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An Informal History of Classical Rhetoric for Mathematicians (Plato and Aristotle)

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Rhetoric, “the art of persuasion,” gets a bad rap among workers in the mathematical sciences. This is unfortunate, since although mathematics is concerned primarily with the demonstration of formal truth, mathematicians do live in the world and need to concern themselves with persuading students, business agents and others not on the mathematical team of the importance of their enterprise. The natural revulsion among keepers of the flame of formal truth for the dirty instruments and forms of public persuasion is a handicap (not fatal yet, perhaps, but a handicap nonetheless) in attracting students and obtaining public support. Thus, a brief history of the origins of rhetoric and its relation to the development of logic—mathematical and otherwise—can be useful in providing a view of the relation between those two integral arts of “fixing” belief, to use the term favored by the philosopher and mathematician C.S. Peirce.

Rhetoric had its institutional roots in the political chaos in Greece around 400 B.C. following Sparta’s defeat of Athens and the temporary collapse of democracy. Although the models of expression favored by rhetoricians trace back to Homer and the oral tradition of heroic action and expression, the availability of tutoring in rhetoric is tied to the period of the restoration of democracy after the oligarchic tyranny following the defeat of Athens. During the tyranny, arbitrary seizure of property and assassination were common, and, as in recent history in South Africa and Central America, injustices filled lists waiting for redress.

With the restoration of the democracy, courts were established to hear claims and grievances. These courts, in the Athenian pattern, did not have established officers, such as judges, prosecutors, and licensed defense lawyers. They were made up of groups of citizens—as many as fifty—who listened to the grievances of citizens and the defenses of those accused, and delivered judgment on the spot. In this situation, cleverness in speaking would provide a strong

advantage for plaintiffs and accused, and as in courts today, the expression of pain and suffering would carry a lot of weight. Not surprisingly, some entrepreneurial individuals offered lessons in speaking to get maximum benefit from these situations. The best known of these individuals are Corax and Tisias, to whom the art of rhetoric is traced by Aristotle.

Imagine the typical case. The “jury” of 50 men sits in an open theater of sorts while the plaintiff explains how his brother was beaten to death and his home seized by the defendant. In his complaint he goes into great detail about the agonizing pain his brother suffered, the misery of his brother’s wife and children in the loss of their father, the humiliation of their loss of privilege and income, the jealous glee of the executors of the forfeiture and the illicit pleasure they take in the property to which they have no right—all of this aimed at arousing the active sympathy and outrage of the jury. The defendant parries in the same terms, pointing to injustices committed by the dead brother that earned him his fate, the insult and pain caused by the present claim, the well-known skuldugery of the plaintiff, and how the misery of the defendant’s wife, children and father was due to the wretchedness of the home forfeited to the defendant which has since been transformed through considerable effort, expense and good will within the last ten years into a location of public hospitality.

Since such skill in arguing had a substantial value, it became a major part of the educational framework. Teachers of the youth of Athens were expected to provide experience and training to prepare men to defend themselves against complaint, much as it was expected that young men would learn to defend themselves with weapons. It is hardly surprising then that the youthful Plato, in observing such processes, would be appalled that this could be considered a form of Justice, a search for Truth. And so rhetoric as an art became the target of special scorn as an educational

discipline because of its claim to discover truth and further justice. In his dialogues on rhetoric, specifically the *Gorgias* and *Phaedrus*, Plato has Socrates attack common rhetorical practice as training in making the worst appear the better cause. This competed with training in reasoning, which he called dialectic. (Although this is a yawning term, cruising across philosophical trade routes, it can generally be taken to mean discussion logic, or finding questions for exploratory discussion.) Plato wanted to ask questions and shape definitions to clarify and comprehend Truth, Justice, Virtue; in his Academy the mode of dialectic was the foundation of education.

Fortunately for the western world, one of Plato's students and teaching assistants at the Academy was Aristotle, who took a different view. Aristotle was interested not just in the essential truth and falsity of methods of thinking and knowing, he was also interested in describing how things worked, practically. Aristotle's *Rhetoric* seems to have been an outgrowth of his discussions of rhetoric at the Academy. (Plato must have decided that the Academy needed to have instruction in rhetoric to attract students, but he was darned if he was going to do that, so he gave the job to this talented junior staffer.) Aristotle's approach was neither to teach merely the Coraxian tricks, or critique the practice of such tricks, but to ask: what kind of thing is rhetoric? And his explanation in the *Rhetoric* and the larger *Organon*, of which it is essentially a part, can be read as an answer to Plato's concerns, an answer that in a sense follows Plato's method.

"Plato!" he seems to say, "hold on a minute—you are getting some things mixed up! First of all, you define rhetoric in terms of the example of these court proceedings. That's far too narrow a definition. Rhetoric should be described in terms of its situation and its appeal. Those court proceedings are examples of speech in judicial situations emphasizing an appeal to audience emotion. The jury isn't trained, they have no standards of justice, no code to enforce, so naturally the most effective appeal is to their sympathy and anger. But surely that doesn't define the only type of speech a citizen needs to do." In a wonderfully

simple yet profound set of categories, Aristotle establishes an observation that speech situations are either judicial, deliberative, or ceremonial (epideictic). Judicial speech aims at accusing someone of crimes they have committed in the past; deliberative speech aims at recommending policy for the future; and ceremonial speech aims at praising or blaming a person for their character. These are the only types of speech that operate with the public at large. Within any of these categories (think: rows), one may use one of three different appeals (think: columns) that are grounded in the speaking situation. One may appeal to the feelings and perceptions of the audience (pathos), as in the court speeches that so appalled Plato. But one may also base an appeal on one's own character or reliability (ethos), or on the argument or evidence (logos).

In response to Plato's identification of rhetoric with basically a single mode of speech (judicial aim with emotional appeal), Aristotle's definition of rhetoric is a full grid with lists of terms expanding each of the nine cells of the grid. Aiming at comprehen-

siveness of description, he expands the audience appeal, for instance, from appeals to anger and sympathetic sadness to a full description of the kinds of associations and perspectives different audiences tend to share. One might say that in so doing, he wrote the first descriptive psychology. For example, for old men, happiness takes the form of protection or successful children while for young men it might be challenge or opportunity to achieve honor. So if you are speaking to an audience of senior citizens, be aware of this difference in shaping your material. Young men tend to pay more active attention to personal slight than old men, who feel more secure in their established reputations. This sort of listing-out description easily expands into an outline that fills several hundred pages without very much analysis or detailed development.

But defining rhetoric is only part of Aristotle's response to Plato. Secondly he points out that it is necessary to distinguish between persuasion relative to the community at large, and persuasion within a field of shared assumptions in a particular investigation—i.e., within a discipline. Within a field of exploration,



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individuals share common terms and assumptions from which they discover new truths or facts, and within which they give value to certain observations. Since those assumptions, truths, and facts are not universally known, the truth of in-discipline reasoning is not self-evident to society as a whole. Assumptions may be passed on with the authority of the discipline, and thus may not be questioned by the masses, but that is due to the enforceability of authority, not to their reasonability. Aristotle's presentation of logic in the *Organon* and the *Rhetoric* assumes that Plato's model for reasoning is the basis for the development of a discipline, a science. If one assumes, as scientists and mathematicians too frequently do, that the principles and assumptions of scientific discourse are self-evident in the public arena, one tends to lose debates.

In his discussion of Logic in the *Organon* (Topics, Categories, Prior and Posterior Analytics), Aristotle retains this distinction, setting up syllogism as a method of reasoning from demonstrated premises to demonstrable conclusions, and setting up dialectic (the basis of logos in the *Rhetoric*) as discussion from common assumptions and opinions that are simply accepted without needing to be demonstrated. Thus, in doing rhetoric, you argue from your audience's opinions. In science, you argue from demonstrated truths. However, one must note that just as some audience opinions may be wrong (and the ethical character of the speaker may be sacrificed in the long run if audiences perceive him/her to be relying on audience beliefs that he/she knows are wrong), demonstrated premises may in the future be discarded by a scientific community -alchemy, for example. Aristotle points out that rhetorical argument aims to persuade audiences, not

to do science. Rhetoric (and dialectic) is about public speaking (and informal discussion), not about understanding the nature of the mind, insects, the weather, or morality.

However, Aristotle does point out that rhetoric and dialectic can play a role in discovering truth. These subjects are useful in education (= propaedeutic), and they can be useful in assessing first principles or premises. The problem with first principles is that they have not been demonstrated to be true. Rhetoric and dialectic cannot demonstrate their truth—nothing can. But rhetoric and dialectic can assist in comparing the meaning and effect of statements of first principles, and there are advantages in being able to do that. It is easy to explain the particular balance between dialectic and syllogism in the medieval age given its pre-scientific situation and the dominance of religious perspectives in education and social understanding. The classical model for educated discourse provided in Aristotle is a complex weaving of social practice and theoretical understanding that values both. Since Descartes and Bacon, the balance in our mode of discussion has been shifting toward emphasizing and valuing scientific rather than rhetorical reasoning. As a result, educated discourse has become more arcane and alienated from the common discourse. The classical model of the Greeks provides a guide to righting this balance with the assumption that any educated person needs to be able to operate in both public and within-discipline modes. Not being able to do so constitutes a cultural handicap which we must define our educational principles and educational principles and methods to correct.

A Collection of Ideas on Systems and their Extensions

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way to extend the human plane in a new dimension.

This leads, almost invariably it seems, to competing claims as to which extension is the correct one. This is rather hard to avoid when various of these posited gods each reveal to a chosen messenger on earth that it is the one true god and that all others are the invention of man.

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