

What did Aristotle really say about Ethics and Technology?

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I. Introduction

This paper makes the argument that, to revive the faculty of deliberation in practices overtaken by exact forms of technical reasoning, ethicists must follow Aristotle in claiming the development of technical rationality within technology and productive work as a philosophical concern.

A central project of several 20th century philosophers has been the rehabilitation of practical moral reason amidst the contemporary expansion of technical, instrumental reason in everyday affairs. This distinction between practical reason (*phronesis*) which directs human action (*praxis*) and technical reason (*techne*) which directs making (*poiesis*) finds its original articulation in Aristotle. While these contemporary philosophers look to Aristotle as the primary source for this distinction, they generally find in Aristotle different flaws that contributed to the ultimate subjugation of *phronesis* by *techne*.

While Arendt appeals to Aristotle to renew the concept of *praxis* as distinct from *poiesis*, she sees the “abasement” of *praxis* as resulting in part from “its derivative, secondary position” to *theoria* in Plato and Aristotle.¹ MacIntyre revives and hopes to preserve Aristotle’s notion of *phronesis* by preserving authentic practices, which are the site of phronetic reasoning, during the current Dark Ages of bureaucratic rationality. However, Aristotle’s elitist “blindness”, according to MacIntyre, keeps him from seeing that practices, and not the “unhistorical...fixed natures” of free men, provide the occasion for phronetic reasoning.²

It is the proposal of this paper that Aristotle’s relevance to this contemporary project goes beyond providing the original articulation of the distinction between *phronesis* and *techne*. His extended analysis of technical deliberation clears the way for practitioners to reject the standard of epistemic exactness for practicing their craft rationally and with excellence. Deliberative *techne* is inquiry that brings incomplete knowledge, refined from previous particulars, to bear on a new particular, in order to achieve the shared end towards to which the *techne* and the particular are both oriented.

II. The analogical structure binding *techne* and *phronesis* in Aristotle

According to Aristotle, there are two parts of the rational soul, the scientific and the deliberative, with the deliberative part being concerned with what admits of being otherwise. *Techne* and *phronesis* are the two states of the deliberative part of the rational soul, distinguished according to the activities with which they are concerned - production and action.³

¹ Hannah Arendt, *Human Condition*, (Chicago: University of Chicago Press, 1998), p. 32.

² Alisdair MacIntyre, *After Virtue*, (Notre Dame: University of Notre Dame Press, 1984), p. 159

³ “For production has its end in something other than itself, but action does not, since its end is acting well itself”. All quotes from *Nicomachean Ethics* (NE) are from the translation of Terence Irwin. Aristotle, *Nicomachean Ethics*, (Hackett Publishing, 1999), NE VI, 5, Sec 4, 1140b7. This recalls the same distinction made at the opening of NE, “the ends appear to differ; some are activities, and others are products apart from the activities”. NE I, 1, Sec 2, 1094a4

This is often taken to be a hard distinction between *techne* and *phronesis*. In fact, Aristotle appears to devote all of NE VI 4 to repeating this distinction, adding for clarification, “Nor is one included in the other”.

Analogy However, there are several features of *phronesis* in which *techne* has a share. The use of the phrase, ‘has a share’, is intentional here, as the relationship between *techne* and *phronesis*, between the crafts and the virtues of character, is clearly one of *techne* participating in certain perfections but to a lesser extent than does *phronesis*. These perfections, such as the good, are thus analogical terms whose meaning is both the same and different according to the various practical sciences that participate in them.

The central perfection that guides the *Nicomachean Ethics* is the good, and it is only through studying activities that seek some good that the essential features of the good become clearer. “[F]or we must use evident cases as witnesses to things that are not evident”.⁴ This is the manner in which all analogical concepts are better understood, whether they be truth, justice, beauty, and so on, and is the manner of argument that we observe throughout the *Ethics*.

We learn in this manner from the *Ethics* that all activities seek some good, but that the goods that they seek are not homonymous. They are analogous, which means that the goods that various activities seek all participate in the same perfection of the good, though in different and limited ways. We also learn through analogy with *techne* that the good depends on the function of an activity⁵ and completing that function well,⁶ that acting well (with virtue) results from habit,⁷ and that acting well also results from aiming at a *kairos*, a mean relative to us.⁸

As was said before, though, *technai* participate in these perfections to a more limited extent than does *phronesis*. Whereas the good is something self-sufficient, the goods that are sought by the *technai* are more limited, being usually subordinate to higher goods for the sake of which they are pursued. The goods pursued by *phronesis*, as virtues of character, are not separate from the actor and are thus self-sufficient.

⁴ NE I, 2, Sec 6 1104a14-15

⁵ “For just as the good, i.e., [doing] well, for a flautist, a sculptor, and every craftsman, and, in general, for whatever has a function and [characteristic] action, seems to depend on its function, the same seems to be true for a human being, if a human being has some function”. NE I, 1, Sec 10 1097b25-29

⁶ “Now we say that the function of a [kind of thing] – of a harpist, for instance – is the same in kind as the function of an excellent individual of the kind – of an excellent harpist, for instance....Moreover, we take the human function to be a certain kind of life, and take this life to be activity and actions of the soul that involve reason; hence the function of the excellent man is to do this well and finely”. NE I, 1, Sec 14 1098a8-15

⁷ “Virtues, by contrast, we acquire, just as we acquire crafts, by having first activated them. For we learn a craft by producing the same product that we must produce when we have learned it; we become builders, for instance, by building, and we become harpists by playing the harp. Similarly, then, we become just by doing just actions, temperate by doing temperate actions, brave by doing brave actions”. NE II, 1, Sec 4 1103a32-1103b2

⁸ “Good craftsmen also, we say, focus on what is intermediate when they produce their product. And since virtue, like nature, is better and more exact than any craft, it will also aim at what is intermediate”. NE II, 6, Sec 9 1106b14-16

Similarly, many *technai* aim at an inexact *kairos*, that is, at an opportune moment with an opportune measure of activity. *Phronesis* too aims at an inexact *kairos*, though not in terms of a material mean but a mean between an excess and deficiency of feelings.

Two technes The varying extent to which *technai* share in these features of the good accounts for the apparent equivocation in the meaning of *techne* throughout the *Ethics*. For there appears to be two types of *technai* in Aristotle, one that is indeed very different from *phronesis* and one that shares a lot with *phronesis*.

The first type of *techne*, which we may refer to as exact *techne*, overcomes chance (*tuche*) with exact knowledge. It participates the least in these features of the good and thus contrasts most sharply with *phronesis*, due in particular to its requirement of exactness (*akribes*) and elimination of chance.

Lettering and stoneworking are *technai* identified by Aristotle as capable of this exactness, and for which aiming at an opportune time and measure is unnecessary. Aristotle identifies exact crafts as most truly crafts.⁹ This appears to appeal to another perfection, in terms of which *techne* had been defined by Aristotle's predecessors, that of epistemic science.

The second type of *techne*, which we may refer to as deliberative *techne*, sets itself apart from exactness and participates more fully in the features of the good that we see most perfected in *phronesis*.

There is no deliberation about the sciences (*episteme*) that are exact and self-sufficient, as, for instance, about letters, since we are in no doubt about how to write them. Rather, we deliberate about what results through our agency, but in different ways on different occasions – about, for instance, medicine and money making. We deliberate about navigation more than about gymnastics, to the extent that it is less exactly worked out, and similarly with other [crafts].¹⁰

Aristotle does define *techne*, but only according to its essential components such that both the exact and deliberative *technai* encountered above are included.

Aristotle defines *techne* as “the state involving reason and concerned with production”¹¹ and both deliberation and exact epistemic thought are types of discursive reasoning (“good deliberation requires reason (*logos*); hence...it belongs to thought (*dianoia*)”¹²). And there is no indication that a *technai* must be exact in order to be *technai*, as Aristotle maintains that “we would not seek the same degree of

⁹ Aristotle asserts that “We ascribe wisdom in crafts to the people who have the most exact expertise in the crafts” (NE VI, 7, Sec 1, 1141a10) and that “Those occupations are most truly arts in which there is the least element of chance” Politics 1258b35-36 *The Complete Works of Aristotle*, ed. Jonathan Barnes (Princeton: Princeton University Press, 1984).

¹⁰ NE III, 3, Sec 8, 1112b1-7

¹¹ NE VI, 4, Sec 2, 1140a4-5

¹² NE VI, 9, Sec 3, 1142b12-13

exactness...in the products of different crafts".¹³ Thus, both of the forms of *techne* introduced in the *Ethics*, exact and deliberative *techne*, appear to be included in Aristotle's definition of *techne*.

In fact, maintaining two Aristotelian notions of *techne* is the only way to make sense of his claim that certain activities "fall under no craft or profession; the agents themselves must consider in each case what the opportune action is, as doctors and navigators do".¹⁴ To say that a *techne*, such as medicine or navigation, falls under no *techne* clearly appeals to two distinct modes of *techne*.

The tolerance of inexactness in Aristotelian *techne* thus stands in sharp contrast to the intolerance for inexactness found in contemporary technical reason.

III. Inexact *techne* in Aristotle and his predecessors

Aristotle's tolerance for a high degree of inexactness in *techne* is historically significant, given the debates over exactness and the crafts in ancient Greece. The contemporary ethical project to challenge the dominance of instrumental reasoning, of technique, thus finds a parallel in debates that provided the context for Aristotle's *Ethics*.

Pre-Socratic *techne* The only ancient treatise devoted to *techne*, the Hippocratic text *On techne*, is written specifically to address the attack on many forms of *techne*, including medicine, that they are too vulnerable to chance and are thus not truly *techne*.¹⁵

The response of *On techne* is not to find a place for chance or inexactness within medicine done well, but to affirm the critique's ideal of a *techne* devoid of chance. The author maintains that neither illness nor health is ever the result of chance "for everything that occurs will be found to do so through something". Just because the causes of illness are "obscure does not mean they are our masters".¹⁶

The author of *On techne* thus defines *techne* as having an "exact measure (*orthos horos*), for "where correctness and incorrectness each have an exact measure, surely there must be an art".¹⁷

Another pre-Socratic text, *On Ancient Medicine*, forgoes the standard of *orthos horos* in favor of rules of thumb accumulated through inductive generalization over long periods of time. Lack of exactness is thus acceptable to the author of *On Ancient Medicine*, as well as to other ancient advocates of an empirical approach to skills.

Polus, who was Socrates' adversary in the *Gorgias*, argued in a book¹⁸ that skills are just rules of thumb based on experience. "There are many skills among mankind, experimentally devised by experience, for experience guides our life with skill, but inexperience guides our life with luck".¹⁹

¹³ NE I, 3, Sec 1, 1094b13

¹⁴ NE II, 2, Sec 4, 1104a6-7

¹⁵ "because not all are healed, the art is blamed, and those who malign it...assert that those who escape do so through luck, and not through the art". All quotes from *On Techne* are from the translation of W.H.S. Jones, Hippocrates, *Hippocrates*, (London: Heinemann, 1923), IV 4-8.

¹⁶ On Techne, XI 4-5

¹⁷ On Techne, V 30-32

Platonic *technē* Plato enters this debate firmly on the side of *technē* as a paradigm of exact knowledge. Plato's Socrates equates *technē* and *epistēmē* repeatedly,²⁰ and allows no role for *tuche* in *technē*.²¹ However, Plato deepens the basis for epistemic knowledge in a *technē* with his consistent appeal to *technē* as knowledge of causes or accounts.

In the *Laws*, the Athenian contrasts “those doctors who are innocent of theory and practice medicine by rule of thumb” with the “gentleman doctor” who acts “almost like a philosopher, engaging in a discussion that ranged over the source of the disease and pushed the inquiry back into the whole nature of the body”.²²

Hutchinson remarks that Plato was clearly “taking sides in a fourth-century debate...about the nature of the skills of medicine, rhetoric, divination and others whose practitioners had an obviously imperfect rate of success”.²³ In fact, we see the same debate between Plato and his interlocutors about rhetoric as about medicine.

The sophist Isocrates argues in his *Against the Sophists* that one finds “the ability to make speeches and all other practical skills in those who are well endowed by nature and who are trained by experience”.²⁴ Isocrates argues elsewhere that “it is much better to have sound opinions about useful things than to have exact knowledge about useless things”.²⁵

In the *Gorgias*, Socrates replies to Isocrates that the rhetoric taught by Isocrates “seems to be a craft, but in my account of it it isn't a craft but a knack and a routine”.²⁶ The rhetoric of the sophists, like the medicine of the empiricists, is not a *technē* for Plato because it is not an exact *epistēmē*.

Plato affirms the standard of exactness for all skills in the *Philebus*. After distinguishing the “disciplines to do with knowledge” into “productive” part and the part “concerned with education”, Socrates inquires “whether within the manual arts there is one side more closely related to knowledge itself”.²⁷

¹⁸ *Gorgias*, 462b10-c3

¹⁹ *Gorgias*, 448c4-7

²⁰ *Theaetetus* 146d-e, where Socrates describes cobbling as “just knowledge (*epistēmē*) of the making of shoes” and carpentry as “simply the knowledge (*epistēmē*) of making wooden furniture”.

²¹ “experience...causes our times to march along the way of *technē*, whereas inexperience causes it to march along the way of *tuche*”. *Gorgias* 448c

²² *Laws* IX, 857c5-d3 Elsewhere the Athenian describes slave doctors who “pick up the skill empirically, by watching and obeying their masters; they've no systematic knowledge” and “never give any account of the particular illness”, “he simply prescribes what he thinks best in the light of experience...with the self-confidence of a dictator”. *Laws* IV, 720b2-c7

²³ “Doctrines of the Mean and the Debate Concerning Skills in Fourth-Century Medicine, Rhetoric and Ethics”, D.S. Hutchinson, p. 26

²⁴ *Against the Sophists*, 14

²⁵ *Helen*, 5

²⁶ *Gorgias*, 463b3-4

²⁷ *Philebus*, 55d1-7

If someone were to take away all counting, measuring, and weighing from the arts and crafts, the rest might be said to be worthless....All we would have left would be conjecture and the training of our senses through experience and routine.²⁸

Socrates identifies “building” as having a corresponding “superior level of craftsmanship over other disciplines”, such as “medicine, agriculture, navigation and strategy”.²⁹

Aristotle’s reply And so it is into this context that Aristotle affirms throughout his *Nicomachean Ethics* that we should not demand the same level of exactness from all *technai*. But this may still leave the possibility that, for Aristotle, while not all *technai* can achieve the same level of exactness, the highest or most exalted *technai* are those that are exact. This would be more continuous with the Hippocratic and Platonic teachings on *techne* as mastering chance through exact knowledge and Plato’s explicit hierarchy of the crafts in the *Philebus*.

But in fact Aristotle appears to hold the inverse to be true. In Aristotle’s hierarchy the highest *technai* are those that are more deliberative.³⁰

Aristotle maintains a distinction between technicians (*cheirotechnoi*) and master technicians (*architektones*) in the *Metaphysics*, with the former more engaged in manual labor and the latter more engaged in thought about a craft. The example Aristotle provides of an “exact” craft in the *Nicomachean Ethics*, stoneworking and bronzeworking, are all manual crafts.³¹

Similarly, Aristotle identifies lettering as a craft that is “exact” and thus requires “no deliberation” and navigation as a craft, a presumably higher craft, that requires deliberation. Prometheus had identified lettering as a *techne* on the same plane with navigation as both provide power over *tuche*.³²

Aristotle thus joins the sophists and the medical empiricists in tolerating a high degree of chance and inexactness in a true *techne*.

IV. Deliberation as the mode of reasoning proper to inexact activity

But unlike the rules of thumb and aggregations of experience that we find with the teachers of rhetoric and experiential medicine, Aristotle’s method for handling inexactness in the arts does not abandon reasoning with causes altogether.

²⁸ *Philebus*, 55e1-6

²⁹ *Philebus*, 56b1-4

³⁰ Aristotle appears to distinguish between arts that are most truly arts, and arts in which there is the most need of excellence.

“Those occupations are most truly arts in which there is the least element of chance; they are the meanest in which the body is most deteriorated, the most servile in which there is the greatest use of the body, and the most illiberal in which there is the least need of excellence.”
Politics 1282a3-8

³¹ *NE VI*, 7, Sec 1, 1141a11-12

³² *Prometheus Bound*, 460-461

Deliberation is the form of reasoning that Aristotle describes as proper to things that lack exactness while still providing a causal account of one's actions. How does deliberation provide causal, reason-based courses of action in crafts that are not "exactly worked out"?³³

According to Aristotle, each faculty is specified by the objects of that faculty, through the acts by which those objects are apprehended.³⁴ Thus, the specification of the faculty of deliberation depends on the nature of the inexact objects to which deliberation is naturally oriented. Why, in other words, do "questions about actions and expediency, like questions about health, have no fixed answers"?³⁵

Particulars The inexactness that is characteristic of *phronesis* and most *technai* is due first to the concern of those deliberative sciences with particulars as well as universals. Aristotle holds that "prudence is not scientific knowledge; for, as we said, it concerns the last thing [i.e., the particular]"³⁶.

Particulars can exhibit many traits, and thus experience with many particulars is required to develop a skill. In medicine, "individual cases are so infinitely various that no systematic knowledge of them is possible".³⁷

Furthermore, the traits that a particular subject may or may not exhibit are not simply univocal properties that are either present or absent. Rather, any understanding of Aristotle's philosophy of particulars and their properties must reference the categories of being through which particulars may be in different measures of act over time.

In other words, the dynamism of particulars towards certain goods, which in turn establishes the different good for each *techne*, also limit the precision with which each *techne* can achieve its good.

Aristotle's act-potency framework for understanding change in particulars is thus critical to appreciate the importance of *kairos* to inexact crafts. Aristotle repeatedly appeals to the *kairos*, or target or opportunity, at which medicine, navigation and prudence must aim. Inexact sciences such as these "fall under no craft or profession, the agents themselves must consider in each case what the opportune action [*ton kairon*] is, as doctors and navigators do".³⁸

Kairos is more intelligible as a critical factor in medicine and navigation once the variation in the particulars with which those crafts are concerned is understood within the act-potency framework through which Aristotle explained all variation between particulars.

³³ NE III, 3, Sec 8 1112b7

³⁴ De Anima, 415a14-23 *The Complete Works of Aristotle*, ed. Jonathan Barnes (Princeton: Princeton University Press, 1984).

³⁵ NE II, 2, Sec 3 1104a3-4

³⁶ NE VI, 8, Sec 8 1142a25-26 "For what the doctor appears to consider is not even health [universally, let alone good universally], but human health, and presumably the health of this human being even more, since he treats one particular patient at a time". NE I, 6, Sec 16 1097a12-15

³⁷ Rhetoric I, 2 1356b31-32 *The Complete Works of Aristotle*, ed. Jonathan Barnes (Princeton: Princeton University Press, 1984).

³⁸ NE II, 2, Sec 4 1104a7-9

If crafts such as medicine or navigation are to account for uncertainty in particulars, uncertainty that is itself in constant change, then acting according to *kairos*, at the opportune time, in the opportune measure, is central to such crafts. By extension, according to Aristotle's analogical argument, *kairos* is even more central to *phronesis*.³⁹

The challenge of technical mastery over the ultimately unknowable qualities of particulars is simply defined away by earlier advocates of exact *technē*, notably Hippocrates in *On Technē*, with a univocal account of particulars.

Chance is eliminated from disease and health "for everything that occurs will be found to do so through something"⁴⁰. The question is simply whether the seat of a disease can be seen by the physician, because "if it admits of being seen, it will also admit of being healed".⁴¹

Thus of all such diseases that "have their seat where they can be seen...in all cases the cures should be infallible".⁴² The possibility of mastering "obscure" diseases is "limited only by the capacity of the sick to be examined and of researchers to conduct research".⁴³

The elimination of chance as a concern of medicine thus depends, in *On Technē*, on a univocal theory of being according to which qualities are either seen or unseen. The author holds this explicitly: "the existent is always seen and known, and the non-existent is neither seen nor known"⁴⁴.

The *technē* of *On Technē* thus achieves its exactness by restricting its concerns to those properties of particulars that are univocal and unchanging.

Deliberation The deliberative *technē* in Aristotle accounts for the inexactness introduced by the variety and dynamism of particulars in both the starting points (universals) and end points (particulars) of its reasoning.⁴⁵

What is particularly notable about deliberation as a form of reasoning is its utter lack of method, being shaped, in the spirit of Aristotelian realism, according to its dynamic and varied objects. This has challenged commentators, but deliberative *technē* is not a method for Aristotle, like the rules of thumb used by some predecessors.

Deliberative *technē* is inquiry that brings incomplete knowledge, refined from previous particulars, to bear on a new particular, in order to achieve the shared end towards to which the *technē* and the

³⁹ "And since virtue, like nature, is better and more exact than any craft, it will also aim at what is intermediate". NE II, 6, Sec 9 1106b8-9

⁴⁰ XI 4-5

⁴¹ XI 31-32

⁴² IX 5-17

⁴³ XI 7-9

⁴⁴ II 11-12

⁴⁵ "conclusions that state what is merely usual or possible must be drawn from premises that do the same". Rhetoric I, 2 1357a27-29

particular are both oriented. There are two parts to this description of deliberation which we will consider in turn.

First, deliberation brings to bear knowledge of means to produce a *techne's* end that, while truly a knowledge of causes in the classical model of science, is incomplete and thus not true for all particulars.

This type of incomplete knowledge is central to all inquiry, and deliberation, according to Aristotle, "is a type of inquiry (*zetesis*)".⁴⁶ The other type of inquiry, dialectic, which addresses "the things we search for (*ta zetoumena*)", also begins with knowledge that is partially true, *endoxa*, the opinion of the many or the wise.⁴⁷

One might respond that little of philosophical value could be deduced from common opinion. Aristotle maintains, however, that "dialectic is a process of criticism wherein lies the path to the first principles of all inquiries".⁴⁸ And indeed, we find Aristotle, in works such as the *Physics*, reasoning from *endoxa*.

Deliberative inquiry also relies upon knowledge that is true in part without being mere rules of thumb. Instead, it is knowledge of causes according the classical model of science, however partial or incomplete. This is particularly evident in the *Rhetoric*, one of two treatises of Aristotle's addressing a *techne* (*Poetics* is the other).

Rhetoric is a *techne* that appeals to *endoxa* in order to clarify it through dialectic. Aristotle never contrasts reputable opinion with knowledge, and instead makes it clear that reputable opinion is the site of knowledge of human affairs, such that the result of dialectical reasoning is in fact a more clarified *endoxa*.⁴⁹ This view of *endoxa* as always partially revealing the truth of things is central to Aristotle's argument in *On Rhetoric*.

A well-formed dialectical argument in Aristotelian rhetoric is an argument that most clearly articulates the reputable opinion on a topic, and then applies that opinion to a particular instance. This application will either affirm the reputable opinion, in the case of a demonstrative enthymeme (a syllogism with *endoxa* as a premise), or refine a reputable opinion by identifying a particular instance in which the opinion does not apply, in the case of a refutative enthymeme.

This structure of rhetoric would be unworkable, though, if reputable opinion did not naturally point towards the truth of things. This raises the second distinguishing characteristic of deliberation, that it is determined by the aims of one particular subjects, not by the deliberator.

⁴⁶ NE VI, 9, Sec 1 1142a33

⁴⁷ PA II, 1, 89b23-24 Whereas "the principles of demonstrations are definitions" (PA II, 3 90b25) dialectic "reason[s] from opinions that are generally accepted". (Topics, T I.1 100a21) *The Complete Works of Aristotle*, ed. Jonathan Barnes (Princeton: Princeton University Press, 1984).

⁴⁸ Topics I.2 101b3

⁴⁹ "For the educated person seeks exactness in each area to the extent that the nature of the subject allows; for apparently it is just as mistaken to demand demonstrations from a rhetorician as to accept persuasive arguments from a mathematician". NE I, 3, Sec 4 1094b24-26

Aristotle points out several times that ends are a given in deliberation, since a doctor “does not deliberate about whether he will cure, or an orator about whether he will persuade, or a politician about whether he will produce good order, or any other [expert] about the end [that his science aims at]”.⁵⁰ These ends are provided by, and shared with, the particular subjects of a *techne*.

Rhetoric does not consist of rules of thumb about the “arousing of...emotions”,⁵¹ but of “modes of persuasion” that are proper to ones particular subjects. Its function is not simply to persuade an audience, but to direct the opinions of a particular audience towards truth⁵²

Rhetoric aims at directing ones audience towards truth, ultimately, because “The true and the approximately true are apprehended by the same faculty; it may also be noted that men have a sufficient natural instinct for what is true, and usually do arrive at the truth”.⁵³

This is why, according to Aristotle, sophists are forced to avoid or distort reputable opinions, for reputable opinion alone will never allow one to make the wrong argument appear right or to make the unjust appear just. “And this is ‘to make the weaker seem the better cause’. Thus, people were rightly angry at the declaration of Protagoras” (R, 1402A10).⁵⁴

The natural orientation of opinion that is reputable to an audience towards revealing the truth of things parallels the natural orientation of patients towards health.

The function of medicine is not simply “to do away with the sufferings of the sick, to lessen the violence of their diseases”, as medicine was defined in *On Techne*.⁵⁵ The “end of the medical art is health”,⁵⁶ according to Aristotle, and “the health of this human being even more, since he treats one particular patient at a time”.⁵⁷

Deliberative *techne* is thus not a method for Aristotle, like the rules of thumb followed by the sophists and medical empiricists. It is a form of inquiry that brings incomplete knowledge to bear on a particular to achieve the shared end towards to which the *techne* and the particular are both oriented.

⁵⁰ NE III, 3, Sec 8 1112b13-15

⁵¹ Rhetoric I, 1 1354a16-17

⁵² “[I]ts function is not simply to succeed in persuading, but rather to discover the means of coming as near such success as the circumstances of each particular case allow”. Rhetoric I, 1 1355b9-12 “It is clear, then, that rhetorical study, in its strict sense, is concerned with the modes of persuasion. Persuasion is clearly a sort of demonstration, since we are most fully persuaded when we consider a thing to have been demonstrated.” Rhetoric I, 1 1355a4-7

⁵³ Rhetoric I, I 1355a14-16

⁵⁴ Arnhardt observes that the “sophistical use of fallacies confirms indirectly the epistemological, if not the moral, solidity of *endoxa*. To make the weaker argument appear to be the stronger, the sophist cannot rely on reasoning from *endoxa*; instead, he must either reason from premises that appear to be *endoxa* but are not, or he must make something appear to follow from *endoxa* when in fact it does not. In either case the sophist seeks to escape the restraints of common opinion.” Larry Arnhardt, *Aristotle on Political Reasoning* (Northern Illinois University Press, 1981), p. 19.

⁵⁵ On Techne III, 6-8

⁵⁶ NE I, 1 Sec 3 1094a8

⁵⁷ NE I, 6, Sec 16 1097a12-15

V. Aristotle and contemporary ethics and technology

Aristotle's accounting for inexactness within *techne* suggests the following two lessons for contemporary ethics concerned with the dominance of instrumental, technical reason.

First, our conception of technical reason, like that of Aristotle, should account for inexactness. The mathematicization of modern science and technology sees inexactness as a problem to be cast out with a more refined method, not a part of reality that should shape one's science.

By reducing particulars to material extension, and rejecting any evidence of natural tendencies towards health or truth or other goods, contemporary *techne* overcomes inexactness by limiting the properties of reality that count as evidence for a *techne*.

An Aristotelian realism about the presence of inexactness in one's objects is thus the first step to limiting the scope of exact technical reasoning.

In fact, we see Arendt and MacIntyre doing precisely this in their critiques of social science as discounting as evidence the unpredictable actions of men that break behavioral models of human activity.

The defense of inexactness in social science, and not in *techne*, by Arendt and MacIntyre reveals their concern to be not with the narrowing of technical reasoning in modern technology, but with the replacement of technical reasoning with mathematical social science. The historical event that both Arendt and MacIntyre point to as eliminating practical reasons from *techne* is "when production moves outside the household".⁵⁸

It seems like an unwarranted retreat, however, to claim that production cannot be both deliberative and organized outside of the home. I would submit that the more likely historical event that led to the narrowing of practical reason to instrumental technique was the late 19th century/early 20th century absorption of technology into mathematical science, in what became applied science.

When technology became a branch of modern, mathematical science, it was no longer a distinct discipline from natural science as it had always been, including during the Industrial Revolution.⁵⁹ If this is the true turning point in the constriction of technical reason to mere method, then an analysis of contemporary technical reason, not social science, is called for.

Second, the modes of thought proper to *techne* must also account for this inexactness. Once the objects of a *techne* are recognized as resistant to exacting methods of technical mastery, a broader

⁵⁸ "As, and to the extent that, work moves outside the household and is put to the service of impersonal capital, the realm of work tends to become separated from everything but the service of biological survival and the reproduction of the labor force, on the one hand, and that of institutionalized acquisitiveness, on the other". After Virtue, p. 227

⁵⁹ This is the thesis of McLellan and Dorn in *Science and Technology in World History* (The Johns Hopkins University Press, 2006).

mode of technical reasoning proper to its objects is called for. This was true for Aristotle and is no less true for us.

Deliberative *techne*, in Aristotle, is specified foremost by the dynamism of particulars towards certain goods such as health or truth. This dynamism of particulars in turn establishes the different good for each *techne*, and also limits the precision with which each *techne* can achieve its good.

Of course, accepting the evidence of one's senses that patients tend towards health or that audiences tend towards truth requires accepting the analogical structure of participation in excellence such as the good. MacIntyre refuses to do this, dismissing such evidence as "metaphysical biology".

Instead, MacIntyre sees the goods for practices as developing organically over a long period of time, which he calls his "socially teleological account" of practices and their internal goods.⁶⁰ Needless to say, this doesn't inspire much confidence in MacIntyre, who closes his text with a call to create "local forms of community" while we wait out the new Dark Ages.⁶¹

What dooms both MacIntyre and Arendt to pessimism is their desire to replace technical rationality in contemporary organizations with *phronesis*. The odds are obviously stacked against such hopes.

However, optimism is in order if one sees the goods internal to *technai* as naturally revealing themselves to practitioners through the orientation of a *techne*'s particular subjects towards these goods. The physician may learn in school that patients are mere material extension and agnostic towards health or illness, but the evidence of his senses will indicate otherwise.

This doesn't require that a physician accept the existence of "a *telos* which transcends the limited goods of practices by constituting the good of a whole human life", as MacIntyre characterized what it was he couldn't accept.⁶² It simply requires that the dynamism of patients towards health, or of an audience towards truth, when evident to the senses of the practitioner, be accounted for.

Accounting for this evidence in the *technai*, and thus limiting the scope of exacting technical rationality seeking mastery, requires addressing the forms of technical rationality used in each *techne* as Aristotle does throughout the *Ethics*.

In MacIntyre and Arendt, by contrast, little analysis is devoted to understanding the reasoning of complex technical practices.⁶³ To revive the faculty of deliberation in technical affairs, then, ethicists must follow Aristotle in claiming the development of technical rationality within the history of technology, engineering and productive work as a philosophical concern.

⁶⁰ After Virtue, p. 197

⁶¹ After Virtue, p. 263

⁶² After Virtue, p. 203

⁶³ "However, even in the work of those, such as Taylor, MacIntyre, and Williams, who advance so greatly our understanding of practical epistemologies, we still find unworldly, almost protean, descriptions of practices that ignore their technological constitutions". Aidan Davison, *Technology and the Contested Meanings of Sustainability*, (Albany: SUNY Press, 2001) p. 169