

New Rhetorics in New Sciences: Figuration and Knowledge Mediation

Introduction

Classical rhetorical terminology of figuration, with its reliance on the antique-sounding *acyron*, *acolouthio*, and even the evocative *abusio* is a fine location for considering ‘new rhetorics’. It is rhetorical critics and theorists stance on the antique, more specifically—on figuration—that frequently divides them; some critics calling for a sell-off of the old terminology, others advocating a revision of terms, yet others discriminating among tropes and figures to apply to our contemporary exigencies. There are, of course, those who still revel in the antique terminology and advocate its relevance. But, particular fields of application, it is claimed, strain the old terminology and call for the ‘new’.¹ Science, it is asserted, is centrally one of these fields. After all, how can the discourses of a field of inquiry alive only since the 17th century usefully be analysed with terms from the 5th century BCE? This chapter reviews key arguments about the continued relevance of figuration and thematizes figuration as an analytic practice (as opposed to an application) for generating theories of meaning in and about scientific texts. More specifically, I follow a particular cluster of classical figures as they appear in the contemporary context of postgenomic biology, arguably among the ‘newest’ of new sciences. I argue that this cluster of figures helps us chart textual, conceptual and institutional practices in this new science. This cluster of figures and its associated textual, conceptual and institutional work helps us to understand knowledge mediation and in so doing, points to the continued theoretical power of figurative analysis in its classical, enlightenment and postmodern moments.²

Two critics in the rhetoric of science have carefully shown the rhetorical power and relevance of classical modes of analysis, leaning heavily on figuration. Jeanne Fahnestock’s *Rhetorical Figures in Science* and Leah Ceccerelli’s *Shaping Science with Rhetoric* both argue that rhetorical figuration is not only about what appears on the page but about patterns of argumentation, patterns of thought. So, the science of electricity in the 18th century is illuminated in terms of ploche and polyptoton, the interdisciplinary

success of arguments during the molecular revolution in biology are credited to a kind of conceptual chiasmus, aided and abetted by the rhetorical styles of the principle rhetorical actors. In Fahnestock's words, "arguments offered to support a claim are likely to follow certain standard patterns of argument or of common topics, and the common topics can be epitomized in certain figures of speech" (2005, 9). Ceccerelli concurs by pointing out that rhetorical figures such as chiasmus, metaphor, and analogy do cognitive as well as textual work (181). So, both critics give an account of figuration that ties figures to classical patterns of reasoning. Reasoning and its expression in figures, on their view, can be analytically considered to be one and the same rhetorical move.

This is complementary to another view of figuration, a conception in which the rhetorical agent 'thinks with' the figure. This view is common in theorists and critics who point to the role of standard and imaginative figures in aiding scientists to articulate something that has not previously been articulated.³ This moves figuration away from its role of helping to produce evidence or evidentiary structure and into its role in the context of discovery. Debra Journet, a rhetorical critic and theorist, and Evelyn Fox Keller, a philosopher of science, put this in terms of the "conceptual productivity of ambiguity (or semantic polysemy) in scientific texts" (Keller & Lloyd, 3). Keller claims that in contexts where phenomena or processes are ill-defined or previously undescribed, scientists use the "imprecision and flexibility of figurative language" to begin the process of description and analysis while leaving open possibilities for future revision. Journet concurs and concludes her analysis of W.D. Hamilton's construction of the "Gene's point of view" by pointing out that "Hamilton's metaphors present an extraordinary productive sociocognitive resource—a kind of disciplinary and interdisciplinary thinking tool that helps scientists 'grope' toward new understandings of the natural world" (411).

These two overlapping views of figuration in the sciences, and here one must be specific and point out that much work on figuration in the sciences has been done on twentieth century biology, helpfully raise and leave open other possibilities for the role of figuration. These two positions: where rhetorical actors in the sciences use figuration to reason with, as a representation of that reasoning, and as a rhetorical tool to begin the process of representation and explanation in new conceptual fields, map roughly onto the

classical rhetorical tradition of describing figures in terms of their use as figures of speech or figures of thought. As such, they might be identified as a ‘classical’ rhetorical approach. This is not to say that any of these interpretations of figuration stop at the classical; Journet invokes Kenneth Burke to probe the use of ambiguity, Ceccerelli counters contemporary approaches to reading audience by challenging Stanley Fish and Stephen Maillioux, and Fahnestock points to contemporary cognitive theory to ground her discussion of figuration. The point, rather, is that the classical tradition of attention to figuration has continued analytic power and shows evidence of being adaptable to the ‘new rhetorics’ presented in contemporary scientific texts. Journet even brings scientists on-side to champion the analytic power of figuration when she quotes Stephen J. Gould’s appreciation of textual exegesis to “deepen our understanding of history and procedure, but [exegesis] would also help us to judge and analyze such contemporary issues as the logic of selectionist theory”. (Gould in Journet 381). Even some scientists, if Gould is to be taken as an exemplar, might not be inimical to the study of figuration and its work in scientific texts in order to trace the textual and conceptual practices of working scientists.

The discussions of figuration in the work of Fahnestock, Ceccerelli, and Journet are not those envisaged by authors of the ‘new rhetoric’ of the 1960s who suggested that we might need ‘new figures for new times’ or even by some contemporary theorists who wonder at the relevance of rhetoric to new media, new technologies, new ways of thinking ‘the social’ (Gaonkar in Gross and Keith, 27).⁴ Instead, these discussions point to the continued relevance of using figures in an analytic practice to discern the rhetorical appeals in the texts. More importantly, these discussions show that, as an analytic practice, rhetorical analysis centered on figuration is also remarkably flexible. Ceccerelli easily modifies the figure of chiasmus to do the analytical work she requires for interdisciplinary texts. She writes “I propose ‘conceptual chiasmus’ to indicate a rhetorical strategy that reverses disciplinary expectations surroundings conceptual categories, often through metaphor, to promote the parallel crisscrossing of intellectual space” (5). While the classical figure of chiasmus, she acknowledges, is a rhetorical figure where the order of words is reversed in parallel clauses, her ‘new’ version allows the analysis of words and concepts and is analytically more productive for the historical

and rhetorical contexts she follows.

Similarly, Fahnestock's analysis of the preservation of arguments between research reports and their accommodations in popular media, focuses on the issue of core arguments and not solely on finding common figures in each genre. One feature of figuration in Fahnestock's analysis is to show that using a variety of figures does not necessarily produce distortion in scientific texts or their accommodations. Instead, she sees figuration as one of the "necessary steps in making knowledge useful to wider communities." An implication of this approach to figuration is that thinking about the end to which figures are used is crucial to rhetorical analysis. As Fahnestock reminds us, there still exists an attitude about the use of figuration where it suggests an "artful insincerity rather than scientific accuracy" (23). Thus, in scientific reports and papers, one might expect to find that a persuasive end is disguised, and as Fahnestock shows, figural core arguments absent. However, the point I take from this study of research reports and their accommodations is that rhetorical theorists and critics should have license to ask about the persuasive ends of figurative language (illustration, the consolidation of argument, pedagogical ends, and even clarity) and not only about the means (metaphor, synecdoche, metabasis, antithesis and so on). To go one step further, some figuration, then, might be seen as implicit, disguised, or, in Fahnestock's language, not fully epitomized. So in a classical inversion, an examination of the rhetorical ends of a discourse may clarify the rhetorical means. It may also be the case that a cluster of figures does the work that one figure could do. Fahnestock claims that in some contexts, "researchers...readily produce phrasing of which a Renaissance-style master like Erasmus would approve. So it is not the case that they are incapable of producing these forms" (23). It is also not the case, on this reasoning, that researchers are capable of both disguising their rhetorical mastery (indeed, they must if they associate figuration with artful insincerity) and producing rhetorical effects that are the result of a cluster of related figures.

These approaches to figuration in the sciences suggest several ways forward for considering figuration as an analytic practice of a 'new rhetorical' sort. First, figuration in scientific texts is a representation of the reasoning or evidentiary process of rhetorical

actors. This is not to say that rhetorical agents are naïve in their use of figures or even accurate in their representation of their own cognitive practices, but figures remain a textual trace of writer's persuasive choices. As such, rhetorical analysis reveals this representation of reasoning, if not reasoning itself, and discusses the work it does in larger arguments. This treatment of figuration is clearly aligned with classical rhetorical approaches to analysis. Second, figures can be seen as more straightforward rhetorical tools that rhetorical agents use to leave open multiple readings, discourage certain interpretations, encourage consensus, or otherwise appeal to audiences to make particular leaps. This view of figuration is 'new' in the sense that it is more sensitive to audience and the rhetorical positioning of audience through figuration. Both of these orientations, however, build in a considerable amount of flexibility into using figures as part of analytical practice and formalize the audience as a relevant theoretical consideration for discerning how figuration works. With these two analytic trends in mind, I will propose a figural move in contemporary scientific rhetoric that challenges rhetorical analysis to be yet more flexible. My challenge is not altogether unprecedented; Journet suggestively ends her essay on metaphor in evolutionary biology with a summary of what metaphors can do. "In particular," she notes "metaphors can facilitate the ability to *mediate* between physical and symbolic planes—a task vital to many disciplinary texts" (411, my emphasis). Following Fahnestock's lead to look to the rhetorical ends of figuration as well as the means, it is to 'mediation' that I now want to turn.

Mediation

I. Metabasis and the Mediation of Knowledge

There is no one term that encompasses, or could encompass, the range of things we might mean by mediation. The sense of mediation that I use in this paper is the ability of a text to present a range of arguments (about the object of study, methods, techniques, equipment, the role of the researcher, or interpretations) that might be seen to come from different domains, but to rhetorically present its relevance in such a way that readers can see the relationship between these previously disparate claims. To highlight this sense of mediation, I turn to two texts of a particular genre, that of research journal 'front matter' to show the existence, function, and integration of strategies of mediation. The two journals I examine are *Cell* (a leading genomics journal), and *Science* (a leading

interdisciplinary science journal publishing genomics research). I choose only one article in each journal, and although these are fairly representative and high quality, they are selective. The key issue is not ‘representativeness’ per se, but cohesive examples of knowledge mediation at work. In the analysis of these two articles, I am most interested in the cluster of rhetorical figures that can aid in the work of knowledge mediation and that we might expect to see in knowledge areas that are being synthesized.

There are several candidates to help us understand the classical, even formalist roots of a series of figures that get at a contemporary sense of ‘mediation’. First, the figure of ‘metabasis’ gives a good introduction to seeing things ‘in the middle’ of a discourse. Metabasis has its roots in Aristotle and is also discussed in the *ad herennium* and other notable formalisms including those by Ockham and Peacham (Wilson 17, Livesy 127-31). Aristotle’s treatment of metabasis, perhaps, is the most straightforward for my purposes here. For Aristotle, each subject matter had its own principles or causes. It was for Aristotle a serious fallacy to transport techniques germane to one subject matter to another subject matter. Aristotle’s concern (and thus the appellation ‘fallacy’) is that one would bring the standards of one subject matter to bear on another subject matter, in effect doing a form of cross-disciplinary proof. His writings on metabasis are incorporated into his work on proper bodies of knowledge whereby proper disciplines have their own modes of proof and do not rely on importing them from other fields (Livesy 129). But we find this ‘fallacy’ of moving conceptual resources between disciplines, if indeed it is one, a common rhetorical move in contemporary science.⁵ Indeed, it might be credited with much of the so-called genomics revolution. It is the transportation of standards from chemistry and methods from fields as diverse as computational mathematics and field ecology to DNA that allows the ‘listing’ or ‘ordering’ of nucleotide sequences into patterns of information that we call ‘the genome’. These conceptual moves are made, abetted and disguised in rhetorical moves that even Aristotle might have grudgingly admired. I do not mean to suggest that genomics is based on a fallacy; instead, I am pointing to the power of this conceptual move to mediate knowledge from one field to another in productive ways as well as to initiate new disciplinary configurations—the field we are coming to know as ‘genomics’. Metabasis

also is not a straightforward application of techniques from one field to another. The ‘mediation’ alluded to here is both the practice of accommodating these techniques in the laboratory as well as rhetorically accommodating these techniques in the scientific paper, report or review article. The emergent field of ‘genomics’ presents an excellent case for examining mediation of various methods, disciplines, and modes of scientific narration, justification, and presentation of evidence.

The most common and straightforward metabasis in the field of genomics is the move between the yeast, *Drosophila*, mammalian, and human genomes. While authors frequently acknowledge key differences among these genomes, movement of standards and techniques across these genomes has been important to defining as well as solving key questions in the field. For example, it is not unusual to find in review articles comparison of work across genomes such as in this example in *Cell*: “In *Drosophila*, in which homologous chromosomes are paired...”, “The odorant receptor system of mammals provides an ideal case...” This leads to occasional ambiguity about which study was done in which organism or to rhetorically questionable conclusions of the analogical variety—if it happens in yeast, it happens in mice. The way that this occurs in texts is sometimes quite stark. In the *Cell* summary above, a long paragraph describes genomic work on *Drosophila*, mice, and artificial gene constructs before beginning the second paragraph with the view that mammals may indeed be the perfect test case for the issue in question (Savarese and Grosschedl). Reading further, we find the mammal in question to be the mouse. The point is not that there is something wrong with this reasoning, that it does not reflect common practice, or even that the particular organism is important. It is, rather, that the disciplinary matrix of ‘genomics’ is defined by this move. Once a ‘genome’ is identified, comparison becomes possible and comparative questions become meaningful.⁶ The genetics of the odorant receptor system in the mouse can be called upon to answer questions raised by studying the genome of yeast. This is the importance of the metabasis—it reveals an argument structure in which comparisons among organisms is proper, normal, and elucidating of key genetic processes.

Because genomic data was produced at such a rapid rate at the end of the 20th century (and it continues apace), techniques and methods of interpreting the data and ‘working

with it' have been rapidly borrowed or appropriated from other fields of biology and chemistry. Many papers have a metabasis like that in the rhetorical sequence following; "The recent completion of several eukaryotic genome sequencing projects now provides an opportunity to use comparative genomics to study homologous genes in multiple species. Multiple sequence analysis has been used ... but recent interest has focused primarily... We now see the import of expanding this approach by...". This version of metabasis provides a framing narrative for the import and modification of techniques. It acts as an important temporal framing and transition from what was done before to what can now be done in research and as such, it hearkens to the classical rhetorical tradition where transitions were given great weight. But this transition acts not only within the frame of the particular text or argument, but also extra-textually. This form of metabasis is a reflection of the changing nature of research in genomics. It marks not a radical break, but a continuous evolution of applying accepted techniques in new areas and the expansion of the new paradigmatic concerns of genomics.

These short examples are suggestive of the epistemic and rhetorical machinery that the figure of metabasis represents. It is no less than the ability to mediate the knowledge and techniques of multiple fields (genetics, microbiology, molecular biology) and present it in a rhetorical frame of 'nothing out of the ordinary'. It is also a concurrent rhetorical shifting of evidence, citation, and the creation of mini-histories in literature reviews to justify applications in new areas.

II. A Decorous Mediation

Second, there is the notion of mediation as reconciliation, a move away from the *agon* of a discourse. Where do we note such rhetorical moves and how do we understand these? Much ink has been spilled about the attempts of scientific discourse to remove pathetic appeals, to create a Mertonian universal space of discursive norms offensive to none (Montgomery). Indeed, rhetorical objectivity is a stance that authors take to sift through competing claims in scientific texts and orient their work, and their arguments, in a particular direction with reference to others. This is achieved in cohort with the imagined

community of researchers represented in the text through references, the subject position ‘we’ and miscellaneous grammatically hidden members of the audience and research community. This last group figures in rhetorical structures such as “...it remains to be determined whether the sub-nuclear localization of interacting gene loci influences the frequency of associations” (Savarese and Grosschedl) and “Future real-time imaging of interchromosomal interactions, combined with biochemical analysis, will help...” (ibid). Both of these structures leave out the possible agents who will do the ‘determining’ or the ‘future real-time imaging’. Such structures can be seen as straightforward attempts to suggest future research directions and to eliminate the subjects who will go down these future trajectories in standard scientific passive voice. However, they also are positioned as a mild criticism of what the current research lacks. Such civility of tone and criticism is well-taken in new areas, or more to the point of this case, fast-moving areas where data production is in overdrive and a range of interpretations is on offer simultaneously.

The narrative structure of the review articles in *Cell* and *Science* are good cases to probe when looking for the rhetorical function of figures of mediation; indeed, part of their rhetorical function is to mediate among interpretations and thus *review* them. But also, review articles canonize certain interpretations and suggest the way forward given the current standing of knowledge in the field. The Savarese and Grosschedl article in *Cell* quoted above, for example, summarizes and reviews the state of play of cis and trans sequences in gene regulation. Importantly, it is flagging the unexpected results of a paper in the same issue that these authors figure as pivotal moment in understanding gene regulation; “Based on the study by Lomvardas et al. and those of others, our view of cis and trans gene regulation is beginning to change.” Indeed, while this sentence credits a range of sources for the change of view, earlier in the piece, the authors are more laudatory “In this issue of *Cell*, Axel and colleagues (Lomvardas et al., 2006) provide an exciting answer to the long-standing riddle of the choice of OR gene expression by olfactory neurons.” The logic of the Lomvardas discovery is carefully truncated and the key issues flagged for readers: “in their new work, Lomvardas et al examine the possibility...”, “the authors show...”, “Together these data suggested a mechanism,” and “However, a major question remained to be answered...” This storyline follows an ideal

logic of discovery where observations and examinations raised important questions that were then solved by experimental design. References to others in the field are provided to support the opening line “A dogma of biology states that the expression of genes is regulated by DNA sequences that act in cis...”. This dogma, then, is narratively troubled by complicating results that eventually are resolved by the Lomvardas study. The resulting rhetorical image is of a community at work in harmony while some members, crucially Lomvardas (Axel to the author), come forward with surprising results that will answer community questions.

A harmonious rhetoric may not seem so surprising until one considers the views, and the rhetorics, of major players in genomic science outside the pages of *Cell* or *Science*. The Human Genome Project revealed in most popular science outlets (*The New York Times*, *New Scientist*, *Discover Magazine* and on several popular news/entertainment programs) a group of researchers with strikingly different attitudes to research questions and the ends and means of research. Indeed, the end of the *Cell* article by Savarese and Grosschedl results in a claim that a specific approach to genomics is needed; “Future real-time imaging of interchromosomal interactions, combined with biochemical analysis, will help to gain insight into the dynamics of this process and further shift our view of cis to trans effects during gene regulation”. This careful conclusion is advocacy for a way forward, but it also a final metabasis of the fields of imaging and biochemistry. Similarly, the ‘perspectives’ article in *Science* by Snyder and Gerstein ends with an argument for comparison and a justification for the metabasis offered in the article itself; “only through large-scale systematic functional genomics experiments and through careful sequence comparisons against related organisms will we be able to convincingly arrive at a definitive annotation of the human genome.”

III. In Medias Res and the Review Article

Third, there is the epic stylistic tradition of beginning in medias res. From Horace onward, epic begins in the middle of things, throwing the audience or reader into chaos or narrative confusion, only to unravel the proper order of things. The contemporary genomic literature is epic in scope and, perhaps, even in function. If the tradition of the secondary epic, the literary epic, is illustrative here, it is because the rhetorical function

and importance of review articles as knowledge mediators are flagged by the feeling of beginning in the middle of things in the way that many reviews position themselves. “Defining Genes in the Genomics Era” displays the *in medias res* introduction and is a good start to understanding the organization of knowledge in the field of genomics. The authors begin, “A genome is defined as the entire collection of genes encoded by a particular organism. What what is a gene?” Perhaps this would not be disturbing in a textbook or a piece of journalism, but in *Science*, the reader finds themselves somewhat bemused by this opening question. The authors proceed to clarify and reduce this bemusement by giving an historical view of ‘the gene’ and an ordered set of criteria that help to define a gene, even if applying those criteria is not straightforward. The *Cell* article is similar, creating that transition from chaos to order that the figure of metabasis had already begun. The authors start with a ‘dogma of biology’ which is in some disarray by the results of a range of studies. This disarray is put back into order by the results of the study that the authors are introducing in this issue of *Cell*. This rhetorical positioning of the audience ‘in the middle’ of a conceptual proplem is efficient shorthand; ‘you may have thought you knew the dogma, these results challenge that dogma, and this study explains why the challenge stands’. Used repeatedly, as is at least suggested by its use in both *Science* and *Cell*, it suggests a field in transition, and on in which central tenants are being reexamined. Readers, then, are being asked to see the field of genomics research as producing vast amounts of data which in some cases yield theories that contradict ‘best knowledge’ in the field. The view from ‘the middle’ is, to be sure, a complicated picture. However, the epic rhetorical position of *en medias res* allows particular issues to be resolved quite neatly using a conceptual shorthand that associates a paper’s findings with the resolution of confusion caused by a glut of data.

The word ‘decorum’ is infrequently applied to scientific discourse.⁷ However, these figures of mediation suggest a heightened awareness of appropriateness in the review and ‘perspectives’ genres. As Fahnestock points out in her work on accommodations of research articles, the ‘perspectives’ papers in *Science* and the brief reviews in *Cell* serve both specialist researchers and nonspecialist readers. While these genres are closely related to the research report and the two are, as Fahnestock notes, ‘mutually

accountable', these shorter pieces orient readers to the importance, timing, and key contributions of the research paper, but in language that non-specialists can understand. Thus, Fahnestock notes that this genre serves "epideictic and deliberative purposes". She continues,

All of the pieces include some form of context setting, placing the new contribution in an ongoing field to establish its relevance. The reception of the new work is usually laudatory, and it is likely that one of the positive reviewers of the manuscript is recruited to write these pieces. Obviously, there has to be some payoff for praising someone else's work, and that payoff, conceivably, comes in several forms. Some use the occasion to mention their own work, through rarely directly...Some write mini-reviews, aping another well-established science genre, to assess the progress in an area. Many use this privileged space to define ongoing issues or unsolved problems and unfulfilled promises in a field in a way that justifies continuing grant support (13).

All of these features are present in the examples under examination. Their function, at least in the field of genomics, however, appears to also be one of knowledge mediation. The mini-review genre, the praise, and the definition of new issues, while justifying continued grant support, also can serve to create a *raison d'être* of a more conceptual sort in an emerging field. I also see evidence of mediation of a decorous kind; authors attributing value to a range of studies, securing a kind of canonical status for certain studies and removing 'dogmas' that are found no longer true or useful. So, while Fahnestock points to knowledge 'consolidation' among specialist and non-specialist groups, I want to point out the role of 'knowledge mediation' within specialist groups. This knowledge mediation function is achieved rhetorically through the use of metabasis, and the rhetorical function of the *in medias res* introduction and complemented by the decorous attention to multiple audiences and interests in the text.

Conclusion: Knowledge Mediation and Rhetorical Figuration

The quick analysis above is meant to be suggestive and to draw attention to the continued relevance of figuration. Indeed, I tentatively advance the claim that 'new sciences' are

pushing ‘new rhetorics,’ ‘new’ in the sense that the function of figuration serves different ends. And here, the important end that I flag is knowledge mediation. Similar to Fahnestock who optimistically argues that ‘core arguments’ in research papers can be made more accessible to non-specialists by the careful use of figuration, I would argue that figuration is also representing some of the epistemic work that researchers are doing to create hybrid fields of knowledge. By examining the function of that figuration, we see more clearly the epistemic configuration in new sciences like genomics. However, to fully substantiate this claim, rhetorical theorists and critics need to examine further exemplars, the role of figures of mediation (if there are any) in research reports and perhaps even the work of mediation in interpersonal and institutional interaction to establish a range of representations of epistemic work.

These claims, however, are not without import for rhetorical theory. I have, perhaps, pushed the notion of a ‘figure’ further than many critics would allow. Indeed, in including the rhetorical stance of ‘en medias res’ and the issue of a decorous mediation, I might be accused of exiting the discussion of figuration altogether. Perelman and Olbrechts-Tyteca write

Theoretically, there is no structure incapable of becoming a figure by the way it is used, but the mere fact that a use of the language is uncommon does not justify our regarding it as a figure. In order that a structure be a possible object of study, it must be possible to isolate it, to recognize it as a structure; it is also necessary to know in what respect a use must be regarded as unusual. Exclamatory phrases, phrases that repeat words after a hesitation, are structures; but they would only be figures of speech outside their normal use, that is, only when they do not express real surprise or real hesitation. (169)

Their approach is clearly inimical to the one I take here. First, it is not the ‘uncommon’ workings of language where I focus, but those workings of language that represent epistemic moves and commitments. Second, I do not accept that figures are only figures when they are outside their normal use. In this way, I follow Fahnestock, Ceccerelli, and Journet as they use figures as ‘epitomes’ of thinking, and words to ‘think with’. Indeed, metabasis might be seen as a counterpart to Ceccerelli’s conceptual chiasmus. But I may depart their company as well when I freely group a set of figures into a new configuration that I call ‘mediation’. Perelman and Olbrechts-Tyteca would be happy with my

functionalism, but not my use of figuration, but Fahnestock et al may be unhappy with my functionalism. This may be a useful debate to pursue in the contexts of ‘new rhetorics’. What is the goal of studying figuration? It is certainly not in line with the accusation that rhetoricians are ‘trope-counting’. If, indeed, it is the case that new rhetorics push our classical rhetorical categories, we may find that our goal is also more than discerning the rhetorical function of figures inside arguments. We may be looking more toward the epistemic ends represented in figuration and the rhetorical purposes to which they put. This seems promising, especially in areas establishing epistemic norms and synthesizing research traditions. Finally, it may be productive to look at figuration in clusters of terms and rhetorical moves, as here with metabasis, en medias res, and decorous mediation. These forms of knowledge mediation are important as they are traces of epistemic moves made at the boundaries of our knowledge, they imply that rhetorical acumen is not only crucial for persuasion at the level of the interpersonal, but at the level of the field, and they provide a counterpoint to the agonistic motivations of grant-getting, publicity seeking, and empire-building in the sciences. While these motivations also exist, there remains rhetorical space for the mediator at the edge of knowledge.

¹ Chief among recent scholars to be seriously sceptical about classical rhetorical approaches to science is Dilip Gaonkar. His view and contemporary rhetorical critics response to it can be found in the collection edited by Alan Gross and Bill Keith *Rhetorical Hermeneutics* Albany: SUNY Press, 1996.

² To follow the the arguments outlined here into the postmodern arena, I recommend an article by Marie-Laure Ryan “Metaleptic Machines” *Semiotica* 150-1/4 (2004) 439-469.

³ To be clear, Ceccerelli also identifies her approach to figuration in this vein. She insists that the role of rhetorical figuration in the ‘new synthesis’ of biology was to open up multiple reading frames and leave texts open for polysemous interpretation. This

underscores my point about figuration being used as an analytic practice that both finds meaning in the texts and represents ways of thinking and arguing in the text's production.

⁴ Chaim Perelman and Olbrechts-Tyteca in their important *The New Rhetoric: A Treatise on Argumentation* allude to the demise of figuration when they break from the centuries-old practice of discussing each figure to a paired-down description of those that are important *qua* argumentation.

⁵ Livesy helpfully points out that Aristotle's rigid and negative view of metabasis and disciplinary knowledge was already under threat in the Medieval period, so it should be no surprise that contemporary science does not see it as a problem at all (143).

⁶ Ironically, the emergence of a unit of research called the 'genome' has raised numerous questions about the previous 'unit' of genetic analysis, the 'gene'. For example, "A genome is defined as the entire collection of genes encoded by a particular organism. But what is a Gene?" (Snyder and Gerstein) Authors use this irony for particular rhetorical effect—to show that the field of 'genomics' has moved on from the analysis of genes and on to what Snyder and Gerstein call "large-scale systematic functional genomics".

⁷ The key exception is Steven Shapin's *A Social History of Truth* which aligns decorum with honesty and truth-telling in early science through the rhetorical category of testimony.