Introduction

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Aims of the volume

It is tempting to view Aristotle's ethics as an imprecise discipline whose methods of enquiry and explanation do not conform to the rigid standards of science laid out in the *Analytics*. The reason, it is often thought, is that the subject matter of ethics exhibits several features that Aristotle thinks disqualify it as a candidate for scientific understanding. For example, Aristotle tells us that moral phenomena are variable and context-dependent (*EN* 1.2.1094b14–16, 2.2.1103b27–1104a8) and that, for this reason, we should not demand precision (*akribeia*) from our accounts of them. Rather, we should be content to state things roughly and in broad outline and to use arguments whose premises hold only for the most part (1.2.1094b11–29, 2.2.1103b34–1104a10). All of this seems to generate an unbridgeable gap between science and ethics; for precision, necessity, and context-independence are among the hallmarks of Aristotelian science. The papers collected in this volume seek to challenge this view by showing that Aristotle's ethics is 'much more like a science than it is usually represented as being'.[1] Even if Aristotle thought, as he clearly does, that we cannot prove through scientific demonstrations what actions ought to be done in particular situations (*EN* 6.5), this is not enough to show that his ethical treatises are altogether unscientific. For there is more to Aristotle's philosophy of science than the theory of demonstration (e.g. Book 2 of the *Posterior Analytics* contains a rich account of scientific enquiry including guidelines for how to construct scientific definitions: see below), and there is more to Aristotle's ethics than general prescriptions for action (e.g. *EN* 2.3–6 is an enquiry into the essence (*ti esti*, 1105a19) of virtue; *EN* 3.1 offers a theoretical account of the nature of the voluntary and involuntary (1109b32–34)). The aim of the present volume is to consolidate

[1] Reeve 1992: 27. See also Anagnostopoulos 1994; Winter 1997; 2012; Irwin 2000; Natali 2007; Salmieri 2009; and Reeve 2012.

emerging research on Aristotle's science and ethics in an attempt to explore the relationship between the two areas of his thought. The central question of the volume is: To what extent do Aristotle's ethical treatises make use of the concepts, methods, and practices that the *Analytics* and other works characterise as 'scientific'?

Before beginning it will be useful to clear away three *prima facie* obstacles to the current project. First, some scholars insist that the gap between Aristotle's science and ethics is unbridgeable in principle given his commitment to the autonomy of the sciences.[2] This view is articulated by Richard Kraut (2014: 3.2):

> Even though Aristotle's ethical theory sometimes relies on philosophical distinctions that are more fully developed in his other works, he never proposes that students of ethics need to engage in a specialised study of the natural world, or mathematics, or eternal and changing objects. His project is to make ethics an autonomous field, and to show why a full understanding of what is good does not require expertise in any other field.

Now it is true that Aristotle thinks knowledge can be compartmentalised into separate sciences (*epistêmai*), each with its own proper subject matter (or genus) and its own first principles (Ferejohn 2013: 65). But his claims about the 'autonomy' of the different sciences in *APo*. 1.7 were never meant to be understood in such an overly-restrictive way. When Aristotle describes each science as an autonomous discipline, what he means to rule out are attempts to prove theorems in one science (e.g. geometry) using principles drawn from another science (e.g. arithmetic), except in cases where the two sciences fall under one another (e.g. as optics is related to geometry). There is nothing in this doctrine to rule out the possibility of adapting the methods and practices developed for use in the theoretical sciences to the investigation of moral phenomena.[3]

Given Aristotle's views about the practical aims of ethics (e.g. *EN* 1.3.1095a2–6; 2.2.1130a26–31), one might further object that the whole idea of a theoretical science of ethics is misguided. For Aristotle insists that ethics (and political science more broadly) is a practical discipline whose

[2] Here 'science' (*epistêmê*) is used in the broad sense to denote any intellectual pursuit or domain of knowledge, including the productive sciences (the crafts) and practical sciences (ethics and politics) (e.g. *Metaph*. 6.1), rather than in the more narrow sense of the *Analytics* that corresponds to our word 'science'.

[3] For a more detailed response to this objection see Leunissen, Chapter 10. It is well worth noting that Aristotle himself violates his own doctrine in the ethico-political works. For example, in *Politics* 1.2 Aristotle invokes the principle that nature does nothing in vain (1253a7–18), which is explicitly identified as a first principle of natural science (*IA* 2, 704b12–18). This presents a problem for the standard view about the autonomy of ethics.

aim is action, *not* knowledge. It is certainly true that ethics is not a theoretical science in the sense that it does not aim at knowledge for its own sake (*Metaph.* 6.1). But it doesn't follow from this that practical disciplines lack a theoretical component or that theoretical knowledge is not among their aims. For example, when Aristotle says in *EN* 2.2 that 'we are enquiring not in order to know what virtue is', this should not be taken to mean that a theoretical enquiry into the nature of virtue is not part of the overall project of the *Ethics*. It clearly is: *EN* 2.3–6 is aimed precisely at answering the question, 'What is (*ti esti*) virtue?' (1105a19), where what is being sought is a definition of its essential nature. Likewise Book 1 is a theoretical investigation into the nature of happiness, while Book 5 seeks a proper definition of the concept of justice.[4] We can accommodate this fact by distinguishing between the *proximate* and *ultimate* aims of a particular discipline.[5] While ethics and political science do not *ultimately* aim at knowledge for its own sake, acquiring theoretical knowledge of matters of conduct is clearly among its *proximate* goals. But we seek that knowledge, not simply to know the truth (as we do in, say, natural science), but so that we can use that knowledge to guide us in our actions. Thus, the student of politics will enquire into matters of conduct in order to know what virtue is. But she seeks this knowledge, not as an end in itself, but so that she can use it in order to become good. In light of this, when we speak about the pursuit of scientific knowledge in the *Ethics*, this should be understood as constituting only a *proximate* goal that is ultimately acquired for the sake of action. It should not be assumed that what we are envisioning is scientific knowledge of matters of conduct that is disconnected from practical ends and is sought purely for its own sake.[6]

Finally, there is the fact that Aristotle denies that practical wisdom (*phronêsis*) is a form of scientific knowledge (*epistêmê*).[7] Practical wisdom is defined as a rational capacity to deliberate well about what is good and profitable for one's life in general. And to be able to deliberate well,

[4] Natali, Chapter 7, argues that Aristotle's enquiry into the *ti estin* of justice in Book 5 is a candidate for an *Analytics*-style definition. See also *Politics* 3.8.1279a10–16 where Aristotle says that it is necessary to examine the nature of oligarchy and democracy in more detail 'because he who engages in a philosophical enquiry about each and is not concerned merely with practice should not overlook or omit anything but must show the truth in each particular case' (1279a11–16). On the 'philosophical' method see *EE* 1.6.

[5] For an extended defence of this point see Anagnostopoulos 1994: ch. 3. See also the chapters by Shields, Leunissen, and Nielsen in this volume.

[6] This point is drawn out more explicitly in *Magna Moralia* 1.1. Compare *Rhetoric* 1.1.

[7] See e.g. *EN* 6.5.1140a31–b3. A similar objection was raised by one of the anonymous referees for this volume.

Aristotle says, is to be able to calculate (*logizesthai*) in advance which actions will best bring about one's good ends (1139a6–14, 1140a29–31, 1140b16–19; cf. 1112b12–1113a3). On this account deliberation is a form of moral reasoning that issues in a judgement about what to do in order to secure one's ends. And Aristotle denies that this form of reasoning amounts to a proof (or demonstration: *apodeixis*) that such-and-such an action must of necessity be done so that practical wisdom does not count as scientific knowledge of which actions will necessarily bring about one's ends.

However, while Aristotle sometimes characterises deliberation as a 'method of enquiry' (e.g. *EN* 3.3.1112b20), this is not the sort of enquiry that the student of ethics is engaged in when she investigates what (e.g.) virtue is (*EN* 2.5–6), or if there is a universal Form of the Good (*EN* 1.6), or what makes actions voluntary (*EN* 3.1), or whether the state exists by nature or convention (*Politics* 1.2). In other words, enquiry of the sort we find in the *Ethics* is not (or not mainly) the province of deliberation, and what Aristotle is doing there when he is investigating the nature of moral phenomena is not exercising practical wisdom (see Anagnostopoulos 1994: 66–68, 76–88; contrast Hardie 1968: 30; Cooper 1975: 19–22, 58–72). For this reason, we can put to one side the argument of *EN* 6.5, which is a claim about the character of the reasoning employed by the *phronimos* in determining how to act in particular situations and not a claim about how the student of ethics goes about investigating moral phenomena, as orthogonal to the current project.

In the next two sections we provide brief overviews of Aristotle's general philosophy of science and his ethical theory as a way to introduce readers to these two aspects of his thought. We then close this Introduction with a summary of the papers in this volume. The questions addressed here are many and complex, and the chapters collected in this volume certainly do not exhaust the issues. The aim is simply to expose some of the ways in which the received view has over-estimated the gap Aristotle sees between science and ethics and suggest some possible avenues for bridging that gap.

Aristotle's philosophy of science

In Book 1 of the *Posterior Analytics* Aristotle defines scientific knowledge in the strict and unqualified sense (*epistêmê haplôs*) as the cognitive state we are in when we grasp the causes of necessary facts that are incapable of being otherwise (*APo.* 1.2.71b9–16; cf. *EN* 6.3). The mechanism for generating such knowledge is demonstration (*apodeixis*), which is a chain of deductive inferences (or syllogisms) whose initial premises (or first

principles, *archai*) must meet certain requirements: they must be true, primitive, immediate, and be causes of, prior to, and more familiar than the conclusion (72a20–b4) (Ferejohn 2013: 69–81). Aristotle goes on to argue that, in order to generate scientific knowledge, the premises from which such demonstrations proceed must also express necessary relations between universals: 'Since it is impossible for that of which there is scientific knowledge in the unqualified sense to be otherwise, that which is known in accordance with demonstration must be necessary. . . . A demonstration, then, is a deduction (*sullogismos*) that proceeds from what is necessary' (*APo*. 1.4.73a21–24; cf. *APo*. 1.6). The requirement that the premises of a demonstration must be necessary is especially important for distinguishing scientific understanding from the weaker cognitive state of belief or opinion (*doxa*):

> Scientific understanding and its objects differ from belief and its objects in that the former concerns what is universal and proceeds through what is necessary, and what is necessary cannot be otherwise (*katholou kai di' anangkaiôn, to d' anagaion ouk endechetai allôs echein*). So while there are things that are true and concern real beings and yet are capable of being otherwise, scientific understanding clearly does not concern them. (*APo*. 1.33.88b30–34)

Finally, Aristotle insists that in order to know a proposition in the strict sense it is not enough simply to grasp *the fact that* S is P (the *hoti*); one must also grasp *the reason why* S is P (the *dihoti*). And that requires grasping its cause (*aitia*), which is picked out by the middle term of the corresponding demonstration (*APo*. 1.13, 2.1–2).

For Aristotle, then, a proper science will be an axiomatic body of propositions comprising a sequence of theorems derived, via demonstrations whose middle terms pick out causes, from a limited set of first principles (Barnes 1993: xii–xiii). In *APo*. 1.2 Aristotle divides these first principles into two kinds: 'axioms', which are common to all the sciences and must be grasped by anyone who seeks to know anything; and 'posits', which are proper to a given science and so must be grasped only by the student of that science (72a15–24). 'Posits' are in turn divided into 'suppositions', which are claims about the existence of the natural kinds investigated by a given science,[8] and 'definitions', which are propositions stating the essence of those kinds (cf. *APo*. 1.10). Of these, definitions appear to hold a primary position in Aristotle's philosophy of science. How we come to grasp such definitions forms a major part of *APo*. Book 2.

[8] Here I follow McKirahan Jr 1992: 36–49. For an alternative reading see Barnes 1993: 99–101.

An Aristotelian definition is an account stating what it is to be a thing (*logos tou ti esti*: 93b29). *APo*. 2.10 distinguishes four kinds of definition: (1) an account that signifies a name or name-like expression (93b30–31); (2) an account that exhibits the cause of a thing's existence, which differs from a demonstration in the arrangement of its terms (e.g. thunder is a noise in the clouds caused by the quenching of cloud fire) (93b37–94a7); (3) an account that corresponds to the conclusion of an essence-revealing demonstration (e.g. thunder is a noise in the clouds) (94a7–9); and (4) an account of the 'immediates' (*tôn amesôn*) that correspond to 'indemonstrable posits (*thesis anapodeiktos*) of what a thing is' (94a10–11). Here we will focus on the procedure for grasping definitions (2) and (4).

According to one interpretation, Aristotle divides the procedure for grasping causal definitions into three stages (Henry 2011: 211–12). Stage One of our enquiry is an empirical investigation aimed at building up a list of features that are found to be correlated with one another in regular ways (Lennox 2004: 92).[9] For example, through careful observations we notice that eight arms, two tentacles, a single fin around the full length of the body, an internal gas chamber for regulating buoyancy, chromatophores for rapid colour change, and a jet propulsion system are regularly found together in nature. This gives us a certain profile of predicates that are correlated with one another either always or for the most part. However, at this preliminary stage of enquiry we do not yet know if those correlations are evidence of a genuine kind (*GA* 4.4.771b1–13). This is the task of Stage Two. According to *APo*. 2.2, whether or not we have hit upon a genuine kind depends on whether or not there is an underlying cause (or 'middle term') that explains why those features discovered in our preliminary (Stage One) account are correlated in regular ways. If there is a cause, then we are justified in believing that the individuals that possess those properties constitute a genuine kind (e.g. Cephalopoda in the above example) (89b23–90a1). At that point we go on to investigate (in Stage Three) what that cause is. This causally basic feature(s) will correspond to the essence specified by the scientific definition of our newly discovered kind. For Aristotle insists that the answers to the question, Why is it? (*dihoti*), which states a cause, and the question, What is it? (*ti esti*), which states an essence, are the same (*APo*. 2.2.90a15–19). In this way we come to know the essence of a kind at Stage Three by discovering the cause of those shared similarities grasped in Stage One.

[9] The exact nature of the various stages is subject to controversy. For an alternative account of Stage One see Charles 2000 and Natali, Chapter 7. On Charles' interpretation, for example, enquiry begins (in Stage One) from an account stating what a name or name-like expression signifies, i.e. a nominal definition.

The notoriously difficult final chapter of the *Posterior Analytics* sets out the procedure for grasping the first principles of scientific demonstrations that serve as the basic premises from which all other propositions in a science are ultimately derived. Although we shall not argue for this here, *APo*. 2.19 appears to concern how one comes to know the fourth kind of definition identified in 2.10, namely, those 'indemonstrable posits' (*thesis anapodeiktos*) that specify the essence of 'the immediates' (*tôn amesôn*), e.g. 'Human is a rational animal'.[10] Because scientific knowledge in the strict sense requires demonstration, and because Aristotle holds that the first principles from which demonstrations ultimately proceed are themselves indemonstrable (*APo*. 2.3), it follows that our grasp on these immediate definitions cannot itself be a form of scientific knowledge. As such, Aristotle argues, there must be some other state through which those principles are known. Aristotle calls this other cognitive state (the state one is in when she grasps the primary principles of a science) *nous*. And the method for acquiring *nous*, he tells us, is 'induction' (*epagôgê*: 100b4). Although the details of this procedure are controversial, the basic method is supposed to advance from perception, to memory, to experience (*empeiria*), which either is identical to (100a6–7), or the source of (100a15–b5), a universal (99b34–100b5).

The upshot of this is that the *Analytics* offers two epistemological 'paths' (*hodoi*) to knowledge: (1) a path *to* first principles (induction or whatever we call the process described in *APo*. 2.19), which results in *nous*;[11] and a path *from* first principles (demonstration), which results in *epistêmê*. Finally, in *EN* 6.7 Aristotle tells us that *sophia* is the cognitive state corresponding to our grasp of the entire axiomatic system: 'It follows that the person with wisdom must not only know what follows from first principles but also possess truth about the first principles themselves. Therefore, *sophia* must be *nous* combined with *epistêmê*' (1141a17–20).

[10] This is suggested by 99b22, which announces the subject of *APo*. 2.19 as an enquiry into how we come to acquire 'knowledge of the immediates' (*tôn d'amesôn tên gnôsin*). These definitions are 'immediate' in the sense that there is no cause (or 'middle term') that explains why humans are rational animals; the relation between definiens and definiendum is basic. (Contrast, 'Fish are finned animals.' In this case *being a swimmer* explains why fins belongs to fish.) This is what makes the first principles of a science indemonstrable.

[11] Some argue that dialectic is the proper method for establishing the first principles of a science based on *Topics* 1.2.101b3–4 (on which see Nielsen, Chapter 1). But this is not the view put forth in the *Analytics*. Instead *APo*. 2 sets out a very different way of arriving at the first principles of a science, specifically its posits (*theseis*), which culminates in the inductive method outlined in the final chapter. And nowhere in the course of that discussion does Aristotle suggest that dialectical reasoning is the primary means of establishing the first principles of a science (cf. Lennox 2011). It is possible, however, that the *Topics* passage is talking about those first principles that Aristotle calls 'axioms', such as the principle of non-contradiction, which are common to all the sciences. But such axioms will not figure as premises in scientific demonstrations.

Aristotle's ethical theory

EN 1.2 opens with some remarks concerning what to expect from the coming enquiry. 'Our discussion will be adequate,' Aristotle says, 'if it has as much clarity as the subject-matter allows; for the same level of precision is not to be sought in all discussions alike any more than in all products of craftsmanship' (1094b11–14). He repeats the warning about precision in 1.7: 'We must remember what has been said before, namely, not to look for the same degree of precision (*akribeia*) in all areas, but only the degree that accords with a given subject matter (*kata tên hupokeimenên hulên*) and is proper to a given line of enquiry' (1098a27–30). Aristotle's message: questions about actions and expediency, like questions about health, have no fixed answers (2.2.1104a2–5). Consequently, they must be answered with accounts that hold only for the most part (*hôs epi to polu*) rather than with accounts that hold in every case (*aei*) without exception (1.2.1094b22). Insofar as the general account is of this sort (*toioutou d'ontos tou katholou logou*), Aristotle infers that the account of particular actions and particular decisions (*ho peri tôn kath'-hekasta logos*) will be even less exact. These 'fall under no craft or profession; the agents themselves must consider in each case what the opportune action is, as doctors or navigators do' (1104a5–10). Therefore, there can be no demonstration (*apodeixis*) of right action; rather, it is a matter of trained judgement and experience to hit on the right thing to do.

Aristotle's remarks have been taken to apply to ethical enquiry as a whole. Thus construed, they also apply to the enquiry in the *Ethics* itself. Does Aristotle think that ethical enquiry as a whole is imprecise? If only a part of ethics is imprecise, in what way and why?

One way to understand Aristotle's reasons for issuing these cautionary remarks is to consider the expectations of a reader approaching Aristotle's treatise. What type of discussion might this reader expect? Following Greek ethicists in the generation immediately following Aristotle, we may divide ethics into a 'dogmatic' and a 'parainetic' part.[12] The dogmatic part contains the basic principles of a system of ethics: its account of the happy life, its definition of virtue, and its classification of goods (axiology). The parainetic part contains action-guiding principles derived from the principles of the general theory, and instructs agents about how they

[12] 'Parainetic' from 'parainesis', meaning 'advice', 'counsel' or 'exhortation'. The division can be traced back at least as far as the Stoics Cleanthes (c. 330BC–c. 230BC) and Aristo (fl. c. 260BC). According to Aristo, the advice-giving part of ethics is superfluous, and should be left out. Defending Stoic orthodoxy, Cleanthes instead insists that the advice-giving part is useful provided that it flows from the fundamental principles of Stoicism. The discussion is preserved by Seneca in his *Letters* 94 and 95. See Inwood 1999: 113–14.

should act given their particular station in life and given their particular circumstances. The latter type of advice is scarce in the *Nicomachean Ethics*. What practical advice the treatise contains typically comes in the form of examples meant to support accounts of individual virtues of character. If we read Aristotle's remarks in light of the distinction between dogmatic and parainetic parts, Aristotle does not maintain that his definition of the happy life, of virtue of character and virtue of thought, or any of the individual virtues, should be treated as approximations, or as mere summaries of reputable opinions (*endoxa*). Rather, he is warning the reader not to expect the kind of practical advice that a parainetic treatise would contain. Ethics is an inexact science, then, to the extent that the type of enquiry that Aristotle undertakes does not aim to articulate practical precepts or to prescribe particular actions for particular agents. Thus, in warning us not to expect precision, he is telling us that his enquiry and his treatise belong to the 'dogmatic' part of ethics rather than the 'parainetic' part. This fits well with the qualification Aristotle adds when he says that 'questions about action and expediency' must be answered with accounts that hold for the most part. These are *practical* questions – questions about precepts rather than first principles. Since questions about action and expediency are of this kind, questions about individual actions will be even less precise. They must therefore be answered not in the way of a parainetic treatise, but rather by individual agents themselves, who deliberate in specific circumstances.

If Aristotle thinks of ethical enquiry as divided into parts – (i) the dogmatic part, to which the *Nicomachean Ethics* belongs; (ii) the parainetic part, containing practical precepts for agents of different kinds (how to relate to one's wife, how to raise one's children, how to be a slave-master etc., cf. his *Oeconomica*); and finally (iii) the deliberative part, comprising enquiry carried out by individual agents seeking means to their ends – we must ask how the three parts relate. If we can become good agents without the knowledge provided by the first part, why should we devote time to an enquiry into the highest good? The dogmatic part of ethics would then seem superfluous.

Aristotle's answer is that good deliberation must start from an adequate conception of the highest good. This is because only an adequate conception of the highest good can justify our choices, and make us do the right thing for the right reason. We deliberate when it is unclear what the right way to proceed is. Where craft and science fail to yield an immediate answer, the agent must engage in deliberation (*bouleusis*), a type of enquiry where we aim to trace an end that we want back to an act that is up to us.

Starting from our end, we seek to lead its principle back to an act we can do (3.3.1112b13–1113a3, cf. 1144a31–36). In this way, we seek to uncover ways in which we may be the principle (as efficient cause) of the end that we want. This end is the final cause of our action. In cases of production, the end is constitutive of the craft (e.g. health for medicine and victory for generalship). But as Aristotle underlines in Book I, these crafts are all subordinate to the most architectonic science, 'political science', which determines which crafts ought to be studied and how far in each city. The ultimate aim of all activity is happiness, which is the subject matter of political science. Happiness, Aristotle argues, is activity in accord with virtue. Thus *eupraxia*, fine action, is the content of the happy life, and the ultimate aim of all our activities.

Many readers have taken Aristotle's remarks about inexactness and particulars to entail that knowledge of universals is superfluous in ethics. It is certainly true that Aristotle thinks practical wisdom requires experience and not simply teaching. He observes that while there are prodigies in mathematics, ethical prodigies do not as a rule exist. To develop practical wisdom, we need to know what kind of thing is conducive to living well in general, and we must be experienced in our ability to discern how that end can be promoted here and now, to particular acts that we can do. We must furthermore have come to appreciate fine actions for their own sakes by having taken pleasure in them. This process of practical induction (Moss 2012: 200–19) makes us attuned to the right values. But the fact that we come to *love* fine ends by pursuing them over the course of our lives does not mean that these ends cannot be examined from a theoretical point of view, that is, from the point of view of first principles of action, or that such enquiry is superfluous. This is the task Aristotle undertakes in the *Nicomachean Ethics*. He thinks that someone who has a target to aim at will be more likely to aim his arrows straight and hence to attain happiness for himself. Therefore, the subject matter of the *Nicomachean Ethics* will be of use to those engaged in practical decision-making. They can justify their decisions with reference to the right conception of the human good.

Knowledge of ethical universals – what happiness is, what virtue of character and thought require, and the sphere and function of the individual virtues – helps us become better people. Therefore, seeking definitions is time well spent from a practical perspective. It is not an idle theoretical exercise. At a lower level of generality, we again see how theoretical enquiry into the principles of ethics has practical repercussions. In addition to fundamental principles, knowledge of relationships that obtain always or for the most part can be useful in deliberation. Knowing what is beneficial