nóema
Rivista online di filosofia

ISSN 2239-5474 n. 16 (2025)

doi: 10.54103/2239-5474/29871 Contributi

PLATO'S USE OF GEOMETRIC ANALYSIS IN THE *MENO*

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Abstract

This article examines Socrates' use of the hypothetical method in the Meno in light of the mathematical background he alludes to – namely, the geometric method of analysis and synthesis. Where most interpreters either focus on the geometric example (without discussing its philosophical application), or on the argument about the teachability of virtue (without discussing the geometry), this article urges that the former should inform our understanding of the latter. In particular, it argues that geometric analysis illuminates some fundamental features of Plato's philosophical approach which might be otherwise overlooked.

Keywords: Geometric analysis and synthesis, ancient Greek geometry, history of mathematics, mathematics and philosophy, hypothetical method.

Published online: 19/11/2025

Milano University Press

L'uso dell'analisi geometrica di Platone nel *Menone*

Questo articolo esamina l'uso del metodo ipotetico da parte di Socrate, nel Menone, alla luce del quadro matematico a cui egli allude, ovvero il metodo geometrico di analisi e sintesi. Mentre la maggior parte degli interpreti si concentra sull'esempio geometrico (senza discuterne l'applicazione filosofica) o sull'argomento relativo all'insegnabilità della virtù (senza discutere la geometria), questo articolo sostiene che il primo dovrebbe influenzare la nostra comprensione del secondo. In particolare, sostiene che l'analisi geometrica illumina alcune caratteristiche fondamentali dell'approccio filosofico di Platone che altrimenti rischierebbero di essere trascurate

Parole chiave: Analisi e sintesi geometrica, geometria greca antica, storia della matematica, matematica e filosofia, metodo ipotetico.

τὸν θεὸν ἀεὶ γεωμετρεῖν
(Plutarch)

Of the many differences separating the ancient Greek philosophical world from its modern counterpart, one of the more surprising is the centrality of mathematics. For Aristotle, mathematics is one of only two truly scientific areas of inquiry, the other being metaphysics; while Plato's casual allusions to complex mathematics in dialogues like the *Timaeus*, the *Theaetetus* and the *Meno* clearly assume a high degree of familiarity with such things in his reading audience. This often creates something of a dilemma for today's readership who either overlook the maths or lose themselves in its minutiae (an infamous example being the nuptial number in the *Republic*). The trick, of course, is to strike a balance, hunting down the mathematical clues where appropriate, but resisting the urge to be overly fastidious. We should, moreover, allow for a certain looseness of usage among those more familiar with such otherwise-arcane mathematics. Just such a measured balance is useful for interpreting the so-called «method from hypothesis» at *Meno* 86b-87d. Much scholarly ink and ingenuity has been spent on Socrates' geometry here, but in spite of this – if not because of it – little has been parlayed into concrete philosophical gains. In this article I hope to draw on the relevant mathematics that was so precious to ancient philosophers like Plato and bring it to bear on how we understand his philosophy.

1. Moving towards first principles

The *Meno* opens with Meno asking Socrates to tell him how virtue or excellence (ἀρετή) is acquired. Just as the request to simply *be told* the answer is characteristic of Meno[1], so too is Socrates' reply characteristic: he remarks the state of affairs that has apparently led Meno to pose such a debater's question[2]. Meno and his fellow Thessalians, we are told, are now wise men. «The responsibility [αἴτιος] for this reputation of your lies with Gorgias» (70b2-3)[3]. Socrates goes on to lament that he cannot, unfortunately, answer Meno's question. Again this is spelled out in reference to the state of affairs whence Socrates' inability has arisen: he does

[1] See 75b1, 76a8-c3, 81e4-6 (with 81a4 and 7) and 86c6-86d2.

[2] How virtue is acquired was a standard topic of debate in the fifth and fourth centuries. For references see J. Klein, *A Commentary on Plato's Meno*, Chicago University Press, Chicago 1965, p. 39, n. 18; and R.W. Sharples, *Plato: Meno*, Aris and Phillips, Warminster 1985, p. 123. See also H. Tarrant, *Recollecting Plato's Meno*, Duckworth, London 2005, p. 19, who views Meno's question as a «challenge and a test…. Certainly one does not listen to a sophistic display in order to find out the answers, but to enjoy the sophistication with which the answer is argued for».

[3] All translations of Plato come from *Plato: Complete Works*, edited by J. Cooper, Hackett Publishing Company, Indianapolis 1997.

not know what virtue *is*, so he cannot say what *sort of thing* it is (71b3-4), the former being prerequisite for the latter. And as the dialogue continues and Meno is encouraged to attempt a definition of virtue, he responds by catalogues the virtue of a man and a woman, promising to extend the list upon request (71e). This, however, was not what Socrates was asking after; rather he wants some singular account that informs the many virtues and «which makes them virtues» (72c8).

In these and other places besides, Plato assumes that the answers to philosophical inquiries can be deduced from what is more fundamental. Lurking behind this is a kind of architectonic philosophical model in which knowledge is gained by grasping «causes» that stand metaphorically «above» an *explanandum*. In its purest form this model ultimately leads up to a final principle that stands above all the others, like the form of the Good or Aristotle's prime mover[4]. The problem with this, of course, is that it seems to put us mere mortals at a distinct disadvantage since we do not truly know anything until we have ascended to the ultimate principle of knowledge – an ascent we have to undertake without knowledge. As Aristotle, and apparently Plato, were fond of saying, we are either moving towards first principles or away from them:

> there is a difference between arguments from and those to the first principles. For Plato, too, was right in raising this question and asking, as he used to do, «are we on the way from or to the first principles?» There is a difference, as there is in a race-course between the course from the judges to the turning-point and the way back. For, while we must begin with what is familiar, things are so in two ways – some to us, some without qualification. (*Nicomachean Ethics* 1095a31-b2)[5]

> Things are prior and more familiar in two ways; for it is not the same to be prior by nature and prior in relation to us, nor to be more familiar and more familiar to us. I call prior and more familiar in relation to us what is nearer to perception, prior and more familiar *simpliciter* what is further away. What is most universal is furthest away, and the particulars are nearest; and these are opposite to each other. (*Posterior Analytics* 71b34-72a6)

The upshot of all this is that, to begin with, the path of philosophical inquiry requires us to grope our way forward in the dark of ignorance. A solution Aristotle gives to this appears on the closing pages of the *Posterior Analytics* where we encounter a rather opaque metaphor about standing one's ground in battle: perceptions of particulars can accumulate into an apprehension of the first principles much as a soldier in rout stands his ground and is joined by another and

[4] Cf. A.R. Nathan, *Why is Plato's Good* Good*?*, «Peitho. Examina Antiqua», 13, 1, 2022, pp. 125-136.

[5] Translations of Aristotle from *The Complete Works of Aristotle: The Revised Oxford Translation*, edited by J. Barnes, Princeton University Press, Princeton 1984.

another until a position of strength – presumably, a metaphoric first principle – is gained[6]. What Plato's answer is seems less immediately apparent. But a potential response can be found in Socrates' allusions to the method *from hypothesis* in various dialogues. In the *Phaedo* (100-101) Socrates proposes a method that relies on hypotheses to understand «causes» leading all the way up to a first principle; and in the *Republic* (510b-c) hypotheses again seem to be useful tools in ascending the chain of being. Arguably the most concrete example of this method comes from the *Meno*. Where the remarks in the *Republic* or the *Phaedo* tend to linger at an abstract level, and the treatment of the *Parmenides* is too particular with its dense and impenetrable examples, the *Meno* occupies a happy medium.

The purpose of this essay is to show how Plato availed himself of the geometric method of analysis and synthesis in the *Meno* to articulate how one might grope one's way forward in the dark towards the source of epistemic light. My efforts here make no pretension to anything that even resembles completeness. I ignore recollection, the Good, developmentalism and a host of other morsels at the Platonic banquet. One cannot say it all at once. I try to tie together some recent scholarship on ancient geometry with a particular reading of one passage in the *Meno* to highlight but one moment in Plato's philosophical thinking. What makes this a novel or pertinent contribution to the scholarship is that, by and large, those primarily interested in elucidating the philosophical application of the method from hypothesis in the *Meno* have lost interest in the geometry Plato alludes to; one scholar going so far as to deny that analysis and synthesis has much to do with it[7]. The problem with this is that there exists a broad consensus, especially among historians of mathematics, that Socrates most assuredly does allude to geometric analysis[8]. Indeed, the modern understanding of this method

6 See J.H. Lesher, *'Just as in Battle': The Simile of the Rout in Aristotle's Posterior Analytics ii 19*, «Ancient Philosophy», 30, 2010, pp. 95-105.

7 H.H. Benson, *Clitophon's Challenge: Dialectic in Plato's Meno, Phaedo, and Republic*, Oxford University Press, Oxford 2015, pp. 124-125.

8 Although denied by R. Robinson, *Plato's Earlier Dialectic*, Clarendon Press, Oxford 1953, p. 121, most scholars see an allusion to Greek geometrical analysis (esp. reduction) in the *Meno*, e.g. T.L. Heath, *A History of Greek Mathematics, vol. I: From Thales to Euclid*, Clarendon Press, Oxford 1921, pp. 301-303; A.S.L. Farquharson, *Socrates' Diagram in the Meno of Plato, 86e-87a*, «The Classical Quarterly», 17, 1923, p. 21; F.M. Cornford, *Mathematics and Dialectic in Republic VI-VII (I and II)*, «Mind», 41, 1932, p. 40; N. Gully, *Greek Geometrical Analysis*, «Phronesis», 3, 1958, p. 7; R.S. Bluck, *Plato's Meno*, Cambridge University Press, Cambridge 1961, pp. 77-85; J. Klein, *Commentary on Plato's Meno*, cit., p. 207; M.S. Mahoney, *Another Look at Greek Geometrical Analysis*, «Archives for the History of Exact Sciences», 5, 1968, pp. 334-336; J.T. Bedu-Addo, *Recollection and the Argument 'From a Hypothesis' in Plato's Meno*, «The Journal of Hellenic Studies», 104, 1984, p. 6 n. 23; W. Knorr, *The Ancient Tradition of Geometric Problems*, Birkhäuser, Boston 1986, pp. 71-74; I. Mueller, *Mathematical Method and Philosophical Truth*, in *The Cambridge Companion to Plato*, edited by R. Kraut, Cambridge University Press, Cambridge 1992, pp. 178-179; S. Menn, *Plato and the Method of Analysis*, «Phronesis», 47, 2002, pp. 211-212; C.A. Huffman, *Archytas of Tarentum: Pythagorean, Philosopher and Mathematician King*, Cambridge University Press, Cambridge 2005, p. 360; D. Scott, *Plato's Meno*, Cambridge

has been considerably advanced in recent decades, but with little downstream effects on Platonic scholarship except from some excellent work from Stephen Menn and David Wolfsdorf[9]. Thus when it comes to the method from hypothesis in the *Meno*, we have a glut of publications on the geometric example which do not look beyond the geometry, and then, on the other hand, we have philosophical exegesis blithely striding along its own unconnected path. This strikes me as a missed opportunity; as I hope to show, the method of analysis speaks to some of Plato's most profound and pronounced epistemic inclinations.

2. The geometric method of analysis and synthesis

The method of analysis and synthesis was an important method of discovery in ancient Greek geometry. It can be described, in very general terms, as a technique used to get from a specific problem or theorem to the basic principles that account for it; it takes you from a lower level *up* to something more familiar or fundamental. Perhaps the main controversy here concerns the way in which one gets from the «thing sought» (ζητούμενον) up to the principles. This phase of the method is called *analysis* and it begins by assuming that the thing sought is in fact the case; from here, on one interpretation, the geometer moves *upwards* casting about for antecedents that imply the thing sought[10]. On this upward interpretation, the second phase of the method, called *synthesis*, then moves back down the chain of implication in the natural direction, confirming the inferences. Another, more popular view, is that in the analysis phase the geometer deduces consequences from the (assumed) thing sought, moving *downwards* (as though the thing sought were an antecedent)[11]. On this interpretation the corresponding

University Press, Cambridge 2006, p. 133; D. Wolfsdorf, *The Method* ἐξ ὑποθέσεως *at Meno 86e1-87d8*, «Phronesis», 53, 2008, pp. 54-57; N. Iwata, *Plato on Geometrical Hypothesis in the Meno*, «Apeiron», 48, 1, 2015, p. 9; and S. Scolnicov, *Plato's Method of Hypothesis in the Middle Dialogues*, edited by H. Tarrant, Academia Verlag, Baden-Baden 2018, pp. 67-71. Aristotle seems to obliquely confirm this in the *Prior Analytics* 69a20-37 where he spells out a reduction of the question of whether or not justice can be taught.

[9] S. Menn, *Plato and the Method of Analysis*, cit.; D. Wolfsdorf, *The Method* ἐξ ὑποθέσεως *at Meno 86e1-87d8*, cit. See also M. Bonazzi (ed.), *Platone: Menone*, Laterza, Roma-Bari 2017, pp. 148-54, who builds on and modifies Wolfsdorf; and N. Iwata, *Plato's Hypothetical Inquiry in the Meno*, «British Journal for the History of Philosophy», 24, 2, 2016, pp. 194-214, who recognises the role of analysis here, but nevertheless separates the use of hypothesis from the method of analysis and argues that Socrates does not reduce the teachability of virtue to a more basic problem (p. 199). Against this, I would urge that analysis (*qua* reduction) is precisely the method readers need to have in mind when unpacking the text.

[10] See e.g. F. Cornford, *Mathematics and Dialectic in Republic VI-VII,* cit., pp. 43-47, which is endorsed by H.D.P. Lee, *Geometric Method and Aristotle's Account of First Principles*, «The Classical Quarterly», 29, 1935, p. 320 and S. Scolnicov, *Plato's Method of Hypothesis in the Middle Dialogues,* cit., pp. 45-66. The latter's arguments are rather convincing to my mind. See also F. Ferrari (ed.), *Platone: Menone*. BUR Rizzoli, Milan 2016, p. 68.

[11] See e.g. T.L. Heath, *The Thirteen Books of Euclid, vol. I: Introduction and Books I, II*, Cam-

synthesis then requires that the chain of implication is reversible or convertible. At any rate, regardless of which interpretation we prefer, all agree that the geometer always aims to end up *higher*, with something more basic: on the first model we intuit antecedents directly, whereas on the second model we infer consequences (moving metaphorically down) until we hit some higher principle. Oddly enough, our key source for this method, which is Pappus of Alexandria's account in Book Seven of his *Collection*, seems to support both the upward and downward interpretations. Written in the third century AD, Pappus's evidence is a bit too distant from Plato to be decisive in these matters; nevertheless, given its centrality in the debate, it will be useful for the reader to be familiar with it. Here is part of the relevant text.

> [...] in analysis we suppose that which is sought to be already done, and we inquire what it is from which this comes about, and again what is the antecedent cause of the latter, and so on until, by retracing our steps, we light upon something already known or ranking as a first principle; and such a method we call analysis, as being a reverse solution.
> But in *synthesis*, proceeding in the opposite way, we suppose to be already done that which was last reached in the analysis, and arranging in their natural order as consequents what were formerly antecedents and linking them one with another, we finally arrive at the construction of what was sought; and this we call synthesis[12].

This account intimates that analysis is the hunt for antecedents. On the other hand, Pappus goes on to claim that if the geometer strikes on something known to be false, then we can conclude that the thing sought is also false (a *reductio ad absurdum*). This tells against the upward interpretation because a false antecedent does not imply a false conclusion; if *x* follows from a falsehood, this does not mean that *x* itself is false. Rather, the idea is that the thing sought entails something known to be false, so we must be moving downwards, that is deductively. Accordingly, some have argued that Pappus or his text have confused two different traditions[13], with several scholars suggesting that the upward model dates back to Aristotle and Plato[14].

bridge University Press, Cambridge 1908, pp. 138-139; R. Robinson, *Analysis in Greek Geometry*, «Mind», 45, 1936, pp. 464-473; S. Menn *Plato and the Method of Analysis*, cit., pp. 198-199; D. Wolfsdorf, *The Method* ἐξ ὑποθέσεως *at Meno 86e1-87d8,* cit., p. 55; and N. Iwata, *Plato on Geometrical Hypothesis in the Meno*, cit., p. 7.

[12] Translation from I. Thomas, *Greek Mathematical Works, vol. I* (reprinted with revisions 1991) *and vol. II* (first printed 1941, with revisions 1993), Loeb Classical Library, Massachusetts, vol. II, pp. 596-599.

[13] M. Mahoney, *Another Look at Greek Geometrical Analysis*, cit., pp. 322-327, argues that the upward theory was interpolated into the text; N. Gully, *Greek Geometrical Analysis*, cit., e.g. p. 13, argues that Pappus incorrectly copied down two incompatible accounts.

[14] N. Gully, *Greek Geometrical Analysis*, cit., pp. 4-11, followed by R. Bluck, *Plato's Meno,* cit.,

Lastly, there is a more recent strand of interpretation that seeks to downplay the significance of the direction of analysis. This account was first put forward by Jaakko Hintikka and Unto Remes (who nevertheless tend towards the downward interpretation)[15] and further developed by Ali Bebhoud. The latter remarks that analysis should not be treated as a «linear chain of implications» in terms of either finding antecedents or inferring consequences[16]. As Hintikka and Remes put it:

> The steps of analysis do not take us from one proposition to another, no matter what the direction of the relation of the logical consequence is which obtains between them, but from a geometrical object or a number of geometrical objects to another one[17].

This non-propositional view seems to have been well received[18] and it should discourage us from expecting a strict and orderly methodology. After all, we are dealing with diagrams, not statements[19]. Analysis, then, might be understood more as an artform than a science. Indeed, it need not even issue in a definitive answer. It can be used to facilitate a *reduction* (ἀπαγωγή) from one problem[20] to a more general problem. The standard example of this is Hippocrates' reduction of the problem of duplicating a cube (namely, how to construct a cube with twice the volume of a given cube). Though he could not solve this problem, he managed to reduce it to the more basic problem of finding two mean proportionals between the base of the given cube and the number twice as big[21]. This method

pp. 77-79 (with n. 1 on p. 77); see also W. Knorr, *The Ancient Tradition of Geometric Problems*, cit., pp. 354-357; and Mueller, *Mathematical Method and Philosophical Truth*, p. 175, who uses the downward model to unpack the passage in the *Meno*. See also S. Menn, *Plato and the Method of Analysis*, cit., p. 219 n. 34, who remarks that «Plato seems not to be interested in the "logical direction" of analysis».

15 J. Hintikka and U. Remes, *The Method of Analysis: Its Geometrical Origin and its General Significance*, D. Reidel Publishing Company, Dordrecht 1974, pp. 10-19.

16 A. Behboud, *Greek Geometric Analysis*, «Centaurus», 37, 1994, pp. 63-66.

17 J. Hintikka and U. Remes, *The Method of Analysis*, cit., p. 32.

18 E.g. S. Menn, *Plato and the Method of Analysis*, cit., pp. 199-202 and R. Netz, *Why Did Greek Mathematicians Publish Their Analysis?* in *Ancient and Medieval Traditions in the Exact Sciences: Essays in Memory of Wilbur Knorr*, edited by P. Suppes, J.M. Moravcsik and H. Mendell, CSLI Publications, Stanford 2000, p. 140.

19 The importance of constructing diagrams is emphasised by J. Hintikka and U. Remes, *The Method of Analysis, cit.,* e.g. Chap. 5 and A. Behboud, *Greek Geometric Analysis*, cit., p. 59.

20 It is perhaps justified to focus on *problem* analysis (rather than analysis of *theorems*) as this is clearly what we are given in the *Meno*. This also seems to be the more prominent use of analysis.

21 Thus, e.g.: Proclus *On Euclid* i. (see I. Thomas, *Greek Mathematical Works, vol. I*, cit., pp. 252-253); T. Heath, *A History of Greek Mathematics, vol. I: From Thales to Euclid*, cit., p. 291, who claims Plato's version of analysis was «nothing more than a series of reductions»; M. Mahoney, *Another Look at Greek Geometrical Analysis*, cit., pp. 331-337, who links this to the *Meno*, as does C. Huffman, *Archytas of Tarentum*, cit., p. 360; W. Knorr, *The Ancient Tradition of Geometric Problems*, cit., pp. 23-24 who uses *analysis* and *reduction* interchangeably in describing the *Meno* passage; and J.L. Berggren and G. Van Brummelen, *The Role and Development of Geometric Analysis and Synthesis in Ancient Greece and Medieval Islam*, in *Ancient and Medieval Traditions in the*

leads *towards* first principles (arithmetic being more fundamental than geometry), but does not ultimately reach anything solid. It rests content to restate the problem at a higher level of generality without actually solving it. This, I submit, is exactly the sort of thing that would interest someone with Plato's philosophical outlook: a heuristic method that allows one to make progress without attempting to solve everything. This is a central feature of his «method of hypothesis».

3. Hypotheses

The Greek word *hypothesis* literally refers to what is *underlying* or *placed beneath*. In and around Plato's era it often carries the sense of *theme* or *topic*[22]. Sometimes it is used to mean *proposal* or *an idea put forward*[23]. More to our purpose, it can carry the sense of *foundation* or *principle*. In the *Memorabilia*, for example, Xenophon explains how Socrates would often lead a discussion back to the *hypothesis* (4.6.13). The example Xenophon gives concerns a discussion over which of two men is better, and the hypothesis turns out to be an account of what it means for a man to be better. Here, then, a hypothesis is something like an underlying principle or grounds for a claim. We find the sense of *foundation* in certain passages in Isocrates where he refers to the «foundation» on which lives are built (1.48.3 and 7.28.5). And in Demosthenes we read that «our principles and foundations [ἀρχὰς καὶ τὰς ὑποθέσις]» should be true and just (2.10.6-7). Much as Demosthenes brings together hypotheses and *archai* – *beginnings* or *principles* – we also find this connection in the *Hippocratic Corpus* where the hot, cold, dry and wet are referred to as hypotheses (*On Ancient Medicine* 1, 13, 15)[24]. The notion of an *archē* fits neatly into Greek geometrical analysis as that which grounds the thing sought. As Jacob Klein has it, a hypothesis is «something *without* which something else cannot be»[25].

Yet it is often thought that in the *Meno* hypothesis means *provisional assumption*[26]. That is certainly what English usage of the term hypothesis leads us to

Exact Sciences, edited by P. Suppes, J.M. Moravcsik and H. Mendell CSLI Publications, Stanford 2000, p. 6, who call reduction a «historical predecessor» to analysis.

22 E.g. Isocrates, *To Philip* 10.2, 83.7, 138.3; Demosthenes, 3.1.6, 19.242.5; and Aeschines, *Against Ctesiphon*, 76.9, 176.8, 190.1. Here and in what follows I draw on D. Wolfsdorf, *The Method* ἐξ ὑποθέσεως *at Meno 86e1-87d8,* cit., pp. 37-41.

23 Xenophon, *Oeconomicus*, 21.1.3, *Cyropaedia*, 5.5.13.3; Isocrates, *To Nicocles* 13.8.

24 See C.A. Huffman, *Philolaus of Croton: Pythagorean and Presocratic*, Cambridge University Press, Cambridge 1993, pp. 78-92, who notes that *hypothesis* can mean the same as αἴτιον or ἀρχή.

25 J. Klein, *A Commentary on Plato's Meno*, cit., p. 120.

26 R. Robinson, *Plato's Earlier Dialectic*, cit., pp. 93-113, argues that a hypothesis is posited provisionally at the «beginning of a process of thinking, in order to work on the basis thereof …. It guides your subsequent thinking» (p. 95). He also thinks one hypothesizes the thing sought (p. 121), as does J. Bedu-Addo, *Recollection and the Argument 'From a Hypothesis' in Plato's Meno*, cit.,

expect. However, in the Greek context, and especially in geometry, things are not quite so simple. Hypotheses, as we have seen, can function as causes or principles. The odd and the even, which play a fundamental role in mathematics, are identified as hypotheses in the *Republic* (510c) and Socrates calls a hypothesis an *archē* in the *Phaedo* (101e1) – but in the *Meno* it does perhaps seem that hypotheses are hypothetical in the English sense of *provisional*. Here Socrates proposes to draw on hypotheses in the manner of a geometer so that they can inquire whether virtue is teachable, in spite of the fact they do not know what virtue actually is.

> So we must, it appears, inquire into the qualities of something the nature of which we do not yet know. However, please relax your rule a little bit for me and agree to investigate whether it [*sc.* virtue] is teachable or not by means of a hypothesis. I mean the way geometers often carry on their investigations. For example, if they are asked whether a specific area can be inscribed in the form of a triangle within a given circle, one of them might say: «I do not yet know whether that area has that property, but I think I have, as it were, a hypothesis that is of use for the problem, namely this: If that area is such that when one has applied it as a rectangle to the given straight line in the circle it is deficient by a figure similar to the very figure which is applied, then I think one alternative results, whereas another results if it is impossible for this to happen. So, by using this hypothesis, I am willing to tell you what results with regard to inscribing it in the circle – that is, whether it is impossible or not.» (86d-87b)

Socrates seems to be saying that one can see whether a certain construction is possible by inquiring into whether a certain hypothesis holds – but he does not know whether or not the hypothesis does, as a matter of fact, hold[27]. So is the hy-

p. 3. R. Bluck, *Plato's Meno*, cit., pp. 75-94 emphasizes that hypotheses are provisional (including the hypothesis «virtue is knowledge», p. 88), as does and N. Iwata, *Plato's Hypothetical Inquiry in the Meno*, cit., pp. 202-203; and F. Grgić, *Plato's Meno and the Possibility of Inquiry in the Absence of Knowledge*, «Bochumer Philosophisches Jahrbuchfiir Antike und Mittelalter», 4, 1999, p. 36 n. 66. See also D. Scott, *Plato's Meno*, cit., p. 138; J. Klein, *A Commentary on Plato's Meno*, cit., p. 212 and H. Benson, *Clitophon's Challenge*, cit. p. 121.

[27] In fact, many have seen in the *Meno* an articulation of the «limiting conditions» (διορισμός) that would make the construction possible: e.g. I. Thomas, *Greek Mathematical Works*, vol. 1, p. 395; R. Bluck, *Plato's Meno*, cit., e.g., p. 79-80, who thinks Plato uses analysis to reduce the problem to its limiting conditions, as does M. Mahoney, *Another Look at Greek Geometrical Analysis*, cit., p. 334 and S. Menn, *Plato and the Method of Analysis*, cit., p. 211. Others discount the idea that Plato puts forward the limiting conditions, because this might not mesh with a reductive analysis: e.g. I. Mueller, *Mathematical Method and Philosophical Truth*, cit., pp. 178-179; and N. Iwata, *Plato on Geometrical Hypothesis in the Meno*, cit., pp. 14-15. But the most likely answer is that Plato is somehow doing both: that is, reducing the problem to a more general problem that also sets out the limiting conditions. This is explicitly claimed by W. Knorr, *The Ancient Tradition of Geometric Problems*, cit., pp. 73-74, who links this confusion with the fact that Plato is using a geometric technique (analogously) for philosophy. See also Mahoney, pp. 334-336; G.E.R. Lloyd, *The Meno and the Mysteries of Mathematics*, «Phronesis», 37, 1992, p. 173; and D. Wolfsdorf, *The Method* ἐξ ὑποθέσεως *at Meno 86e1-87d8*, cit., p. 47. To my mind a familiarly with analysis *qua* reductio) is the more immediately useful notion for the modern reader trying to make sense of Plato's text.

pothesis provisional or stable? Perhaps part of the problem here is the tendency of the English meaning of the term to obscure the ambivalence in Plato's usage. Hypotheses are explainers: they provide a solid basis.[28] However, when employed in geometric analysis to facilitate a reduction, a hypothesis can set out the «cause» of a thing sought even though this «cause» itself is not actually stable or solid; the provisional nature of the hypothesis co-existing with its explanatory sense. The explanatory or foundational sense is operative first. In analysis we are not (initially) testing the hypothesis, nor do we hypothesise (in the English sense) the hypothesis; it is the thing sought, not the hypothesis, that is hypothesised and that is the (initial) object of inquiry. But if the analysis leads us, not to a confirmed principle, but to something that itself needs further confirmation, we may then subsequently bring *this* under scrutiny. Once a hypothesis has been used to explain or address a problem, then the provisional nature of the solution may come to the fore. Thus, hypotheses in geometric analysis *are* more fundamental or underlying, but they can also be part of a provisional solution.

We can see this basic idea playing out in key passages of the *Phaedo* and *Republic* which also allude to hypotheses. Although a detailed defense of these passages would take us too far afield, I would like to glance over Plato's usage in these texts to flesh out how hypotheses can be employed. We can start with the *Phaedo* where Socrates relates his failed attempt to grasp the Good and the «second-best method» he must now resort to. This is a method for finding *aitia* which Socrates initially details as follows:

> Taking as my hypothesis [ὑποθέμενος] in each case the theory [λόγον] that seemed to me the most compelling, I would consider as true, about cause and everything else, whatever agreed with this, and as untrue whatever did not so agree. (100a)

As in the *Meno*, here too Socrates seeks *aitia*, in this case the things *responsible* for coming-to-be and destruction; although there is an enormous amount of scholarship on what it might mean to «agree with [συμφωνεῖν]» the hypothesis in this context, it seems quite clear that the hypothesis here plays an explanatory role as something more fundamental, again, as per the method of analysis[29]. Moreover,

[28] Thus Wolfsdorf, *The Method* ἐξ ὑποθέσεως *at Meno 86e1-87d8,* e.g. p. 41, argues that hypotheses in the *Meno* are cognitively secure, against the common view that they are provisional; see also S. Menn, *Plato and the Method of Analysis*, cit., p. 211: «[Plato] is recommending tackling a difficult question by reducing it step-by-step to more basic questions until we can answer it directly».

[29] To glance over the scholarship on what συμφωνεῖν means in 100a we can begin with R. Robinson, *Plato's Earlier Dialectic*, cit., pp. 126-129, who shows that *accord* and *discord* cannot be contradictories because if they mean *imply* and *fail to imply*, the absurd conclusion follows that anything not implied by the hypothesis is false, and if they refer to *consistency* and *inconsistency*, the absurd conclusion follows that anything consistent with the hypothesis is true. Robinson

Socrates goes on to explain that one should not initially question the hypothesis: «If someone then attacked your hypothesis itself, you would ignore him and would not answer until you had examined whether the consequences that follow from it agree with one another or contradict one another» (101d). We are (initially) to treat this hypothesis as something cognitively secure – until, of course, we come to examine the hypothesis itself, which requires another hypothetical reduction. As Socrates continues: «And when you must give an account of your hypothesis itself you will proceed in the same way: you will assume another hypothesis, the one which seems to you best of the higher ones until you come to something acceptable».

Here the connection with analysis (especially reduction) seems particularly conspicuous, yet for many scholars it is not immediately apparent what Socrates is talking about when he brings in this *higher hypothesis*, be it something that he will not develop until the *Republic*[30], a merely persuasive response to an objector[31] or something else. As David Gallop has argued, «it seems hard to find in the text, or to supply any "higher" hypothesis», and for David Bostock it is «perplexing in several ways»[32]. This makes for a striking contrast to the response of the audience in the dialogue, both Socrates' audience in the prison and Phaedo's external audience in Phlius (102a). Plato is quite emphatic on this point: once Socrates has finished his explanation Simmias and Cebes chime in unison their superlative consent (ἀληθέστατα...λέγεις, 102a2). Even more noticeably, Plato has Echecrates interrupt for only the second time in the dialogue to say, «It seems marvellous to me how clearly he [Socrates] put things, even for someone of small intelligence» (102a). And Phaedo, in response, concurs that it *was* marvellous. How can Socrates' «second-best method» be so familiar to Socrates' companions and so strange to us? I suggest that he is making use of his (Pythagorean) companions' familiarity with geometry: he is alluding to the method of analysis[33].

concludes that Plato is being vague and he really means *implication* and *inconsistency*, which are contraries (pp. 128-129). He is followed by D. Gallop, *Plato: Phaedo*, Oxford University Press, Oxford 1975, pp. 179-81 and D. Bostock, *Plato's Phaedo*, Clarendon Press, Oxford 1986, pp. 162-163. K.M. Sayre, *Plato's Analytic Method*, Chicago University Press, Chicago 1969, pp. 15-19 defends Socrates' use of contraries and suggests that «accord» here alludes to *convertible* propositions on the analogy of geometric analysis (see pp. 21-22, 27). D.T.J. Bailey, *Logic and Music in Plato's Phaedo*, «Phronesis», 50, 2005, p. 112 notes that it is reasonable for Socrates to mention contraries since the *Phaedo* is full of references to opposites.

30 E.g. J. Burnet, *Plato's Phaedo*, Clarendon Press, Oxford 1911, p. 114 and R. S. Bluck, ὑποθέσεις *in the Phaedo and Platonic Dialectic*, «Phronesis», 2, 1957, pp. 24-25.

31 E.g. R. Robinson, *Plato's Earlier Dialectic*, cit., pp. 137; but see D.L. Blank, *Socrates' Instructions to Cebes: Plato, Phaedo 101d-e*, «Hermes», 114, 1986, p. 150 and J. Gentzler, "συμφωνεῖν" *in Plato's Phaedo*, «Phronesis», 36, 1991, p. 275 for the idea that we may be «objecting to ourselves» in internal dialogue.

32 D. Gallop, *Plato's Phaedo*, cit., p. 190 (see pp. 188-192) and D. Bostock, *Plato's Phaedo*, cit., p. 166 (see pp. 166-170). See also R. Robinson, *Plato's Earlier Dialectic*, cit., pp. 136-41.

33 See K. Sayre, *Plato's Analytic Method*, cit., pp. 20-21 and 22-25 for arguments in support of this. Cf. J. Bedu-Addo, *The Role of the Hypothetical Method of the Phaedo*, «Phronesis», 24,

Plato, however, does not go into much detail about the higher hypothesis in the *Phaedo*; for this we turn to the image of the line in the *Republic*, which Socrates uses in his account of philosophical education. As is well known, Socrates divides this line so that the bottom two segments represent the physical world and the top two the intelligible realm. The latter is further divided thus:

> In one subsection, the soul, using as images the things that were imitated before, is forced to investigate from hypotheses, proceeding not to a first principle [ἀρχήν] but to a conclusion. In the other subsection, however, it makes its way to a first principle [ἀρχήν] that is not a hypothesis [ἀνυπόθετον], proceeding from a hypothesis but without the images used in the previous subsection, using forms themselves and making its investigation through them.
> I don't yet fully understand what you mean.
> Let's try again. You'll understand it more easily after the following preamble. I think you know that students of geometry, calculation, and the like hypothesize the odd and the even, the various figures, the three kinds of angles, and other things akin to these in each of their investigations, as if they knew them. They make these their hypotheses and don't think it necessary to give any account of them, either to themselves or to others, as if they were clear to everyone. And going from these first principles through the remaining steps, they arrive in full agreement. (510b-c)

Here again we find the same, «analytic» ambivalence in the notion of hypotheses. On the one hand, they clearly function as basic principles that a geometer can rely on without examining; but then these principles themselves come under scrutiny. Though I have emphasised how hypotheses function as principles, here we encounter a hypothesis that is *distinguished* from a first principle: the *un*-hypothetical first principle. The reason for this is that Socrates wishes to foreground the way each hypothesis is but a stepping-stone to the ultimate first principle[34].

1979, pp. 122-123; I. Mueller, *Mathematical Method and Philosophical Truth*, in R. Kraut (ed.), *The Cambridge Companion to Plato*, Cambridge University Press, Cambridge 1992, p. 182 and Y. Kanayama, *The Methodology of the Second Voyage and the Proof of the Soul's Indestructibility in Plato's Phaedo*, «Oxford Studies in Ancient Philosophy», 18, 2000, pp. 50-51. On the continuity between the hypothetical methods we find in the *Meno* and the *Phaedo*, see F. Ferrari, *Platone: Menone*, cit., pp. 70-71.

[34] Some have denied that the hypothetical method in *Republic* refers to geometrical analysis: e.g. R. Robinson, *Plato's Earlier Dialectic*, cit., p. 166, K. Sayre, *Plato's Analytic Method*, cit., pp. 41-43 and R. Mohr, *The Divided Line and the Doctrine of Recollection in Plato*, «Apeiron», 18, 1984, p. 35. Yet these scholars tend to assume the *downward* interpretation of analysis that makes deductions from the thing sought. As I understand it, Plato's allusion to geometric analysis draws on the way geometers employ diagrams to reduce a thing sought to something more basic; this resonates with Socrates' hypothetical method here in the *Republic* which details the attempt to move *upward*, reiterating the method until hitting something ultimate. An allusion to geometric analysis in *Republic* is detected by R. Bluck, *Plato's Meno*, cit., pp. 97-100; I. Mueller, *Mathematical Method and Philosophical Truth*, cit., pp. 184-186; S. Menn, *Plato and the Method of Analysis*, cit., p. 218; and M. Bonazzi, *Platone: Menone*, cit., pp. 153-154.

Viewed from the ultimate perspective of the first principle (which is the form of the Good), all the hypotheses lose their logical priority; yet it is clear that on the way *up*, each was respectively considered cognitively secure. This, then, recalls geometric analysis because of the possibility of moving *up* to a lemma, and then repeating the process again by reducing the lemma to another lemma, and so on until you hit something truly solid.

4. The analysis of the teachability of virtue

Let us now return to the *Meno.* Plato's geometric example, by sheer dint of its obscurity, has drawn a disproportionate amount of scholarship[35]. Be that as it may, Socrates presumably tries to give us the details we need to notice to understand the argument about the teachability of virtue that follows[36]. The first stage of this argument «reduces» the «problem» to the claim that *virtue is a kind of knowledge*. Whatever may have been current among geometers, it seems tolerably clear that in this moral argument the «analysis» moves *upwards* by divining an antecedent: Socrates asks, «Among the things existing in the soul, of what sort is virtue, that it should be teachable or not?» (Εἰ ποῖόν τί ἐστιν τῶν περὶ τὴν ψυχὴν ὄντων ἀρετή, διδακτὸν ἂν εἴη ἢ οὐ διδακτόν; 87b). If we are to adjudicate between an upward or a downward model of analysis for Plato, it seems more likely be the former. Socrates asks, if virtue is *what*, would it be teachable?[37] To facilitate this analysis, he makes use of the given claim that *knowledge is teachable*, while something that is not knowledge is not. This reduction is analogous to the hypothesis in the geometric example. It serves to relocate the question at hand to a more fundamental – hence *hypothetical* – level.

[35] While many have proffered reconstructions of the geometric example, others are less sanguine about this possibility: J. Klein, *A Commentary on Plato's Meno*, cit., pp. 206-207, calls it a hoax and several have suspected that it is deliberately opaque, e.g.: R. Bluck, *Plato's Meno*, cit., p. 441; R. Sharples, *Plato's Meno*, cit., p. 10; G. Vlastos, *Mathematics and Elenchus: A Turning-Point in Plato's Philosophical Development*, «The American Journal of Philology», 109, 1988, p. 380; R. Weiss, *Virtue in the Cave: Moral Inquiry in Plato's Meno*, Oxford University Press, Oxford 2001, p. 133; H. Tarrant, *Recollecting Plato's Meno*, cit., p. 56; D. Scott, *Plato's Meno*, cit., p. 137; and especially G.E.R. Lloyd, *The Meno and the Mysteries of Mathematics*, cit., pp. 81-82. Nevertheless (and perhaps because of this), the number of attempted reconstructions is well into the double digits. A popular solution was put forward independently by T. Heath, *A History of Greek Mathematics, vol. I: From Thales to Euclid*, cit., pp. 298-303 and J. Cook-Wilson, *On the Geometrical Problem in Plato's Meno, 86e sq.: with a Note on a Passage in the Treatise de Lineis Insecabilibus (970a5)*, «The Journal of Philology», 28, 1903, pp. 222-240. Surveys of the scholarship can be found in Bluck, p. 441; Sharples, pp. 158-160; G. Lloyd; D. Wolfsdorf, *The Method* ἐξ ὑποθέσεως *at Meno 86e1-87d8*, cit., pp. 46-54; and N. Iwata, *Plato on Geometrical Hypothesis in the Meno*, cit., p. 3.

[36] J. Klein, *A Commentary on Plato's* Meno, cit., pp. 207-208 and H. Tarrant, *Recollecting Plato's Meno*, cit., p. 56.

[37] *Contra* D. Wolfsdorf, *The Method* ἐξ ὑποθέσεως *at Meno 86e1-87d8,* cit., pp. 54-57, Socrates is here casting about for antecedents.

One of the more contentious issues here regards which items should be designated hypotheses as such. Where some argue that simple statements like *virtue is knowledge* are the hypotheses, others look to the conditional statement *if virtue is knowledge, it is teachable*[38]. To my mind, the former makes better sense of the geometry, though there does seem to be a certain looseness to Socrates' usage. In the geometric example, of course, the hypothesis is not really this or that statement, but a diagram; and Socrates does not discuss the analysis employed to reach the diagram, he simply states it as something he prepared earlier. This de-emphasises the particular steps involved in constructing the diagram and shifts attention to the fact that the problem can be treated in terms of something underlying. This is the core idea conveyed by the proposal to inquire «from a hypothesis». Socrates effectively says that in the attempt to solve problem p, if q holds, so too will p. In this sense the claim that «virtue is knowledge» seems a clear candidate for a hypothesis in the «analysis» of the teachability of virtue, though it is never identified as such. The claim that «virtue is knowledge» sets out a state of affairs which guarantees that virtue be teachable; it is an as-yet-unconfirmed antecedent.

«The next point to consider», Socrates continues, «seems to be whether virtue is knowledge or something else» (87c11-12). Socrates does not pursue this further inquiry in regard to the geometric example, but he does attempt it for the virtue argument. He accounts for the new problem – Is virtue knowledge? – via the given claim that *virtue is good*, which is self-evident (and is explicitly identified as a hypothesis at 87d2-3). Using this given claim, Socrates can now show that virtue is knowledge provided that all good things come from knowledge. Which is to say, if all goods are knowledge and virtue is a good, then virtue falls under knowledge. Thus, he concludes,

> If then there is anything else good that is different and separate from knowledge, virtue might well not be a kind of knowledge; but if there is nothing good that knowledge does not encompass, we would be right to suspect that it is a kind of knowledge. (87d)

[38] For the conditional hypothesis see e.g. J. Bedu-Addo, *Recollection and the Argument 'From a Hypothesis' in Plato's Meno*, cit., p. 9; and R. Weiss, *Virtue in the Cave*, cit., p. 131 n. 9. For the view that *virtue is knowledge* is the hypothesis see e.g. R. Robinson, *Plato's Earlier Dialectic*, cit., pp. 117-120; H. Zyskind and R. Sternfeld, *Plato's Meno 89c: 'Virtue is Knowledge' a Hypothesis?* «Phronesis», 21, 1976, pp. 130-134; R. Bluck, *Plato's Meno*, cit., pp. 86-87; and D. Scott, *Plato's Meno*, cit., pp. 137-140 and 221-224. Those who do *not* view hypotheses as provisional tend to take the self-evident claims *knowledge is teachable* and *virtue is good* as the hypotheses: F. Grgić, *Plato's Meno and the Possibility of Inquiry in the Absence of Knowledge*, cit., pp. 31-35; S. Menn, *Plato and the Method of Analysis*, pp. 211-212; D. Wolfsdorf, *The Method* ἐξ ὑποθέσεως *at Meno 86e1-87d8*, cit., pp. 42-46 and 53-54. M. Bonazzi, *Platone: Menone,* cit., pp. 148-154 identifies as hypotheses the claims that *virtue is knowledge* and *virtue is good*. Finally, N. Iwata, *Plato's Hypothetical Inquiry in the Meno*, cit., argues that only virtue is good counts as a hypothesis. But for all that, it is not entirely clear that Plato actually has a firm view on the matter (cf. I. Mueller, *Mathematical Method and Philosophical Truth*, cit., pp. 179-180) and I worry that this debate might miss the forest for the trees; see below.

Once again, we have shifted to an antecedent state of affairs; Socrates continues to look *up* to pursue his inquiry.

He now only needs to account for the claim that all good things come from knowledge, which he does by arguing, first, that those things that might benefit the body need to be guided by knowledgeable use (87e), and then, that the same is true of the qualities that might be good for the soul (88c). Thus, all goods come from knowledge which proves that virtue is indeed teachable. In this way Socrates reduces the first problem (whether virtue is teachable) to a second problem (whether virtue is knowledge), which, in turn, is shown to follow from the claim that all good things come from knowledge – which is directly argued for.[39] Thus, having conducted an analysis, we can now produce a deductive synthesis as follows: since virtue is good and all goods come from knowledge, then virtue (*qua* good) is a type of knowledge; and since knowledge is teachable, then virtue (*qua* knowledge) is indeed teachable. Later in the dialogue, of course, Socrates will retract the argument that all good things come from knowledge by arguing that true opinion can also provide this function (97).

So where in all this are the hypotheses? The foregoing interpretation creates a tension between two different readings. I have claimed that Socrates is interested in reducing a problem (or thing sought) to a hypothesis much as he reduced the teachability of virtue to the claim *virtue is knowledge*. Here I focus on the procedure of reduction to identify the hypothesis: you reduce the thing sought to a hypothesis, which is initially cognitively secure and only subsequently comes under scrutiny. This would make *virtue is knowledge* the natural candidate for being a hypothesis. Yet Socrates explicitly remarks that the given claim *virtue is good* is a hypothesis; and in the economy of the argument, Socrates does not reduce the problem-claim *virtue is knowledge* to the claim that *virtue is good*. Rather in the first stage of the argument *virtue is teachable* is shown to result from the claims (i) *knowledge is teachable* and (ii) *virtue is knowledge*; and in the second stage of the argument the claim *virtue is knowledge* is shown to follow from the claims (i) *virtue is good* and (ii) *all goods come from knowledge*. Thus:

Phase 1: *virtue is teachable* follows from
i: knowledge is teachable
ii: virtue is knowledge

[39] More exactly, Socrates argues that since (i) virtue is good and (ii) good things are beneficial, then (iii) virtue is beneficial (87e); he then uses the sub-conclusion (iii) virtue is beneficial with the claim (iv) only actions lead by knowledge are beneficial to reach his conclusion that «virtue, being beneficial, must be a kind of wisdom» (88d). This allows us to parse Socrates' argument in different ways depending on whether we take premise ii to be part of an independent phase of the analysis or part of the third and final phase. I'm not sure that a great deal hangs in the balance.

Phase 2: *virtue is knowledge* follows from
i: virtue is good
ii: all goods come from knowledge

If, as Socrates says, the claim that *virtue is good* is a hypothesis, then we should think that the hypothesis in the first stage of the argument is not *virtue is knowledge,* but *knowledge is teachable* (as most scholars hold – see note 38 above). It is, then, the self-evident claims labelled «i» that function as hypotheses. Nevertheless, I have identified the claim (ii) *virtue is knowledge* as a hypothesis since it seems clear that Socrates reduced *virtue is teachable* to *virtue is knowledge*. This fits with the notion analysis involves repeatable reductions to ever-higher hypotheses. That said, I suspect it is impossible to settle on a single solution that satisfies all the issues here.

Here, there is a danger that scholarly rigour can detract from the import of Plato's analogy. On the one hand, a lemma like *virtue is knowledge* counts as a hypothesis because of the role it plays in reduction of the initial problem. This is quite clear from a comparison with the geometrical example. Socrates had said: «If that area is such that...then I think one alternative results, whereas another results if it is impossible for this to happen. So, by using this hypothesis, I am willing to tell you...» (86d-87b; compare 87a2 with 87b5). The item identified as a hypothesis in this example must surely correspond to the claim *virtue is knowledge*. If virtue is *of this kind*, then it will be teachable. It does not seem possible to substitute in the claim *knowledge is teachable* as the hypothesis here. Rather, because it is a kind of knowledge, virtue is teachable. On the other hand, self-evident claims like *virtue is good* or *knowledge is teachable* resemble hypotheses insofar as they are self-evident or given. What's more, virtue is good is explicitly identified as a hypothesis. If forced to choose between these two alternatives, I would opt for the former because it draws attention to the role of reduction, which is crucial, not only in the *Meno*, but also in the *Phaedo* and *Republic*. To my mind, the purpose of Socrates' remarks about hypotheses is more to do with the general drift of the method of analysis than the precise issue of which particular items get designated as a hypothesis. This would suggest a certain looseness to Plato's usage – one that, ironically enough, those more directly familiar with analysis and synthesis would probably not notice. In either case a hypothesis is an explanatory condition assumed in relation to a given problem.[40]

[40] I borrow this description from M. Bonazzi, *Platone: Menone,* cit., p. 154. He identifies as hypotheses the claims that *virtue is knowledge* and *virtue is good*, not least because this makes it easier to harmonise Socrates' usage with what we find in other dialogues. I am very sympathetic to this approach, but I do not see that Bonazzi's hypotheses are equivalent: *virtue is knowledge* is a lemma, while *virtue is good* is a self-evident claim (much like *knowledge is teachable*). An-

5. Geometry and philosophy

Socrates resorts to something analogous to geometric analysis because he wants to pursue his inquiry *up* towards what his more basic and fundamental. Such considerations loom large in Plato's thinking, and not just in the heady metaphysics we encounter in dialogues like the *Republic* or the *Timaeus*. One such example can be seen here in the *Meno*. Later in the conversation, Socrates turns to discuss true opinion and how it differs from knowledge. Having remarked that true opinions seem no less useful than knowledge, Socrates induces Meno to wonder why indeed knowledge is valued more highly than right opinion. Charmingly enough, Socrates responds with a diagnosis of the *cause* of this bewilderment in Meno (δι' ὅτι θαυμάζεις). «It is because you have paid no attention to the statues of Daedalus, but perhaps there are none in Thessaly» (97d). Of course this is a piece of silliness. (If only Meno had looked at one of these statues, he would have figured it all out!) But it is not entirely nonsense; nor, however, is it the example we are interested in. This comes in the subsequent explanation that true opinions, like a Daedalian statue, are only good if you tie them down, this latter being knowledge.

> To acquire an untied work of Daedalus is not worth much...for it does not remain, but it is worth much if tied down, for his works are very beautiful. What am I thinking of when I say this? True opinions. For true opinions, as long as they remain, are a fine thing and all they do is good, but they are not willing to remain long, and they escape from a man's mind, so that they are not worth much until one ties them down by (giving) an account of the reason why [ἕως ἄν τις αὐτὰς δήσῃ αἰτίας λογισμῷ]. (97e-98a)

Knowledge essentially involves the possession of «causes» *aitiai*. Socrates goes on to argue that recollection is the method by which we come to divine these causes.

other comparable interpretation comes from D. Ebrey, *A New Philosophical Tool in the Meno: 86e–87c*, «Ancient Philosophy», 33, 2013, pp. 75-86. He notes that the hypothetical method allows Socrates to move from one problem to a more fundamental one (see pp. 81 and 87), yet the central feature of the method on Ebrey's reading is the use of bi-conditionals (especially *virtue is teachable if and only virtue is knowledge*). True enough, these can play a role in analysis (especially in a *diorismos*), but it is not clear that Socrates is thinking exclusively or primarily in terms of bi-conditionals. Accordingly, Ebrey's interpretation can seem Procrustean in places: e.g., the claim that Socrates moves to more fundamental problems now appears as an accidental feature of the method and Ebrey must reject the notion that the method of hypothesis is re-applied a second time (because the second iteration does not issue in a bi-conditional) – which requires rejecting Socrates' explicit claim that he is still hypothesising when it comes to the claim *virtue is good*. The problem here is that Ebrey tends to ignore Socrates' geometrical analogy. Though he touches on this at the end (pp. 94-95), it does not guide his interpretation; indeed, he makes a point of not focusing on the use of the term hypothesis (p. 93). While I agree there are difficulties with this term, it nevertheless lies at the heart of the analogy. Finally, my view can also be compared to that of F. Ferrari, *Platone: Menone,* cit., pp. 68 and 236 n. 159, who similarly notes the relevance of reduction and the repeatability of the hypothetical method. His view is developed in less detail, however, making less use of the geometric example.

Whatever this might mean, let it suffice to observe that the method of analysis too can move us *up* in the same direction. This, in general, is where Plato thinks knowledge resides.

Another such example can be found in the *Euthyphro* in a discussion over whether something becomes loved by the gods simply because the gods love it, or whether it must possess some independent quality that draws the gods' love. Socrates tries to persuade Euthyphro that *being carried* is somehow prior to being a *thing carried*, and that *being loved* is prior to being a *thing loved*[41]. Socrates renders a generalisation in the following terms:

> if anything is being changed or is being affected in any way, it is not being changed because it is something changed, but rather it is something changed because it is being changed; nor is it being affected because it is something affected, but it is something affected because it is being affected. (*Euthyphro* 10c)

Plato proposes, here again, to address a moral issue by seeking out what is most fundamental or basic[42]. Such causes will, of course, assume a tremendous amount of significance in Plato's metaphysics. Forms are explicitly called *aitiai* in the *Phaedo* and are clearly metaphysically prior to the particulars they explain. When philosophers ascend the ladder of love in the *Symposium* or come up out of the cave in the *Republic* or go up into the heavens in the *Phaedrus*' Palinode – they are ascending to something more fundamental. Even supposing the *Meno* was conceived earlier in Plato's development, it is perfectly natural that these basic assumptions about knowledge existed in his mind, at least inchoately. So much seems obvious from Socrates remarks (cited earlier) about a single form of virtue at 72c7-8: «Even if they are many and various, all of them have one and the same form which makes them virtues...»

Two core features of Plato's philosophical inquiry come to the fore here. The first is that it is directed towards the more fundamental. This speaks to something essentially hierarchical in Plato's worldview. His is a world separated «aristocratically» into things that are ontologically more important and more significant by their very nature, and those that are less so. Newton's law of gravitation (as I understand it) uses mass to explain certain movements; but although mass assumes an explanatory or epistemic priority here, it would be mere nonsense to suppose that it possesses some essential, metaphysical priority. Plato's forms, by contrast, are *essentially* more basic, more knowable, more real than the things

41 For the scholarship see D. Wolfsdorf, *Euthyphro 10a2-11b1: A Study in Platonic Metaphysics and its Reception Since 1960*, «Apeiron», 38.1, 2005, pp. 7-12.

42 Cf. A. Nathan, *Why is Plato's Good* Good*?*, cit., pp. 133-134.

they explain[43]. An epistemic implication of this is that we begin our inquiries at some remove from these explanatory causes. They are further away from the particulars they explain. This is the second feature I want to draw attention to in connection with Plato's use of *apagōgē*, reduction. Namely, as we move our way up the hierarchical chain, we do so in the absence of knowledge, which lies further up. This points to a rather disconcerting aspect of Platonic inquiry. And yet, as the method of analysis seems to suggest, one *can* make advancements even when moving from one unknown to another.

[43] Cf. A.R. Nathan, *The Study of Being in Plato and Aristotle*, «Peitho. Examina Antiqua», 14, 1, 2023, pp. 38-40.