the discipline, but Gross has lapped the field, as all of them would no doubt cheerfully acknowledge. He is universally admired and beloved. Alan G. Gross? *C'est rhétorique de la science,—presque.*

That *presque*, 'almost,' is razor thin, from the side. But, rotate our angle of vision ninety degrees, and it is also unavoidably wide, for two reasons. First, there is Gross's curious, continuing indifference to the research of many other rhetoricians of science. Second, and surely related, there is the distinctive, if not idiosyncratic, direction he has taken his own primary research. He is by far the largest pike in the pond, but Alan G. Gross is not swimming with the school. There are many factors contributing to the separate and increasingly conservative course he is plotting, but the most obvious reason is the Gaonkar Episode, which reaches directly into the workings of Gross's first book.

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Gross's critical methods in *The Rhetoric of Science* betray an unease about the analytic power of rhetoric not shared by most other practitioners. Aristotle gets an introductory gesture, and is put to sporadic, mostly superficial, work in the book; Chaim Perelman has a minor presence; there is a glance at Kenneth Burke;

and that's pretty much it for the rhetorical tradition. Gross appears more comfortable in the book with the work of Jürgen Habermas, and Victor Turner, and Donald Davidson, and John Searle than with the work of Cicero, or Quintilian, or Hermogenes, or Erasmus, or Melanchthon, or Vico, or George Campbell, or Richard McKeon, or Wayne Booth. Indeed, his eagerness to traffic in the theories of sociologists, anthropologists, and especially philosophers might be one of the factors that has led scholars from those fields to see rhetoric of science as imperialist and Gross as a self-styled conquistador, even though Gross meant his use of such work as a compliment not as an expropriation.]

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Dilip Parameshwar Gaonkar exploited Gross's unease with his own field with his charges of hermeneutic 'thinness' against him and others in the field. But Gross proved to be alone among rhetoric of science practitioners in his anxiety over this alleged flimsiness of the critical vocabulary. ["Gaonkar is clearly good for our business," John Angus Campbell said in his role as the 1998 president of the American Association of the Rhetoric of Science and Technology: "[S]o little are Gaonkar's charges against us believed, and so useful are they in garnering us attention, that we boast of an impressive array of new recruits particularly among younger faculty and graduate students" (Campbell 1999, 101; see also Selzer 1998, 448). Gross found the widespread and forceful rejection of Gaonkar's arguments distasteful, calling the ensuing debate "fruitless [and] ... best forgotten" (Gross and Gurak, 2005, 242).]¹ But the Gaonkar episode marks a sea change in his own work. He characterizes Gaonkar's case as an "admonition" (Gross, 1997, 153) to rhetoric of science, and it would be fair to describe his own subsequent work as "admonished." Also, frankly, in its critical focus and reach, it would be fair also to describe that work as "better."

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¹Gross believes that "ignoring [Gaonkar] ... was the big mistake [by rhetoricians of science]" (Gross [with Beard] 2013, 11:30). But Gaonkar was as far from being ignored as it is possible to be. Most of the major figures responded in one way or another. Gross and Keith (1997) was widely read, widely discussed, widely reviewed. Gaonkar was in the eyes of most of us refuted, not ignored.

[*Communicating Science* examines more than 2,000 articles, representing over three and a third centuries (1665-1995), in three languages (English, French, German), covering the five major branches of science (astronomy, physics, chemistry, biology, and geology), and the five main genres (methodological, experimental, observational, theoretical, and review articles). From this data (drawn, under a random protocol, from a list of elite journals, as identified by Gascoigne 1985 and Garfield 1976), Gross and Harmon read 430 articles, top to bottom, and examined short passages (10 contiguous lines, randomly selected), from around another 1,800, seeking to answer questions about style (lexical and syntactic choice), presentation (arrangement, layout, graphics), and argument (appeals, evidentiary strategies, structure). As Bazerman has noted, the study remains quite preliminary, given the great sweep of the topic, and there are ways the sample might be further mined for the effect of factors such as scientific discipline, genre and arrangement (Bazerman, 2004, 342), but the *Communicating Science* project is very impressive, the accomplishment substantial. On both counts, it amounts to Gross meeting, full on, the challenge Gaonkar raised for him.

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Gross's next book with Joseph Harmon (*sans* Reidy), *The Scientific Literature*, has no heavy lifting to do. It is a wonderfully light complement to *Communicating Science*. Again, the coverage is admirable—not so much in general terms, and every science scholar will find at least a few favorites overlooked, but in terms it shares with *Communicating Science*, well-thought-out sampling criteria. While all of the excerpts are in English, French and German literature is again represented. All of the major sciences are represented, both in overall distribution and in specific sections. There are sections which sample from scientific controversy, with brief series of back-and-forth pieces, and from exemplars of argument structure, and from chronological periods, and from historically important journals, and from different national contexts, and from different reasoning patterns. One section that all readers will turn to eagerly is "Scientific Writing Style: Norms and Perturbations." The pieces illustrating norms highlight features like caution, impersonality, clausal simplicity, lexical density and phrasal complexity. The perturbation pieces demonstrate unusual outbreaks of undisguised belligerence, playfulness, or self-conscious eloquence. There is a charming diagram of an experimental apparatus that appeared in the *Journal of the American Chemical Society* in 1955, which was in almost

every respect typically scientific (abstract, precise, accurate), except that there was a small stick-figure man fishing in one of the flasks (containing a 1% suspension of the algae, *Scenedesmus*, in a 4 mg. KH_2PO_4 /liter solution). Another piece, from a 1935 issue of *Science*, by ichthyologist Hugh M. Smith is a splendid example of *ploche*, *polyptoton*, and *incrementum* in the natural history of fireflies.

The focus of *The Scientific Literature* is the article, in its various subgenres. This makes the book an excellent source of specimens, with useful side trips, embodying the results and arguments of their more scholarly (one is tempted to say the more scientific) collaboration, *Communicating Science*. It is also, aided by Harmon and Gross's very careful (but breezy and elegant) framing, a primer for scientists looking for styles and structures to emulate in their own work. They will be entertained and educated, reading Robert Hooke and James Hutton and Sewall Wright, but they will also find useful models by reading Edwin Hubble and Oswald Avery *et al.* and Murray Gell-Mann, and important lessons on the incorporation of tables, and equations, and images, in reading Dimitri Mendeleev, Albert Einstein, and Richard Feynman. They will find inspiration in reading almost any selection; and they will find, as will you, a very wide-ranging, illuminating, and rewarding explication of the scientific literature, reading the very fine commentaries on these articles by Harmon and Gross.

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In *Starring the Text*, Gross returns to establishing the unique contributions rhetoricians can make to science studies. In fact, he returns to *The Rhetoric of Science* to remove barriers other science scholars might encounter, starting with the belligerence, but much else goes as well. About half of the previous chapters are gone, replaced by newer material. All of the retained chapters are significantly altered, line-by-line and the whole is placed in a very different frame. Gaonkar accelerated the shift, but Gross had started to back away from his constitutive and ubiquity claims within a year of the publication of the first version (e.g., Gross, 1991a, 36), suggesting that he had pushed his claims, and certainly his phrasing, to extremes in a calculated play for the interdisciplinary hearing he did in fact gain. Now, he “excise[s] the radical epistemological inferences that were designed to provoke thought,” while also claiming that his “philosophical position” survives intact (ix), a highly curious stance for a rhetorician to take, and one that *Starring the Text* does not support.

The new title may strike readers unfamiliar with literary studies or semiotics as somewhat peculiar, and certainly it doesn't have the marketing panache of the original title. It derives from Roland Barthes's argument that the first move of semiotic analysis is to feature the text, put it in a starring role, catch it in the spotlight (Barthes, 1974, 13; more particularly, Barthes means dismembered pieces of the text, chunks he calls *lexias*). Gross uses Barthes's notion prominently in the first edition, adopts it for the title of the third version, and prefaces that version with a sketch of its implications (Gross, 1990a, 4). The notion is pivotal to him in the way it clears a space for rhetoric among the disciplines of science studies. Recall the full title of the recent rendition: *Starring the Text: The Place of Rhetoric in Science Studies*. Here is how Gross frames rhetoric in the preface:

Is rhetoric a master discipline, encompassing all others? Of course not. The claim that rhetoric is an intellectual tool useful in explicating the sciences rests on an alternate epistemological vision: an insistence that science is just one way of knowing. This claim in turn rests on a fundamental federalism about the domains of knowledge. In accordance with this federalism, rhetoric produces a knowledge different from that of science, different though not inferior: knowledge of science insofar as science is persuasive communication. Rhetoric "stars" the texts, tables, and visuals of science, that is, it makes their hermeneutic unraveling central. This is its role in science studies as one discipline among many joined in a common enterprise, a confederation of equally sovereign intellectual states: history of science, philosophy of science, and sociology of science. (Gross, 2006, ix; see also Gross, 1990a, 9-10).

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Even more than methodological looseness, Gross is anxious in his current work to repudiate the strong epistemological positions for which his early work became emblematic, deploying his first-generation/second-generation schema to that end. He associates the strong view, that rhetoric is constitutive of science, with the earliest rhetoricians of science—Campbell, Bazerman, Myers, Gross; (Gross, 2006, 5)—and the restraint to “not [to] engage epistemic issues” (Gross, 2006, 17) with two texts he regards as virtually definitional of the “new phase” (Gross et al. 2002, 17): Celeste Condit's *Meanings of the Gene*, and his own

Communicating Science.² And, with *Starring the Text*, he literally rewrites his own legacy, erasing his notorious "[science is] rhetoric ... without remainder" passage (Gross, 1990a, 33; 1992; Gross and Keith 1997, 6; see also McGuire and Melia 1989, 1991, 1995).]

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While Gross is an excellent critic and a careful thinker, that is, while he has a deep appreciation for the power of rhetoric, while he is a pioneer in rhetoric of science and its best known, most dogged proponent, neither his views nor his approach are entirely representative. And his picture of the field is decidedly lop-sided. Rather than demonstrating the limitations of early work, or the effectiveness of Gaonkar's castigation, works like Ceccarelli, 2001, 2013; Condit, 1999; and Fahnestock, 1999—along with several others, like Atkinson, 1999; Bazerman, 1999; Waddell, 2000; Locke, 2002; Harris, 1997, 2005; Scott 2003; Segal, 2005; Shea, 2009; Keränen, 2011; Wynn, 2012, Walsh, 2013, demonstrate the continuing health of the field, its methodological richness and its relevance to apparently recalcitrant fields of discourse like those of the sciences.]

In the time since this review article first appeared *in Perspectives on Science* (Harris, 2009), Gross has continued effacing the rhetorical quotient of his work, still in close collaboration with Harmon, almost to the point of invisibility. They have published a style guide for scientific rhetors (Gross and Harmon, 2010), a rich study of scientific illustration (Gross and Harmon, 2014), and have completed the "Internet Revolution" manuscript (see Gross and Beard 2013, 27:15), as well as a couple of papers (Gross and Harmon 2009; Harmon and Gross 2009). Gross has also published a variety of articles on his own (Gross 2007, 2009a, 2009b, 2010, 2011), as well as co-edited a collection on the internet and science (Gross and Buehl, in press). I have no doubt missed a dozen or so, not to mention the dozen or so more that will surely appear between my completion of this piece and your reading of it.

²As a curious candidate for the Annals of Lumping and Splitting, it is worth noting that in Gross's 1996 entry for the *Encyclopedia of Rhetoric and Composition*, Prelli and Bazerman are lumped together, split away from Gross₁; they are conservative, he radical, about epistemological issues. In *Starring the Text* and *Communicating Science*, all three, including Gross₁, are lumped for their strong epistemological concerns, with the split now at Gross₂ as the conservative.

I will directly address only Gross and Harmon's groundbreaking *Science from Sight to Insight* (2014), both for its considerable scholarly merit and for the diagnostic value it offers on the career trajectory of Alan G. Gross.

Recall that when *The Rhetoric of Science* appeared many of us complained that, as exhilarating as it could be, its critical approach was highly scattershot—some Davidson here, a little Barthes there, some folkloric morphology for this analysis, a helping of sociology for that one, a side order of Geertz with your Turner. It's not that any of us felt the rhetorical tradition was hermetically sealed off from other disciplines; quite the opposite. No field has been more catholic than rhetoric, and rhetoricians of science have been notably interdisciplinary. Prelli (1989) prominently adapts Merton, Myers (1990) significantly deploys Woolgar and Latour, Bazerman (1988) blends Vygotsky and Fleck; and everyone annexes Kuhn's pre-rhetorical insights, often with gestures to kindred suavely inflected science scholars such as Polanyi, Hanson, and Feyerabend.³ Rhetoric of science, indeed, was born when rhetoricians noticed that philosophers, sociologists, and historians of science were talking, in their various dialects, about symbolic inducement. It is, like most subfields of rhetoric, inherently hybridized.

But where Prelli, Myers, Bazerman, and others, built integrated hermeneutic frameworks angled from a rhetorical perspective, Gross skipped from outside theorist to outside theorist in *The Rhetoric of Science* with repeated rhetorical invocations but little attempt at overall coherence. Habermas gave him the ideal-speech-community frame for peer review, and then was gone; Propp showed up to provide a reading of the narrative structure of Watson's *Double Helix*, and then was gone; Turner loaned his social-drama frame for priority disputes, and then was gone; there was no serious attention to cognate concerns or terminologies among these approaches, and minimal effort to accommodate them to the rhetorical tradition. In retrospect, it is easy enough to see this patchiness— despite the accompanying aggressive rhetoric-without-remainder talk—as a symptom of Gross's discomfort with rhetoric as an architectonic art. Indeed, Gross was frank about his disciplinary insecurities at the time, saying the rhetorical tradition

³Gross (1991a, 35) uses the disciplinary openness of the earliest rhetoricians of science to defend his own approach against the accusations that it was a poorly integrated pastiche of exogenous sources. But the accusations did not concern the *use* of exogenous sources, just the poverty of the integration.

was full of second-rate minds and calling his neo-Aristotelian framework in the book “pretty thin gruel” (Gross, 1991a, 35). This characterization—“thin”—was soon echoed by Gaonkar, and in the limiting case, Gaonkar is certainly right. The rhetoric in *The Rhetoric of Science* is thin. This does not mean, however, despite what both Gross and Gaonkar believe, that the rhetoric in the rhetoric of science is thin. As a subfield, it is equally as thick as philosophy, sociology, or history of science (all disciplines which have been known to borrow widely—from each other, from linguistics, from psychology, from computer science, even from rhetoric). One need only look at the work of its finest practitioners—Fahnestock, Ceccarelli, Condit—to see how critically thick rhetoric of science can be. We don’t all measure up to the standards they set, but not every philosopher of science is Nancy Cartwright or Peter Galison either, nor is every sociologist of science Harry Collins or Michael Mulkay, or every historian of science Martin Rudwick or Steven Shapin; yet those subfields are getting along fine.

Rhetoric remains thin in Gross’s work, but not as gruel-thin as in *The Rhetoric of Science*—trowelled-sparsely-over Searle on one page, Quine on another. *Starring the Text* lost some of the vigor of its earlier incarnations, but it gained corresponding rigor. Gross’s work with Harmon is better consolidated yet. The rhetoric in his books and articles now is thread-thin, almost imperceptible in the fabric of his work, but present warp and weft. He has a much more cogent science-studies project now, informed throughout by a rhetorical sensibility familiar from the Burkean mantra, “something of the rhetorical motive comes to lurk in every ‘meaning,’ however purely ‘scientific’ its pretensions. Wherever there is persuasion, there is rhetoric. And wherever there is ‘meaning,’ there is ‘persuasion’” (Gross, 1969 [1950], 172). But Gross elides that middle step. Maybe he even forgets it. The word *rhetoric* is increasingly rare and perfunctory in his recent work, and the machinery of the tradition (with the exception of metaphor and a few other tropes) is absent. The word *persuade*, however, can be found in key locations, and the word *argument* (in a distinctly *New Rhetoric* cast) is ubiquitous. Listen to Gross and Harmon on the goal of scientific communication, for instance—“the end point is always persuasive argument”—and recall that their motivation is to explicate the routes scientists and their genres take to reach that goal (Gross and Harmon, 2014, 14).

Gross and Harmon’s *Sight to Insight* has a tightly charted framework for that explication, illustrated efficiently as a kind of reception process model:

Readers of scientific tables and visuals perform the following tasks: by means of Gestalt patterning they perceive structures and their components; by means of regimes of scanning and matching, they identify the components of these structures; by means of semiotics, they interpret them; finally, by argumentative and narrative means, they integrate these meaningful structures and components into semiotic wholes (Gross and Harmon 2014, 12).

Most cognitivists would be skeptical about the implied sequentiality here; one ‘reader’ might well move in something like a step-wise way through these stages while another might come with basically pre-formed semiotic wholes she maps against the visual, perhaps as a function of indwelling (Polanyi, 1958). A fuller picture of assessing and understanding visuals would see interpretation from the outset, continuously recalibrating as the visual is ‘read.’ Indeed, *interpret* is a much better verb for the overall activity of ascertaining a visual than *read*. It would see scanning and matching as ongoing and revisionary, with various *Gestalt* dispositions at play throughout and semiotic impressions as emerging piecemeal out of a cyclic, contingent, hermeneutic encounter.

What is important about Gross and Harmon’s “synoptic midlevel theory,” though, is not the cognitive realism of its process realization, but the capacity it has for “exegetical enlightenment,” which is greater than any other approach to scientific visuals I know (Gross and Harmon, 2014, 10). Each ‘stage’ of their model is crucial to the exegetical encounter. The *Gestalt* propensities for construing lines of association and dissociation are indispensable for understanding abstract visuals and likely for the fundamentals of realist visuals as well. Scanning and matching optical activity is a material fact that any theory of visuals needs to accommodate. Pierce’s indexical-iconic-symbolic categories neatly parcel out the necessary semiotic landscape. Scientific visuals serve as arguments—or, rather, as encapsulated sub-routines within larger arguments—that build or reinforce (or corrode) causal stories.

Again, however, Gross and Harmon don’t just inventory these components as areas of analysis, or, as the earlier Gross might have, adopt a different approach for each component. They enmesh these components in a coherent matrix of theory, keyed particularly to a dual-coding framework in which visual meaning is not derivative of verbal meaning (or vice versa), which provides a specific mapping of, in Gross and Harmon’s Heideggerian terms, scientific en-framing. They put this model to very good work (taxonomically,

historically, analytically), and while they neither use the r-word very much or very nobly--they like the phrase "hollow rhetoric" so much that they recycle it on pages 15, 162--nor provide any obviously rhetorical readings, they spade up very fertile ground for such readings. The considerable exegetical enlightenment they afford is rhetorically ripe. When Gross and Harmon say, for instance, adopting Lipton 2004's terminology, that "loveliness trump[s] likeliness" (Gross and Harmon, 2014, 133), they are making a deeply traditional rhetorical observation, namely, that aesthetic style is more persuasive than 'reasonableness' when there is a conflict.

I have a story to tell about Gross's antipathy to rhetoric (see Harris, 2009, 372). In 2004, my *Rhetoric and Incommensurability* was in press (Harris, 2005). It is a volume of which I remain shamelessly pleased because of the extraordinarily strong articles I was lucky enough to attract from the reigning heavyweights in rhetoric of science—Bazerman, Campbell, Ceccarelli, Fahnestock, Lessl, Miller, Prelli, Simons, and Gross. While it was in press, Gross published his "Why Hermagoras Still Matters." The article appeared in *Rhetoric Review*. Written for an audience of rhetoricians, it featured one of the progenitors of the rhetorical tradition and focused on a foundational framework of the field that remains highly relevant. It is *about rhetoric*. Gross's argument is not just about why Hermagoras matters, but about (1) why rhetoric matters, (2) why it matters in the analysis of science, and (3) why it should therefore should take its place in science studies alongside history, philosophy, and sociology of science. These are also the precise objectives of my book. There's more: The fulcrum of Gross's argument is that incommensurability is a testing ground for the position of rhetoric in science studies. It is *about incommensurability*. In short, Gross's article—to be as redundant as redundant can be—is *about rhetoric and incommensurability*. Let's recall name of my book again: *Rhetoric and incommensurability*. Here's where it gets troubling: one would search in vain in Gross's article for any mention of *Rhetoric and Incommensurability*.⁴ I know. I did.

⁴Most egregiously, Prelli's chapter, which offers an elaborate case for the relevance of stasis theory to scientific incommensurability, is not mentioned (though his 1989 book gets a wave). Nor do Fahnestock and Secor get the courtesy of an acknowledgement for their 1988 "Stases in Scientific and Literary Argument."

Now, Alan Gross is by no means allergic to self-promotion. Yet he could not bring himself to mention a volume including his work—work, in fact, which put him in the rather heroic role of rejecting the view shared by almost everyone else between those covers. Alan and I exchanged some brief unsatisfying notes about the omission, but a few years later, when he finally did bring himself to mention the book (albeit in a paralipsis), his reasons for that omission became inescapably clear. Like the tasteless jokes of ill-mannered and daffy relatives, some of the things other rhetoricians of science say in public embarrass him.⁵ He dismisses the consensus the book expresses over incommensurability—iterated with considerable evidence, sophistication, and force throughout, by the field’s major figures—as “a view so extreme it can safely be ignored” (Gross, 2006, 181). In short, a group of scholars who virtually invented rhetoric of science are, for Gross, a radical fringe; this, we note, from the one-time bad boy of Rhetoric Unbound, the self-styled champion of “Rhetoric of Science without Constraints” (Gross, 1991c; see McGuire and Melia, 1989, 1991).

But that was Gross₁, the Radical Rhetorician. If Gross₂ is the Reluctant Rhetorician, perhaps we now have a Gross₃, the Null Rhetorician. I once defined rhetoric of science narrowly as the study of science by scholars “who pledge ... allegiance to rhetoric” (Harris, 1997, xvii). By that measure, Gross has left the fold. There is evidence of residual allegiance, but there is no pledge.⁶ Quite the opposite. Maybe the pledge was ‘mere’ rhetoric from the start.

⁵Maybe what he says embarrasses us as well. I certainly wouldn’t include myself in that *us*. I am proud to engage in a scholarly enterprise that includes such a smart, principled, challenging, instructive, erudite, kind, and cantankerous practitioner as Alan G. Gross. But the ARST oral history project expurgates his interview—<http://www.youtube.com/watch?v=KXCZiYVroLc>, linked in this issue as “Alan Gross in His Own Words: An Interview in the Association of Rhetoric of Science and Technology Oral History Project.” In the original, available at <http://ias.umn.edu/2013/09/01/gross/>, Gross makes some contentious remarks about scholars central to the rhetoric of science and to the identity of ARST (Gross [with Beard] 2013, 12:30-13:00).

⁶Aside from the pervasive interest he shows in persuasion, if one reads his and Harmon’s introduction for point of view, one can detect an identification, albeit loosely, with rhetoricians. “[W] have concluded that our object of study has been seriously distorted by a bias we have shared with our colleagues in philosophy, sociology, and history,” they say, “a bias in favour of the verbal” (Gross and Harmon, 2014, 18). The “we” certainly includes Gross and Harmon, but it is a collective “we.” Who else does it enfold? Their articulation of the “State of the Field” evokes Aristotle, Cicero, Perelman and Burke before surveying Bazerman (1988),

But the last thing rhetoricians should take from the erasure of the rhetorical lexicon in Gross's work is a reason to put him aside. Virtually everything Gross has written (excepting perhaps pre-1990 work like Gross and Stacy, 1984) belongs on the shelves of rhetoricians, and this latest book may be the most important of the *oeuvre*. Gross is openly dismissive of 'visual rhetoric' (Gross [with Beard], 2013, 13:40-13:50), again displaying either remarkable negligence of, or remarkable discourtesy toward, his colleagues' work,⁷ and in his visual work with Harmon, they prefer a foundational dependence on that famous traditional repository of visual analysis, philosophy, than on the available frameworks in rhetoric, because "classical works in rhetorical criticism paid little heed to the visual element" and "neither Chaïm Perelman nor Kenneth Burke ... addressed this issue" (Gross and Harmon, 2014, 6-7). But again, make no mistake, he and Harmon go a very long way toward enriching and anchoring a potent visual rhetoric of science.

Nearly twenty years ago, [Gross commented on the intellectual balance-of-trade gap affecting rhetoricians in science studies: "While they readily cite other disciplines, other disciplines rarely cite them." (Gross, 1996b, 627) (Note the antimetabole-antithesis merger here, epitomizing the logic of negated reciprocity). If it does improve, as all of us practicing rhetoric of science believe it should, the new balance will owe a great deal to the tireless, wide-ranging, scrupulous efforts of Alan G. Gross, *la rhétorique de la science. Presque.*] But, we must now add, he is not especially proud of that association, and has abandoned those efforts. Meanwhile, we have

Ceccarelli (2001), Fahnestock (1999), Myers (1990), Moss (1993), Pera (1994), and Scott (1996). Gross, Harmon, and Reidy (2002) are also included. (Mostly, these scholars and their works are brought in to cite their inattention to visuals, and establish a scholarly mandate, though sociologists, philosophers and historians have been largely inattentive to visuals as well.) It is instructive, that is, to see the company Gross and Harmon put themselves in; our peeps.

⁷Just within rhetoric of science, for instance, see Fahnestock's important work on visual figures (1999, 65-67, 82, 98-102, 108-112, 137, 144-147, 174-177; 2003), and such work as Gibbons (2007), Jack (2009), and Walsh (2010). Indeed, see Gross himself, in a slightly better mood, staking a claim for the importance of rhetoric for a full-blooded analysis of visuals (2009b, 150, 156n4), and staking it in *Rhetoric Society Quarterly*, which seems to suggest a willing investment in the visual-rhetoric enterprise. (He does take on the hobby horse of "traditional rhetorical theory," which commits the 4th C BCE sin of not forecasting the suasive dimensions of copper engraving, phototypesetting, vector graphics, and the like; see also Gross and Harmon, 2014, 6-7.)

such exemplary works as Condit (1999), Fahnestock (1999), and Harris (2005) helping to reduce that disciplinary trade deficit, each with growing exogenous citations; and we can look forward to such impressive recent work as Wynn (2012), Walsh (2013), and Cecarelli (2013) to continue reducing the deficit.

Reference List

- Agassi, J. "Review of Allen [sic] G. Gross, *The Rhetoric of Science*." *Philosophy of the Social Sciences* 29 (1999): 329-335.
- "Reply to Professor Gross." *Philosophy of the Social Sciences* 31 (2001): 252-253.
- Atkinson, D. *Scientific Discourse in Sociohistorical Context: The Philosophical Transactions of the Royal Society of London, 1675-1975*. Mahwah, NJ: Lawrence Erlbaum Associates, 1999.
- Avery, O. T., C.M. MacLeod, and M. McCarty. "Studies on the Chemical Nature of the Substance Inducing Transformation of Pneumonococcal Types: Induction of Transformation by a Desoxyribonucleic Acid Fraction Isolated from Pneumococcus Type III." *Journal of Experimental Medicine* 79 (1944): 137-158.
- Barthes, R. *S/Z*. New York: Hill and Wang, 1974.
- Bazerman, C. *Shaping Written Knowledge: The Genre and Activity of the Experimental Article in Science*. Madison: University of Wisconsin Press, 1988.
- *The Languages of Edison's Light*. Cambridge, MA: MIT Press, 1999.
- "Review of *Communicating Science*." *Isis* 95 (2004): 341-342.
- Bazerman, C., J. Little, et al. *Reference Guide to Writing Across the Curriculum*. West Lafayette, IN: Parlor Press, 2005.
- Buchwald, J. Z. "Kinds and the Wave Theory of Light." *Studies in the History and Philosophy of Science* 23 (1992): 39-74.
- Booth, W. C. *The Rhetoric of Rhetoric: The Quest for Effective Communication*. Oxford: Blackwell, 2004.
- Brummett, B., R. L. Scott, T. Farrell, R. A. Cherwitz, and J. W. Hikins. "Forum: Rhetoric as Epistemic." *The Quarterly Journal of Speech* 76 (1990): 69-84, 300-303.

- Burke, K. *The Rhetoric of Motives*. Berkeley: University of California Press, 1969.
- Campbell, J. A. "Darwin and *The Origin of Species*." *Speech Monographs* 37 (1970): 114.
- "The Polemical Mr. Darwin." *Quarterly Journal of Speech* 61 (1975): 375-390.
- "Scientific Revolution and the Grammar of Culture." *Quarterly Journal of Speech* 72 (1986): 351-376.
- "The Invisible Rhetorician: Charles Darwin's Third-Party Strategy." *Rhetorica* 7 (1989): 55-85.
- "The Comic Frame of Rhetoric of Science: Epistemology, and Ethics in Darwin's *Origin*." *Rhetoric Society Quarterly* 24(1/2) (1994a): 27-51.
- "Of Orchids, Insects, and Natural Theology: Timing, Tactics, and Cultural Critique in Darwin's Post *Origin* Strategy." *Argumentation* 8 (1994b): 63-80.
- "Response to Simons." *Quarterly Journal of Speech* 85 (1999): 101-103.
- "The 'Anxiety of Influence': Hermeneutic Rhetoric and the Triumph of Darwin's Invention over Incommensurability." In R. A. Harris (Ed.), *Rhetoric and Incommensurability* (Pp. 333-389). West Lafayette, IN: Parlor Press, 2005
- *On the Frontier of Science: An American Rhetoric of Exploration and Exploitation*. East Lansing, MI: Michigan State University Press, 2013.
- Condit, C. M. *The Meanings of the Gene: Public Debates about Human Heredity*. Madison: University of Wisconsin Press, 1999.
- Dennett, D. *Darwin's Dangerous Idea*. New York, Simon & Schuster, 1995.
- Dobzhansky, T. *Genetics and the Origin of Species*. 1st Ed. New York, Columbia University Press, 1937.
- Fahnestock, J. "Accommodating Science." *Written Communication* 3 (1986): 275-296.

- "Arguing in Different Forums: The Bering Crossover Controversy." *Science, Technology, & Human Values* 14 (1989): 26-42.
- *Rhetorical Figures in Science*. New York: Oxford University Press, 1999.
- "Verbal and Visual Parallelism." *Written Communication* 20 (2003): 123-152.
- "Preserving the Figure: Consistency in the Presentation of Scientific Arguments." *Written Communication* 21 (2004): 6-31.
- "Rhetorical Stylistics." *Language and Literature* 13 (2005a): 215-230.
- "Cell and Membrane: The Rhetorical Strategies of a Marginalized View." In R. A. Harris (Ed.) *Rhetoric and Incommensurability*. (Pp. 390-422.) West Lafayette, IN: Parlor Press, 2005b.
- Fahnestock, J. and M. Secor. "The Stases in Scientific and Literary Argument." *Written Communication* 5 (1988): 427-440.
- Franken, A. *Lies and the Lying Liars Who Tell Them: A Fair and Balanced Look at the Right*. Boston: E.P. Dutton, 2003.
- Gaonkar, D. P. "The Idea of Rhetoric in the Rhetoric of Science." In Gross, A.G. and W. Keith (Eds). *Rhetorical Hermeneutics: Invention and Interpretation in the Age of Science* (Pp. 25-88). Albany: State University of New York Press: 1997a.
- "Close Readings of the Third Kind: Reply to my Critics." In Gross, A.G. and W. Keith (Eds.) *Rhetorical Hermeneutics: Invention and Interpretation in the Age of Science*. (Pp. 330-357.) Albany, State University of New York Press: 1997b.
- Garfield, E. "Significant Journals of Science." *Nature* 264 (1976): 609-615.
- Gascoigne, R. M. *A Historical Catalogue of Scientific Periodicals, 1665-1900, with a Survey of Their Development*. New York, Garland, 1985.
- Gibbons, M. "Seeing the Mind in the Matter: Functional Brain Imagine as Framed Visual Argument." *Argumentation & Advocacy* 43 (2007): 175- 188.
- Gross, A. G. *The Rhetoric of Science*. Cambridge, Harvard University Press, 1990a.

- "Rhetoric of Science is Epistemic Rhetoric." *The Quarterly Journal of Speech* 76 (1990b): 304-306.
- "An English Professor Looks at the Scientific Article: An Essay-review of Charles Bazerman, *Shaping Written Knowledge: The Genre and Activity of the Experimental Article in Science*." *Studies in History and Philosophy of Science* 21 (1990c): 341-349.
- "Response to Harris." *Rhetoric Society Quarterly* 21 (1991a): 35-36.
- "Review of *Writing Biology: Texts in the Social Construction of Scientific Knowledge* by Greg Meyers." *Rhetoric Society Quarterly* 21 (1991b): 82-84.
- "Rhetoric of Science Without Constraints." *Rhetorica* 9 (1991c): 283-299.
- "Review of Jean D. Moss's *Novelties in the Heavens*." *Rhetorica* 11 (1993): 205-207.
- *The Rhetoric of Science*. Second Edition. Cambridge, MA: Harvard University Press, 1996a.
- "Rhetoric of Science." In T. Enos (Ed.) *Encyclopedia of Rhetoric and Composition* (Pp. 622-627). New York: Garland Publishing, 1996b
- "What if We're Not Producing Knowledge? Critical Reflections on the Rhetorical Criticism of Science." In Gross, A.G. and W. Keith (Eds.) *Rhetorical Hermeneutics: Invention and Interpretation in the Age of Science*. (Pp. 138-155). Albany: State University of New York Press, 1997.
- "The Science Wars and the Ethics of Book Reviewing." *Philosophy of the Social Sciences* 30 (2000): 445-450.
- "Review of Jeanne Fahnestock's *Rhetorical Figures in Science*." *Quarterly Journal of Speech* 87 (2001): 231-232.
- "Why Hermagoras Still Matters: The Fourth Stasis and Interdisciplinarity." *Rhetoric Review* 23 (2004): 141-155.
- "Kuhn's Incommensurability." In R. A. Harris (Ed). *Rhetoric and Incommensurability*. (Pp. 179-197). West Lafayette, IN: Parlor Press, 2005.
- *Starring the Text: The Place of Rhetoric in Science Studies* Carbondale, IL: Southern Illinois University Press, 2006.

- “Medical tables, Graphics and Photographs: How they work.” *Journal of Technical Writing and Communication* 37 (2007): 419-433.
- “The Continuity of Scientific Discovery and Its Communication: The Example of Michael Faraday.” *Journal of Biomedical Discovery and Collaboration* 4 (2009a): np.
- “Toward a Theory of Verbal–Visual Interaction: The Example of Lavoisier.” *Rhetoric Society Quarterly* 39 (2009b): 147-169.
- “Rhetoric, Narrative, and the Lifeworld: The Construction of Collective Identity.” *Philosophy & Rhetoric* 43 (2010): 118-138.
- “A Model for the Division of Semiotic Labor in Scientific Argument: The Interaction of Words and Images.” *Science in Context* 24 (2011): 517-544.
- Gross, A. G. With David Beard. “ARST Oral History Project: Alan Gross, Professor of Rhetoric, September 2013. Interview.” <http://ias.umn.edu/2013/09/01/gross/>
- Gross, A. G., and J. Buehl (Eds). *Science and the Internet: Communicating Knowledge in a Digital Age*. Amityville, NY: Baywood, in press.
- Gross, A. G., and J. E. Harmon. “The Structure of PowerPoint Presentations: The Art of Grasping Things Whole. *IEEE Transactions on Professional Communication* 52 (2009): 121-137
- *The Craft of Scientific Communication* (Chicago Guides to Writing, Editing, and Publishing). Chicago: University of Chicago Press, 2010.
- *Science from Sight to Insight: How Scientists Illustrate Meaning*. Chicago: University of Chicago Press, 2014.
- Gross, A. G. and W. Keith (Eds). *Rhetorical Hermeneutics: Invention and Interpretation in the Age of Science*. SUNY Series in Speech Communication. Albany: State University of New York Press, 1997.
- Gross, A. G. and C. S. Stacy. *Write & Rewrite: The Craft of College Composition*. New York: Harper & Row, 1984.
- Gross, A. G. and A. Walzer (Eds). *Rereading Aristotle's Rhetoric*. Carbondale: Southern Illinois University Press, 2000.

- Gross, A. G., J. E. Harmon, and M. Reidy. *Communicating Science: The Scientific Article from the Seventeenth Century to the Present*. New York: Oxford University Press, 2002.
- Halloran, S. M. "The Birth of Molecular Biology." *Rhetoric Review* 3 (1984): 70-83.
- Harmon, J. E., and A. G. Gross. *The Scientific Literature: A Guided Tour*. Chicago: University of Chicago Press, 2007.
- "The Structure of Scientific Titles." *Journal of Technical Writing and Communication* 39 (2009): 455-65.
- Harris, R. A. "Review of *The Rhetoric of Science* by Alan G. Gross." *Rhetoric Society Quarterly* 21 (1991): 32-35.
- (Ed.) *Landmark Essays in Rhetoric of Science: Case Studies*. Mahwah, NJ: Lawrence Erlbaum and Associates, 1997.
- "Reception Studies in Rhetoric of Science." *Technical Communication Quarterly* 14 (2004): 249-255.
- (Ed.) *Rhetoric and Incommensurability*. West Lafayette, IN: Parlor Press, 2005.
- "Alan Gross and the Rhetoric of Science." *Perspectives on Science* 17.3 (2009): 346-380.
- Hasian Jr., M. A. *The Rhetoric of Eugenics in Anglo-American Thought*. Athens: University of Georgia Press, 1996.
- Hyland, K. *Hedging in Scientific Research Articles*. Philadelphia: John Benjamins, 1998.
- Jack, J. "A Pedagogy of Sight: Microscopic Vision in Robert Hooke's *Micrographia*." *Quarterly Journal of Speech* 95 (2009): 192- 209.
- Keith, W. (Ed.) *Special Issue on Rhetoric of Science. The Southern Communication Journal*, 1993.
- Kennedy, G. A. "A Hoot in the Dark: The Evolution of General Rhetoric." *Philosophy and Rhetoric* 25 (1992): 1-21.
- Keränen, L. *Scientific Characters: Rhetoric, Politics, and Trust in Breast Cancer Research*. Tuscaloosa, AL: University of Alabama Press, 2011.
- Kuhn, T. S. *The Road Since Structure: Philosophical Essays, 1970-1993*. Chicago: University of Chicago Press, 2000.
- Lipton, P. *Inference to the Best Explanation*. Second edition. London: Routledge, 2004.

- Locke, S. "The Public Understanding of Science -- A Rhetorical Invention." *Science, Technology & Human Values* 27 (2002): 87-111.
- Lyne, J. "Ways of Going Public: The Projection of Expertise in the Sociobiology Controversy." *Argument in Transition: Proceedings of the Third Summer SCA/AFA Conference on Argumentation*. (Pp. 400-25). Annandale, VA: SCA, 1983
- "Punctuated Equilibria: A Case Study in Scientific and Para-Scientific Argument." *Argument and Social Practice. Proceedings of the Fourth SCA/AFA Conference on Argumentation*. (Pp. 403-419). Annandale VA: SCA, 1985
- "Learning the Lessons of Lysenko: Biology, Rhetoric, and Politics in Historical Controversy." *Argument and Critical Practice: The Fifth SCA/AFA Conference on Argumentation*. Speech Communication Association, 1987.
- Lyne, J. and H. F. Howe. "Punctuated Equilibria: Rhetorical Dynamics of a Scientific Controversy." *Quarterly Journal of Speech* 72 (1986): 132-47.
- Mattila, E. 2005. "Interdisciplinarity 'In the Making:' Modeling Infectious Diseases." *Perspectives on Science* 13 (2005): 531-553.
- McCloskey, D. "Big Rhetoric, Little Rhetoric: Gaonkar on the Rhetoric of Science. In Gross, A.G. and W. Keith (Eds.) *Rhetorical Hermeneutics: Invention and Interpretation in the Age of Science*. (Pp. 101-112). Albany: State University of New York Press, 1997
- McGuire, J. E. and T. Melia. "Some Cautionary Strictures on the Writing of the Rhetoric of Science." *Rhetorica* 7 (1989): 87-99.
- "The Rhetoric of the Radical Rhetoric of Science." *Rhetorica* 9 (1991): 301-16.
- "How to Tell the Dancer from the Dance: Limits and Proportions in Argument about the Nature of Science." In Krips, H., J. E. McGuire, and T. Melia (Eds). *Science, Reason, and Rhetoric*. (Pp. 73-94). Pittsburgh: University of Pittsburgh Press, 1995
- Melia, T. "Review of Dear (1991), Gross (1990), Myers (1990), Prelli 1989." *Isis* 83 (1992): 100-106.
- Meyer, M. *Rhetoric, Language, and Reason*. University Park, PA: Pennsylvania State University Press, 1994.

- Miller, C. R. "Kairos in the Rhetoric of Science." In Witte, S.P., N. Nakate, and R. Cherry (Eds). *A Rhetoric of Doing: Essays in Honor of James Kinneavy*. (Pp. 310-327). Carbondale, IL: Southern Illinois University Press, 1992
- Miller, C. R. "Review Article: The Rhetoric of Science and Persuading Science: The Art of Scientific Rhetoric." *Configurations* 1(2) (1993): 279-282.
- "Classical Rhetoric Without Nostalgia: A Response to Gaonkar." In Gross, A.G., and W. Keith (Eds.) *Rhetorical Hermeneutics: Invention and Interpretation in the Age of Science* (Pp. 156-171). Albany, NY: State University of New York Press, 1997.
- Montgomery, S. L. *The Scientific Voice*. New York: Guilford Press, 1996.
- Moss, J. D. "Galileo's Letter to Christina: Some Rhetorical Considerations." *Renaissance Quarterly* 36 (1983): 547-76.
- Moss, J. D. "Galileo's Rhetorical Strategies in Defence of Copernicanism" *Novità Celesti e Crisis del Sapere* 36: (1984): 95-103. P. Galluzzi (Ed.) Florence: Giunti Barbèra.
- "The Rhetoric of Proof in Galileo's Writings on the Copernican System." *Reinterpreting Galileo*, W. Wallace (Ed.) (Pp. 179-204). Washington, D. C.: Catholic University of America Press, 1986.
- "Newton and the Jesuits in the Philosophical Transactions." *In Newton and the New Direction in Science*. G. V. Coyne, M. Heller and J. Zycinski (Eds.) (Pp. 117-134). Vatican City: Vatican Observatory: 1988.
- "Novelties in the Heavens: Rhetoric and Science in the Copernican Controversy. Chicago, University of Chicago Press, 1993.
- Myers, G. "Nineteenth Century Popularizations of Thermodynamics and the Rhetoric of Social Prophecy." *Victorian Studies* 29 (1985): 35-66.
- "Texts as Knowledge Claims: The Social Construction of Two Biology Articles." *Social Studies of Science* 15 (1985): 593-630.
- "The Social Construction of Two Biology Proposals." *Written Communication* 2 (1985): 219-45.

- “Writing Research and the Sociology of Scientific Knowledge: A Review of Three New Books.” *College English* 48 (1986): 595-610.
- *Writing Biology*. Madison: University of Wisconsin Press, 1990.
- “Review of Communicating Science.” *Metascience* 12 (2003): 374–377.
- Newton, I. *Philosophiae Naturalis Principia Mathematica*. Glasgow: Treuttel & Würz, 1822[1687].
- *Mathematical Principles Of Natural Philosophy*. A. Motte (Trans., revised F. Cajori. Chicago: *Encyclopedia Britannica*, 1952 [1687].
- Parmenides. “Extracts from *On Nature*. D. Gallop, R. D. McKirahan, Jr., J. Barnes, J. M. Robinson and Others (Trans.) http://www.tphta.ws/TPH_ONPP.HTM. Retrieved 5 February 2008.
- Paul, D., D. Charney, and A. Kendall. "Moving Beyond the Moment: Reception Studies in the Rhetoric of Science." *Journal of Business and Technical Communication* 15 (2001): 372-399.
- Perelman, C., and L. Olbrechts-Tyteca. *The New Rhetoric: A Treatise on Argumentation*. South Bend, IN: University of Notre Dame Press 1969 [1958].
- Polanyi, M. *Personal Knowledge: Towards a Post-Critical Philosophy*. Chicago, University of Chicago Press, 1958.
- Prelli, L. J. *A Rhetoric of Science*. Carbondale, University of South Carolina Press, 1989.
- *A Rhetorical Perspective for the Study of Scientific Discourse (Topics, Argument, Invention)*. College Station, PA: Pennsylvania State University Press, 1984.
- “The Rhetorical Construction of Scientific *Ethos*.” In H. W. Simons (Ed.) *Rhetoric in the Human Sciences* (Pp 48-68). London: Sage, 1989.
- Ravetz, J. R. “Just Words.” *Nature* 350 (1991): 30-31.
- Schiappa, E. “Second Thoughts on the Critiques of Big Rhetoric.” *Philosophy and Rhetoric* 34 (2001): 260-274.
- Schrödinger, E. *What is Life? The Physical Aspect of the Living Cell*. Cambridge: Cambridge University Press, 1944.

- Scott, J. B. *Risky Rhetoric: AIDS and the Cultural Practices of HIV Testing*. Carbondale, Il: Southern Illinois University Press, 2003.
- Scott, R. L. "On Viewing Rhetoric as Epistemic." *Central States Speech Journal* 18 (1967): 9-17.
- "On Viewing Rhetoric as Epistemic: Ten Years Later." *Central States Speech Journal* 27 (1976): 258-266.
- "Epistemic Rhetoric and Criticism: Where Barry Brummett Goes Wrong." *The Quarterly Journal of Speech* 76 (1990): 200-301.
- Segal, J. Z. *Health and the Rhetoric of Medicine*. Carbondale, Il: Southern Illinois University Press, 2005.
- Selzer, J. "Scrutinizing Science." *College English* 60: 444-450, 1998.
- Shea, E. P. *How the Gene Got Its Groove: Figurative Language, Science, and the Rhetoric of the Real*. Albany: State University of New York Press, 2009.
- Simons, H. W. "Are Scientists Rhetors in Disguise?" In White, E.E. (Ed.) *Rhetoric in Transition*. (Pp. 115-30). University Park, PA: Pennsylvania University Press, 1980.
- (Ed.) *Rhetoric in the Human Sciences: Inquiries in Social Construction*. London: Sage, 1989.
- (Ed.) *The Rhetorical Turn: Invention and Persuasion in the Conduct of Inquiry*. London: Sage, 1990.
- Solomon, M. "The Whiptail Lizard Reconsidered." *Perspectives on Science* 11 (2003): 318-325.
- Tindale, C.W. *Rhetorical Argumentation: Principles of Theory and Practice*. Thousand Oaks, CA: Sage, 2004.
- Von Mayer, J. R., J. P. Joule, and S. Carnot [with an Introduction by G. Sarton]. "The Discovery of the Law of Conservation of Energy." *Isis* 13 (1929): 18-44.
- Waddell, C. (Ed). *And No Birds Sing: Rhetorical Analyses of Rachel Carson's Silent Spring*. Carbondale, Southern Illinois University Press, 2000.
- Walsh, L. "Before Climategate." *Poroi* 6 (2010): 3-33.
- *Scientists as Prophets: A Rhetorical Genealogy*. New York: Oxford University Press, 2013.

- Whitt, L. A. "Value-Bifurcation in Bioscience: The Rhetoric of Research Justification." *Perspectives on Science* 7: (1999): 413-446.
- Willard, C. A. "Rhetoric's Lot." In Gross, A.G. and W. Keith. *Rhetorical Hermeneutics: Invention and Interpretation in the Age of Science* (Pp. 172-91). Albany: State University of New York Press: 1997.
- Wilson, E. O. *Consilience: The Unity of Knowledge*. New York, Alfred A. Knopf, 1998.
- Wynn, J. *Evolution by Numbers: The Origins of Mathematical Argument in Biology*. West Lafayette, IN:Parlor Press, 2012.
- Wynne, A. "Playing with Fire: Alan G. Gross, *The Rhetoric of Science*." *History of the Human Sciences* 5 (1992): 87-94.
- Yoshihara, Y., N. Hiroshi, and K. Mori. "Sniffing out Odors with Multiple Dendrites." *Science* 291 (2001): 835-837.