

The Prospect of Invention in Rhetorical Studies of Science, Technology, and  
Medicine

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In a recent essay in the *Quarterly Journal of Speech*, E. Johanna Hartelius (2012) argued that rhetorical invention is the foundation of distinctive intellectual and productive contributions of rhetorical studies, reiterating in a different context Floyd D. Anderson and Charles Kneupper's (1980) call for more attention to invention nearly three decades ago. My position is that rhetorical studies of science, technology, or medicine (hereinafter, RSTM) should extend the study of rhetorical invention, whether manifested in the discourses and practices of the natural sciences, the social sciences, or public discourses about science.<sup>1</sup> I will illustrate three broad lines of inquiry without presumption of exhaustiveness to indicate how studies of invention can further contribute to RSTM. Most of this paper is devoted to discussion of the invention of perspectives of or about science, technology, or medicine (hereinafter STM), with more abbreviated discussion of the identification, analysis, and criticism of commonplaces related to STM, and the place of a rhetorical perspective informed by invention in the cross-disciplinary work of STM studies and in collaborative projects with practitioners of STM.

I divide study of the invention of perspective into two distinct approaches: figurative invention and invention of arguments. The study of figurative invention involves inquiry into the creative processes and imaginative practices of figurative language in the invention of perspectives of or about STM, especially including perspectives that adduce claims in STM that are largely taken-for-granted as proven or highly probable. Useful but surprisingly few exemplars of this approach are available. Jeanne Fahnestock's book (1999) on classical figures of thought in science, as well as Hayden White's (1973; 1978; 1999) and Kenneth Burke's (1969) work on the master tropes that presumably prefigure all thought and discourse, are among important resources for this work. Fahnestock (2005; also, more generally, 2011) related the figures to work in the cognitive sciences, and there are general studies of the Vichian tropes in discourse of and about science (Schiappa 1993; Tietge 1998; Smith 1996). Mark P. Moore's tropic studies of synecdoche (1993, 1994, 1996, 2009) in public discourse about matters of science provide exemplars of the kind of detail needed in case studies of the imaginative origins of perspective, whether of or about STM. For instance, I am at work on the invention of ecology during the early decades of the twentieth century, a study that discloses emergence of a plurality of competing ecologies, separable by the tropes that prefigured them (Prelli, 2011).

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<sup>1</sup> Invention was a major focus of rhetorical studies of science in the late 1980s (Gross, 1990; Nelson, 1987, 407-34; Prelli 1989; Simons, 1990). For a useful overview of the field as it stood nearly twenty-five years ago see Campbell and Benson (1996).

Kenneth Burke articulated the terminological operations of master tropes and their prosaic counterparts (1969), and conducted a thorough study of metaphor in relation to its prosaic counterpart, the interested “orientation” or perspective (1984b). The four tropes (metaphor, metonymy, synecdoche, irony) and their prosaic counterparts (perspective, reduction, representation, dialectic) provide a useful critical framework for examining the imaginative origins of invented perspectives. Whenever data and facts become points of contention, especially in public discourses about STM, we can anticipate that participants to the controversy will find themselves involved in a rhetorical struggle to literalize some metaphorical associations as factual and to refigure other facts as metaphorical, if not fictional (Prelli, 2006b). The result of studies of this rhetorical dynamic is no less than disclosure of the creative origins of what subsequently becomes the taken-for-granted data, facts, or concepts or theories, of purportedly authoritative STM in the public domain, if not also in the technical domain.

Studies of figurative invention are also informed by Kenneth Burke’s dramatism. The pentad, recalcitrance, and perspective by incongruity are useful critical concepts for identifying, differentiating, and analyzing perspectives adduced to create or respond to specific problems. The pentad enables mapping of distinct terminological starting points and their extensions to encompass a situation’s meanings (Anderson and Prelli, 2001). Recalcitrance, perhaps the most realistic concept within Burke’s dramatisitic realism, provides a standard for assessing the adequacy of alternative perspectives in coming to terms with, or summing up, a situation’s meaning.<sup>2</sup> Such an assessment reveals recalcitrant factors that “incite” participation, that are disclosed from the terminological vantage of each respective orientation as “correcting” or “substantiating” and, perhaps above all, what recalcitrant factors each perspective discloses for the others through communicative contact and critical conflict.<sup>3</sup> Perspective by incongruity enables rhetoricians to invent perspectives incongruous with those that have become dominant, exposing meanings inaccessible from their terms. Enacting incongruous perspectives points the way toward a dialectic that brings alternative perspectives into communicative contact and, thereby, enables revisions and readjustments that yield more encompassing and matured perspectives.

Detailed work on dramatism in RSTM is rare, though exemplars are available that show its promise. Through pentadic mapping, for example, critics have identified and challenged perspectives that dominate a discourse in terms of a

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<sup>2</sup> McGuire and Melia’s (1989) influential paper that advanced a “modest realism” warranted by Burke’s concept of recalcitrance is at least partly responsible for obscuring that concept’s critical utility in RSTM. They used recalcitrance to chasten rhetoricians for their “rampant rhetoricism,” purportedly restoring proper proportional order to rhetorical studies of science by demarcating where they would lack analytical and critical purchase. It turns out, though, that the realism of *Burke’s* recalcitrance is of a different and more encompassing order than the narrow realist version McGuire and Melia assigned to the term-- a narrow interpretation that, it turns out, was based on a misreading of Burke’s more encompassing rendering of the term (Prelli, et. al., 2011).

<sup>3</sup> The quoted terms are Burke’s (1984b, 47n).

purportedly settled medical science or related established policy.<sup>4</sup> Pentadic mapping has also disclosed that ossified divisions can be transformed through invention of a new terminological starting point that more adequately encompasses a situation.<sup>5</sup>

The creative processes and practices involved in generating perspectives of or about STM can also be examined through a focus on argumentation. This part of the field is thriving, with some scholars finding utility in classical precepts (topoi, stasis) to focus their studies. Others do not use them, at least not explicitly, or allude to them as ancillary to their analytical tasks. Among those putting classical precepts to central use in their work are Graham and Herndle (2011), Prelli (2004, 2005), and Walsh. Those that eschew or make only ancillary use of classical precepts include Lynch (2011), whose study of the “scientific idiom” shows how “real definitions” are generated that, in turn, establish facts about stem cells. That book illustrates the study of the invention of public arguments about STM. So, too, does Keranen’s (2010) work on the contested personae of medical researchers during a public controversy over the legitimacy of influential technical claims, along with their implications for the medical treatment of breast cancer. Wynn’s (2012) book analyzing interrelationships among rhetoric, mathematics, and biological science provides another suggestive exemplar for rhetorical studies of invention that center on arguments that participated in the establishment and change of sciences historically. All three cases alert us to the choices made and deferred that produced the arguments, the distinctive perspectives that those arguments warranted, and the questions those perspectives were adduced to resolve through securing the adherence of audiences – all marks of neo-classical studies of argumentation, though without the telltale nomenclature.

One fertile but untilled area for examining argumentation about STM is the study of claims making in the social construction of social problems (or, more generally, public problems, such as the global warming). Sociologists (Adorjan, 2011; Andreas and Greenhill, 2010; Best, 1990; Gusfield 1981; Perrin and Miller-Perrin, 2011; Waidzunas, 2012) initiated and developed this area of study, while rhetoricians have not contributed studies of their own to the project. For example, Best (2013, 96-104)-- a leader in the field – followed Gusfield (1981) in discussing medical reframing of otherwise moral or political problems, as instanced by the phobia label (“homophobia,” “Islamophobia,”) to construct social problems in terms not warranted by formal psychiatric categorization and diagnosis. Best’s work is difficult to distinguish from that of rhetoricians since they, too, might choose to frame their inquiries using Toulmin’s argument model. Rhetoricians conduct analyses that identify and discriminate among selected and discarded “warrants” or other elements of argument during the process of invention, and examine how arguments so produced constrained the thought and actions of those who became audience to the resultant framings. Best’s work also suggests a distinctive,

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<sup>4</sup> For examples of this sort of work, see Meisenbach, et. al., (2008) and Beck (2006)

<sup>5</sup> For a suggestive and illustrative study of this sort of criticism see Webber (2011).

important focus for the study of invention in RSTM. Rather than limit analysis to public claims making *about* STM, we also could pursue this related question: How were the evidence, concepts, values, and methods adduced as “settling” or “authoritative” STM in public claims making about specific problems generated in the first place? Rhetorical analysis of the argumentation that generated the resources of STM for public claims making about particular public problems can disclose inventional decisions that produced alternatively argued positions, differentiate among those positions according to issues or questions raised and addressed, and assess how and why some positions ultimately appeared in public and policy making discourses while others remained concealed from public view – with, of course, particular attention to consequences for public understanding of the problems framed.<sup>6</sup>

Regardless of whether inventional decisions and practices are examined from the vantage of dramatism, argumentation, or some other approach, an area of RSTM that is sure to generate varied and extensive work in the years ahead is the study of the use of graphics and other visuals or, more generally, *displays*, in generating or establishing perspective (Prelli, 2006a). Harmon and Gross’s forthcoming book, *What One Picture is Worth*, offers a general theory of visual communication within science that will garner attention, though some may find its program seeking warrant from science for critical work unnecessarily confining (see also Gross, 2009a, 2009b). There is other extant work (Fahnestock 2007; Gibbons 2007; Prelli 2006b) relevant to invention and deployment of graphical devices, but it remains clear that examination of graphics in argumentation before technical, public, or both kinds of audience sets a very fruitful theme for future work in RSM. For instance, the so-called climate change “hoax,” purportedly discovered in climate scientists’ emails, upon closer examination could be no more than exposing to public view the routine inventional decisions about how best to *display* data before professional peers. That sort of decision takes me to the *performative* dimensions of rhetorical display, an area that has garnered little, if any, attention in RSTM. Ochs and her colleague’s studies, particularly of physicists’ viewgraphs and rehearsals of their use for subsequent presentation before professional peers, is suggestive for rhetoricians who seek to contribute studies of the invention and enactment of performances of or about STM (Ochs, et. al., 1996 and 1994; Ochs and Jacoby 1997).

The second promising line of inquiry for future work in RSTM is the identification, analysis, and criticism of commonplaces of and about STM. By commonplaces I here mean static and opaque words and locutions that range from the taken-for-granted if not exceedingly banal -- what Jacques Ellul (1968) characterized as “the excrement of society” -- to often repeated expressions that evoke powers of attraction and repulsion or, respectively, god and devil terms (Weaver, 1970). Commonplaces that draw their authority from association with

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<sup>6</sup> For an example of a technical controversy that remains concealed behind public claims making that culminated in the Violence Against Women Act, see my study (2006) of the controversy between “family violence” and “violence against women” researchers.

various fields of STM are varied and extensive and, thus, provide rhetoricians with a never-ending array of possible foci for critical inquiry. Much public, as well technical, discourse betrays a naïve realism that evokes such terms and locutions as though they designated concrete realities. Just look around. Nearly every day at colleges and universities we hear worshipful invocation of the new commonplaces of higher education – “innovation,” “transformation,” “change,” “engagement,” “success” – that however ill-defined or elaborated, have become established as warrants for profiteers to sell services to achieve them “efficiently” or “cost-effectively.” As though that is not bad enough, the commonplaces are adduced as though the result of authoritative scholarship and research. For instance, a recent university’s promotional flyer extolled “creative disruption” as something “scholars” now inform us about, oblivious to its origins as the odious invention of criminal junk-bond king Michael Milken (Christensen and Eyring, 2011, 207-212). College and university administrators nonetheless often knowingly seize upon that new commonplace as an exciting new technique for “reinventing” higher education (with “innovation” achieved by disrupting old-fashioned arrangements that feature tenured faculty, academic departments, and the disciplines those departments represent as authoritative custodians of curricular and other facets of higher education). The new commonplaces of higher education are part of a debased rhetoric of expertise and authority left largely unchallenged. Rhetoricians of STM, by virtue of their training in rhetorical perspective, professional disposition and experience, and inclination toward fairness and transparency, are well positioned to unmask these pretenders and, thereby, work to restore a greater level of reason in deliberations about higher education and other matters of public importance.

Public discourse about STM is permeated with commentaries and assertions presumably authorized as somehow settling some matter of public interest. We hear expert commentaries ranging from daily interpretations of why the stock market gained or declined a few points and recitations of alleged facts about “entitlements” in relation to the national deficit, through representations of the surveilling powers of drone technology and the accuracy and precision of its usage in conducting missile strikes, to scientific categorization of various maladies of body and mind along with ordinal scales for measuring them. All are the result of invention that, necessarily, conceals from public view alternative perspectives toward these varied specific problems. Disclosing the implications of what is revealed and what is concealed from public view seems an important area for extension of RSTM of significant social or political consequence.

I close with the third line of inquiry, captured by this question: How do RSTM relate to cross-disciplinary work with colleagues in other fields of STM studies, as well with scientists and researchers on projects that predominantly *do* STM? “Interdisciplinarity” surely is among the new commonplaces at today’s colleges and universities. Our colleagues in the sciences readily associate “disciplines” with *scientific* specialty areas. Thus, an environmental science or sustainability science project is “interdisciplinary” when it brings together a water person, a wildlife person, a soils person, a forestry person, and so, with sociologists and policy

analysts perhaps added on, especially, if they too, capture the human dimensions of “system” studies in the form of abstract mathematical and statistical metonyms called data. All share the same general *scientific* orientation. Rhetoricians’ work surely could benefit from learning and perhaps conducting statistical analyses, but rhetorical studies are not distinguished by efforts to secure representative samples for testing hypotheses but, rather, through use of a well-chosen sample of one, the “representative anecdote,” whose detailed analysis affords larger-scaled understandings of situated, contextual meanings not accessible to de-contextualized, more abstract, modes of analysis. Rhetoricians can and do learn and conduct work using qualitative social science methods to augment their work, but content analysis, interviews, and ethnography do not distinguish what rhetoricians bring distinctively to such projects.

What distinguishes RSTM is a rhetorical perspective. Rhetoricians study selectivity in the enactment of perspective toward specific problems, whether from the vantage of dramatism, argumentation, or some other approach. Disclosing selections made and discarded unlocks the partiality of perspectives adduced and how those selections operate to induce or warrant adherence from those who become audience to them. A rhetorical perspective toward STM, then, is one that is oriented toward choice making, with its best and most distinctive insights always about the particular case. Disclosing the inventional operations generating perspectives, distinguishing among the alternative perspectives brought into contact, and assessing implications for those who become audience to them, are among the analytical outcomes of distinctively rhetorical approaches. Those outcomes furnish materials for criticism, as well. After all, rhetorical studies are among the humanities, so criticism, as well as analysis, remains a chief task for rhetoricians. These distinctive qualities of a peculiarly *rhetorical* perspective may strike some as altogether too basic and others as, perhaps, outmoded, but that perspective distinguishes rhetorical studies conceptually from all others and does so in language that is readily communicable among ourselves, our colleagues in other fields -- including especially the natural and social sciences -- our students, and the public.

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