Classical Quarterly 62.1 81–91 (2012) Printed in Great Britain
doi:10.1017/S0009838811000401

ACADEMIC DISCIPLINES IN ARISTOPHANES' *CLOUDS* (200–3)[1]

This paper will consider what Aristophanes' *Clouds* can teach us about the state of academic disciplines in late fifth-century Athens.[2] In particular, I will call attention to a moment in *Clouds* which suggests that Aristophanes not only possessed a concept of certain discrete academic disciplines, but that he expected his Athenian audience to have entertained one as well. I do not expect that this assertion will, at first glance, shock many readers of *Clouds*. It is not surprising, after all, to find the notion of distinct bodies of knowledge, investigation and teaching in a play satirizing contemporary education; as others have observed, a caricature has no point unless there are some facts upon which exaggerations may be based.[3] For this reason, it is curious that scholars investigating the origins of academic disciplines in antiquity have rarely invoked Aristophanes' testimony.[4] If my reading of *Clouds* is convincing, then it will mark one of the earliest explicit appearances of a concept that has only occasionally (and, I should add, controversially) been credited by historians of science to writers in the fifth century. The Presocratics and Hippocratics,[5]

[1] I am grateful to the anonymous referee at *CQ* for many comments and insights that contributed to the argument throughout. This essay grew from a seed planted in the footnotes to my dissertation, 'Tragic persuasion in early Greek rhetoric' (Diss., University of Pennsylvania, 2009), supervised by Sheila Murnaghan and Ralph Rosen. I am happy to be able to acknowledge here my debts to both of them for many years of assiduous support and advice.

[2] Works cited repeatedly as follows: Dover = K.J. Dover (ed.), *Aristophanes Clouds* (Oxford, 1968); Kahn = C.H. Kahn, 'On early Greek astronomy', *JHS* 90 (1970), 99–116; Brumbaugh = R.S. Brumbaugh, 'Scientific apparatus on stage in 423 B.C.', *YClS* 22 (1972), 215–21; Lloyd *MRE* = G.E.R. Lloyd, *Magic, Reason and Experience: Studies in the Origins and Development of Greek Science* (Cambridge, 1979); Charlton = W. Charlton, 'Greek philosophy and the concept of an academic discipline', *HPTh* 6 (1985), 47–61; Schiappa = E. Schiappa, *The Beginnings of Rhetorical Theory in Classical Greece* (New Haven, CT, 1999). References to the text of Aristophanes' *Clouds* are to Dover's edition (above). All translations and emphases are my own unless otherwise indicated.

[3] e.g. F.A.G. Beck, *Greek Education* (London, 1964), 236 argues that Aristophanes' *phrontistērion* ridicules a particular style of Athenian educational institution. Dover, xxxv–vi, however, is sceptical. Cf. P.A. Vander Waerdt, 'Socrates in the *Clouds*', in id. (ed.), *The Socratic Movement* (Ithaca, NY, 1994), 48–86, has argued against Dover's scepticism regarding the historicity of Aristophanes' 'Socrates'.

[4] e.g. the most recent contribution in G.E.R Lloyd, *Disciplines in the Making: Cross-Cultural Perspectives on Elites, Learning, and Innovation* (Oxford, 2009), 142 mentions Aristophanes once and only in connection with the trial of Socrates. This scarcity is striking in contrast with e.g. Beck (n. 3) and H.I. Marrou, *A History of Education in Antiquity*, tr. G. Lamb (Madison, WI, 1982), esp. ch. 4, which draws heavily upon the description in *Clouds* of the 'old education' (961: *τὴν ἀρχαίαν παιδείαν*), but is not concerned with individual disciplines.

[5] On the Hippocratics, see Lloyd *MRE*, ch. 3. For the Presocratics generally, see J. Barnes, *The Presocratic Philosophers* (London, 1982[2]), 122, 270 and *passim*; for the Milesians in particular, see D.R. Dicks, 'Solstices, equinoxes, and the Presocratics', *JHS* 86 (1966), 26–40; and response in Kahn, 99–101.

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Herodotus,[6] Gorgias[7] and the sophists, have all received individual attention, but historians of science have critiqued many of these possible candidates, especially by calling into question the problematic intersection in their works of science and philosophy.[8] 'It is some indication that the concept of an academic discipline did not exist before the fourth century, that Xenophon does not have it', writes Charlton (at 58), citing 'passages like' *Memorabilia* 1.1.11–15. There, Xenophon describes how little value Socrates found in sophistical contemplation: 'he demonstrated that those who thought about such matters were indulging in foolishness' (*τοὺς φροντίζοντας τὰ τοιαῦτα μωραίνοντας ἀπεδείκνυε*, 1.1.11). Nevertheless, various fifth-century texts do take up the question of what constitutes a *technē* and do attempt to systematize and teach a body of scientific knowledge. Thus my goal is not to position Aristophanes as the first to conceptualize or articulate disciplines in the ways he does, nor to argue that his notions of academic disciplines differ materially from those of his contemporaries. The Hippocratic treatises *On Ancient Medicine* and *De arte*, for example, both roughly contemporaneous with *Clouds*, aim to define and distinguish a medical *technē*, and I will refer to both throughout my analysis.[9] The underlying hope in my reading of Aristophanes' *Clouds* is rather to bring to bear a text that seems to have dropped out of sight in discussions of academic disciplines in antiquity, and to focus attention upon a moment in that text, which to date has not received due consideration.

In order that Aristophanes not fall prey to the same criticisms that have discredited other educators and intellectuals, however, it is important to establish some practical criteria by which we may recognize academic disciplines, even crudely formed. Over the course of this paper, I will suggest two such *sine quibus non*, drawn precisely from many of the criticisms (some above) typically levelled at fifth-century intellectuals: first, the need for a technical vocabulary and (more controversially) for a single name under which to organize the discipline.[10] The importance of having a uniform and acknowledged vocabulary emerges from many of the late fifth- and early fourth-century texts in which individual academic subjects are being discussed and defined. For instance, in the anecdote (cited above) from the *Memorabilia*, Xenophon calls the object of foolish speculation 'the so-

[6] G.E.M. de Ste Croix, 'Herodotus', *G&R* 24 (1977), 130–47; E.A. Havelock, 'The linguistic task of the Presocratics', in K. Robb (ed.), *Language and Thought in Early Greek Philosophy* (La Salle, IL, 1983), 7–82, at 56–7.

[7] I. Banu, 'Notes sur Gorgias', *StudClas* 22 (1984), 5–17. Schiappa, ch. 7 argues that Gorgias' *Helen* is 'predisciplinary'.

[8] F.M. Cornford, 'Was the Ionian philosophy scientific?' *JHS* 62 (1942), 1–7; Lloyd *MRE*, 266; Dicks (n. 5), 39, and response in Kahn, 99: 'such a dichotomy between early philosophy and early science in Greece is misguided in principle'. Cf. Charlton, 49.

[9] For the dates and authorship of *On Ancient Medicine* (*ΠΕΡΙ ΑΡΧΑΙΗΣ ΙΗΤΡΙΚΗΣ* = *VM*) and *On the Art* (= *De arte*), see H.W. Miller, '*On Ancient Medicine* and the origin of medicine', *TAPhA* 80 (1949), 187–202; G.E.R. Lloyd, 'The Hippocratic question', *CQ* 25 (1975), 171–92; M.J. Schiefsky, '*Technē* and method in the Hippocratic treatise "On Ancient Medicine"' (Diss., Harvard University, 1999), 2–3; and *Hippocrates On Ancient Medicine* (Leiden, 2005), esp. 63–71; D.G. Spatharas, 'Gorgias and the author of the Hippocratic treatise *De arte*', *C&M* 58 (2007), 159–63.

[10] On the first point, Charlton, 56 is able to dismiss the fragments of Empedocles and Anaxagoras, as well as Herodotus – though he admits (at 57–8) that history 'depends less than other academic disciplines on a technical vocabulary'. Schiappa, 23–8 defends the pre-eminence of naming in academic disciplines by citing, in particular, M. Foucault, *Discipline and Punish: The Birth of the Prison* (New York, 1979), 143; K. Burke, *Language as Symbolic Action* (Berkeley, 1966), 359–79; and F. de Saussure, *Cours de linguistique générale* (Paris, 1973).

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called "cosmos" of the sophists' (ὁ καλούμενος ὑπὸ τῶν σοφιστῶν κόσμος, 1.1.11). The controversy between Schiappa and O'Sullivan surrounding the use(s) and meaning(s) of the passive participle καλούμενος in the works of Plato reveals the significance of these naming moments; while Schiappa argues for two predominant uses – one as a preface to show that a word is being used self-consciously (*Phd.* 86d and 94d; *Resp.* 442a, 511c, 518d), the other to introduce new words or new meanings of old words (*Cra.* 406c; *Symp*. 190e; *Leg.* 894c) – O'Sullivan denies that this second meaning is possible, maintaining that καλούμενος 'cannot refer to a neologism or a new significance'.[11] In the passage from the *Memorabilia*, Xenophon attributes the marked word κόσμος to 'the sophists' (ὑπὸ τῶν σοφιστῶν), implying at least that it belonged to their accepted technical vocabulary. If so, then his use of καλούμενος seems clearly to belong to Schiappa's first category, and is thus free from O'Sullivan's trenchant criticisms. In turning to Aristophanes, however, and putting aside the debate surrounding specifics of the participle καλούμενος, we can observe both tendencies implied by Schiappa's categories: not only to use accepted words in new ways but also to invent technical terms (including names of disciplines) where none existed. In fact, Denniston's investigation of technical terms in Aristophanes opens with precisely this observation: 'Every living science, especially in its early stages, is compelled to devise fresh terms, either by coining new words or by giving new meanings to old ones. Unless and until these fresh terms become absorbed in the vocabulary of everyday speech, their unfamiliarity makes them a target for the shafts of the humourist.'[12] Denniston's concluding advice to readers of Aristophanes, seconded by Miller with regard to most technical terms, is thus to make generous use of inverted commas. 'Naturally', writes Miller, 'Aristophanes transmutes these words and uses them for his own purpose.'[13] The subject of his paper, and of Denniston's, is not comic coinages, but rather comic uses of acknowledged and attested technical terms. As I have already suggested, this is only half of Aristophanes' practice.

Charlton's only mention of Aristophanes in his paper on academic disciplines in antiquity (at 55) invokes the cleverly invented name of the *phrontistērion* as evidence for the lack of scientific schools in fifth-century Athens: 'If scientific schools had been a regular feature of the fifth-century scene, there would have been a word

[11] N. O'Sullivan, 'Plato and ἡ καλουμένη ῥητορική', *Mnemosyne* 46 (1993), 87–9, at 87 in response to a claim made by E. Schiappa in 'Did Plato coin *rhētorikē*', *AJPh* 111 (1990), 457–70, at 468–9. Schiappa in 'Plato and ἡ καλουμένη ῥητορική: a response to O'Sullivan', *Mnemosyne* 47 (1994), 512–14, at 513 is willing to grant O'Sullivan's point, but maintains that 'there is no reason to treat this one odd phrase as a sort of linguist's fieldguide to fifth-century usage, especially in the context of a fictional dialogue brimming with neologisms'.

[12] J.D. Denniston, 'Technical terms in Aristophanes', *CQ* 21 (1927), 113–21, at 113. Denniston's aim is precisely to identify the appearances of such terms in Aristophanes, especially literary critical terms in *Frogs*, which he finds 'full of technical jargon, barely understood by the "man in the street", and forming the object of his half-contemptuous amusement'. His method is noted and applied by H.W. Miller in 'Aristophanes and medical language', *TAPhA* 76 (1945), 74–84, whose express purpose (at 75) is 'to direct attention to those medical terms used by Aristophanes which appear to have been technical at the time'. Especially provocative for our current investigation is Aristophanes' use of ἰατροτέχνης at *Clouds* 332, which Miller (at 79) takes to be an oblique reference to Hippocrates. Dover, ad loc. is uncertain. Cf. Miller's earlier essay on 'Medical terminology in tragedy', *TAPhA* 75 (1944), 156–67; and the most recent contribution by T.K. Hubbard in 'Attic comedy and the development of theoretical rhetoric', in I. Worthington (ed.), *A Companion to Greek Rhetoric* (Oxford, 2010), 490–508.

[13] Denniston (n. 12), 121; Miller (n. 12 [1945]) 74–5.

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for them, and Aristophanes would not have invented the joke-name "phrontisterion" on the model of "bouleuterion".'[14] Schiappa (ch. 2 and *passim*) employs a similar argument (that is, from silence) against the existence of a rhetorical discipline in Aristophanes' day: 'Had the word ῥητορική been used by the Sophists or had it even been associated with them, Aristophanes certainly would have targeted it as one of the objects of his attack', Schiappa explains. 'That ῥητορική does not appear even once in this play [i.e. *Clouds*] is strong evidence that the term had not yet been invented.'[15] Still, as Charlton (at 55) himself admits, 'human creation is never *ex nihilo*', and Aristophanes' comic coinage φροντιστήριον depends at least in part upon the connotations of the Greek φρονέω and the suffix -τήριον. Havelock has observed that Aristophanes' recurring use of φροντίς to describe not only the school's building but the pursuits of its inhabitants as well – at 101 the resident faculty are described as 'anxious thinkers' μεριμνοφροντισταί – points to its status as current intellectual 'jargon'. Xenophon's use of the participle φροντίζοντας in the *Memorabilia* to denote the foolish indulgences of Socrates' interlocutors (1.1.11, see above) adds force to this argument.[16] So the accusations against Socrates, which Plato describes in the *Apology*, allegedly mischaracterize him as 'a wise man, someone who thinks deeply about astronomical phenomena' (σοφὸς ἀνήρ, τά τε μετέωρα φροντιστής, 18b). Goldberg, following Dover (ad 94), has also pointed out the official-sounding nature of the suffix -τήριον, which would have made the name of Aristophanes' comic school sound 'solemn, pompous, and absurd.'[17]

The author of *De arte* and *On Ancient Medicine* is highly concerned with scientific terminology and naming as well, proposing at one point that disciplines derive their names 'from some elementary nature' (ἔκ τινος εἴδεος, *De arte* 2.9): 'the existence of a name', explains Schiefsky, 'is thus a sign of the existence of an *eidos*'.[18] After describing the primitive processes by which humans gradually sought out and developed suitable diets, the author of *On Ancient Medicine* exclaims, 'What more just and fitting name can be assigned to this discovery and

[14] The argument is set specifically in opposition to Beck (n. 3), 141–3. Cf. other evidence for Socratic schools in Xen. *Mem*. 1.6.14 and Epicrates fr. 11. See Dover, xxxii–lvii, and ad 94 and 101.

[15] Schiappa (n. 11 [1990]), 459. Cf. P. Chantraine, 'Le suffixe grec –IKOS', in id., *Études sur le vocabulaire grec* (Paris, 1956), 97–117; T. Cole, *The Origins of Rhetoric in Ancient Greece* (Baltimore, 1991), 2 and 115–58; A. Ford, *The Origins of Criticism: Literary Culture and Poetic Theory in Classical Greece* (Princeton, NJ, 2002), 4 and 10–13 has also argued judiciously against the use of disciplinary labels such as 'rhetoric' in the fifth century. Charlton, 52–3 credits Plato and Aristotle with the invention of a number of technical terms, which he deems essential to the concept of an academic discipline. Cf. the recent contribution by D.M. Timmerman and E. Schiappa, *Classical Greek Rhetorical Theory and the Disciplining of Discourse* (Cambridge, 2010).

[16] Cf. *Clouds* 155, where the student at Socrates' school describes one of Socrates' ideas as a φρόντισμα. E.A. Havelock, 'The Socratic self as it is parodied in Aristophanes' *Clouds*', *YClS* 22 (1972), 9 n. 24; Denniston (n. 12), 119–20.

[17] S.M. Goldberg, 'A note on Aristophanes' *phrontisterion*', *CPh* 72 (1976), 255–6; D. O'Regan, *Rhetoric, Comedy, and the Violence of Language in Aristophanes' 'Clouds'* (Oxford, 1992), 27–8, esp. n. 42.

[18] Schiefsky (n. 9 [1999]), 28–9, esp. n. 44; later in the *De arte*, diseases that cannot be seen are called 'invisible' (ἄδηλα) precisely because 'they are determined to be by the field' (τῇ τέχνῃ κέκριται εἶναι, *De arte* 11.2–3). For the uses of the term εἶδος in the Hippocratic Corpus, see C.M. Gillespie, 'The use of εἶδος and ἰδέα in Hippocrates', *CQ* 6 (1912), 179–203; Miller (n. 9), 200–1, and '*Dynamis* and *physis* in *On Ancient Medicine*', *TAPhA* 83 (1952), 184–97, at 196–7.

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investigation than that of "medicine"?' (*Τῷ δ' εὑρήματι τούτῳ καὶ ζητήματι τί ἄν τις οὔνομα δικαιότερον ἢ προσῆκον μᾶλλον θείη ἢ ἰητρικήν*; *VM* 3.36–8). Later in the treatise, the author criticizes those practitioners who depend upon 'hypotheses' and 'postulates' and prescribe cures based on the qualities of heat and cold, dryness and moisture: 'It is impracticable to recommend to a sick man, "apply some heat"', he explains, 'for right away he would ask, "What is that?" And hence the need to speak technical nonsense …' (*Ἐπεὶ ἐκεῖνό γε ἄπορον προστάξαι τῷ κάμνοντι, θερμόν τι προσενέγκασθαι· εὐθὺς γὰρ ἐρωτήσει, τί ἐστιν; ὥστε ληρέειν ἀνάγκη …*, *VM* 15.8–11). Aristophanes is certainly no stranger to speaking technical nonsense, and it is perhaps no coincidence that the author of *On Ancient Medicine* parodies a weakness in traditional medicine by imagining in dialogue form this brief, absurd exchange between a doctor and a patient.[19]

The second useful characteristic of a discipline that I will suggest is implied by Plato's critique (in *Timaeus* 91d, for instance, and *Republic* 7.529–31) of many natural scientists, who rely too closely on their senses for conducting empirical research – a criticism levelled also by earlier Presocratic thinkers.[20] On this point, Dicks and Neugebauer have denied the existence of scientific astronomy before about 430 B.C., emphasizing mathematical precision in addition to empirical observation as essential features.[21] Kahn has challenged this history by observing the mathematical underpinnings of Presocratic astronomy: 'Anaximander proposed a clearly defined geometrical system of cylindrical earth and rotating astral rings with relative dimensions specified by numerical ratios.'[22] Still, Plato's criticisms, echoed by Dicks, are instructive, and they seem to indicate a basic need for scientific tools to supplement the eyes and ears, as well as for instruments to record and measure the processes and results of investigation. As Kahn admits, there is no evidence for accurate astronomical measurements or predictions before those of Meton and Euctemon around 432 B.C., and Brumbaugh argues for the role of measures and models in the development of Western science.[23] When told of Socrates' inquiry into the distance a flea can jump, Strepsiades' first question is conspicuously, 'How then did he measure it?' (*πῶς δῆτα διεμέτρησε;* 148), and brings out the interest in accurate measurement associated with effective academic inquiry and teaching.[24]

[19] Forms of the verb *ληρέω* appear at *Eq*. 536, *Plut*. 508 and 517, and *Ran*. 512; see also Hippoc. *Acut. (Sp.)* 10.50. On the critique in *VM* of 'hypotheses', see Miller (n. 9), 187 n. 4, (n. 18), 184–8, and '*Technē* and discovery in *On Ancient Medicine*', *TAPhA* 86 (1955), 51–62, esp. at 53–5; G.E.R. Lloyd, 'Who is attacked in *On Ancient Medicine*?' *Phronesis* 8 (1963), 108–26, reprinted in *Methods and Problems in Greek Science* (Cambridge, 1991), 49–69; Lloyd *MRE*, 147–8; D.W. Vickers, 'The naive empiricism of *On Ancient Medicine*', *Apeiron* 13.1 (1979), 1–8; Schiefsky (n. 9 [1999]), 8–21 and (n. 9 [2005]), 55–62.

[20] Charlton, 51–2 cites similar warnings by Empedocles (B17.21 DK), Anaxagoras (B21 DK) and Democritus (B11 DK).

[21] Dicks (n. 5), 39; O. Neugebauer, 'The history of ancient astronomy, problems and methods', *JNES* 4 (1945), 1–38; and *History of Ancient Mathematical Astronomy* (New York, 1975).

[22] Kahn, 100, who does not care to argue over names and labels: 'if anyone wishes to call [Anaxagoras'] theory of eclipses "pre-scientific" before it reaches the stage of precise prediction, we need not quarrel about a name'. On Anaximander's system see more recently G. Naddaf, 'On the origin of Anaximander's cosmological model', *JHI* 59 (1988), 1–28; and C.H. Kahn, 'Some remarks on the origin of Greek science and philosophy', in A.C. Bowen (ed.), *Science and Philosophy in Classical Greece* (New York, 1991), 1–10, at 3.

[23] Kahn, 99; Lloyd *MRE*, 171–3; Brumbaugh, 215–21.

[24] For technical uses of the verb *διαμετρέω*, see Gal. 19.557; Cleom. *Astro*. 1.11; Simp. *In Cael*. 480.6. Dover, xl doubts that the question is one 'which a real Strepsiades would have asked', but he admits the implication that 'there was probably much more scientific experiment

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Again we find support for this proposition in the Hippocratic treatises, both of which obsess over precision and instruments. The rejection in *On Ancient Medicine* of the traditionally 'hypothetical' approach to medicine is based on the argument that such an approach is inexact, that 'it is not clear to the speaker himself nor to his audience whether [what was said] is true or not' (*οὔτ' ἂν αὐτέῳ τῷ λέγοντι οὔτε τοῖσιν ἀκούουσι δῆλα ἂν εἴη, εἴ τε ἀληθέα ἐστὶν εἴτε μή*, *VM* 1.19–20). As Schiefsky has argued, 'it was a widespread view that a *technē* needed to be able to achieve *akribeia* ['precision'], and any discipline that could claim only limited *akribeia* ran the risk of not being recognized as a *technē* at all'.[25] The author of *On Ancient Medicine* is painfully aware throughout the treatise that precision in his field is impossible: 'I heartily applaud that doctor', he comforts the reader, 'who makes little mistakes' (*κἂν ἐγὼ τοῦτον τὸν ἰητρὸν ἰσχυρῶς ἐπαινέοιμι τὸν σμικρὰ ἁμαρτάνοντα*, *VM* 9.14–15).[26] The *De arte* (11.18–20) also admits that, based on their descriptions, doctors are sometimes unable to diagnose a patient's symptoms exactly and that 'only when the art [of medicine] has a full understanding does it resolve to treat' (*ἡ μὲν γὰρ αἰσθανομένη ἀξιοῖ θεραπεύειν*, 11.21). After all, the author recognizes that medicine is limited 'by the instruments of the art' (*Ὧν γάρ ἐστιν ἡμῖν τοῖσί τε τῶν φυσίων <u>τοῖσι τε τῶν τεχνέων ὀργάνοις</u> ἐπικρατέειν, τουτέων ἐστὶν ἡμῖν δημιουργοῖς εἶναι, ἄλλων δὲ οὔκ ἐστιν*, 8.10–12). This admission is a nod to those critics who claim that 'if medicine were a science, all would be equally cured' (*εἴπερ ἦν ἡ τέχνη, πάνθ' ὁμοίως ἰᾶσθαι*, 8.4–5). In response, the *De arte* argues that medicine is not to be blamed for its inability to perform unnatural tasks: 'if any should think that an art can accomplish things to which that art is not disposed, or that nature can accomplish things to which nature is not disposed, he is guilty of a misunderstanding closer to insanity than ignorance' (*εἰ γάρ τις ἢ τέχνην, ἐς ἃ μὴ τέχνη, ἢ φύσιν, ἐς ἃ μὴ φύσις πέφυκεν, ἀξιώσειε δύνασθαι, ἀγνοεῖ ἄγνοιαν ἁρμόζουσαν μανίῃ μᾶλλον ἢ ἀμαθίῃ*, 8.8–10). From these passages emerges a notion of medicine as a field of research and practice conscientiously delineated within the strict limits imposed by the capacities of its tools and instruments.

With these two complementary principles in mind – the needs of aspiring academic disciplines for a technical vocabulary and for precise measuring instruments – let us turn to a scene in the revised *Clouds* (*c*. 419–416 B.C.),[27] which has been

in the fifth century than a cursory acquaintance with the fragments of the Presocratics might suggest'. On this point, Miller (n. 19), 53 n. 12 observes 17 occurrences of *ζητέω* and 30 of *εὑρίσκω* and its derivatives in the brief treatise *On Ancient Medicine*.

[25] Schiefsky (n. 9 [1999]), ch. 3 and (n. 9 [2005]), 13; Miller (n. 18), 185; Lloyd *MRE*, 147.

[26] Cf. *VM* 12.5–13; Miller (n. 19), 57–8; Schiefsky (n. 9 [2005]), 262–74.

[27] On the revised version of the comedy and its date, see Dover, lxxx–xcviii; T.K. Hubbard, 'Parabatic self-criticism and the two versions of Aristophanes' *Clouds*', *ClAnt* 5 (1986), 182–97 and *The Masks of Comedy. Aristophanes and the Intertextual Parabasis* (Ithaca, NY, 1991), 88–112; E.C. Kopff, 'The date of Aristophanes *Clouds* II', *AJPh* 110 (1990), 318–29, who argues for the later date of 414; I.C. Storey, 'The dates of Aristophanes' *Clouds* II and Eupolis' *Baptai*: a reply to E. C. Kopff', *AJPh* 114 (1993), 71–84; R.M. Rosen, 'Performance and textuality in Aristophanes' *Clouds*', *YJC* 10 (1997), 397–421; and A.H. Sommerstein, 'The silence of Strepsiades and the *agon* of the first *Clouds*', in *Talking about Laughter* (Oxford, 2009), 176–91, who argues (at 187 and n. 32) with Storey (above), 78–81, that Aristophanes' revision 'was not a fundamental rewrite, more a series of adjustments' which left much of the play essentially the same as the original production. I am indebted to the anonymous referee at *CQ* for the compelling observation that line 186 in this very scene (*τοῖς ἐκ Πύλου ληφθεῖσι, τοῖς Λακωνικοῖς*) would probably not have been written after the spring of 421 B.C.; see Dover, ad loc.

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left out of traditional histories of science and philosophy. The moment in question occurs soon after Strepsiades' enrolment in Socrates' *phrontistērion*, where he has come to learn how to argue his way out of debt. On arrival, Strepsiades is greeted by a current student, who explains to him the school's groundbreaking research on the physiology of gnats.[28] A few fart jokes later, with the ice effectively broken, Strepsiades asks: 'In heaven's name, what are these? Tell me!' (*πρὸς τῶν θεῶν, τί γὰρ τάδ' ἐστίν; εἰπέ μοι*. 200) And the student answers, 'Why, this here is *astronomy*' (*ἀστρονομία μὲν αὑτηί*). Emboldened, Strepsiades continues, 'And what about this here?' (*τουτὶ δὲ τί*; 201) '[This here is] *geometry*', replies the student (*γεωμετρία*). What has happened during this exchange?

First, it is important to observe that the scene in *Clouds* is one of the earliest uses of two words, *ἀστρονομία* and *γεωμετρία*, both of which have enjoyed long and healthy lives (beginning around this time) as the names of academic disciplines.[29] Herodotus credits the Egyptians under Sesostris (*c*. 1300 B.C.) with the invention of geometry as a method for the king to keep track of tax revenues, by measuring individual plots: in the event of a flood, 'he would send out people to inspect and measure how much smaller the plot had become' (*ὁ δὲ ἔπεμπε τοὺς ἐπισκεψομένους καὶ ἀναμετρήσοντας ὅσῳ ἐλάσσων ὁ χῶρος γέγονε*, 2.109).[30] Similar accounts appear in Plato, Diodorus Siculus and Strabo, while Aristotle credits the Egyptian priestly class with developing mathematics to fill their abundant leisure time.[31] 'It seems to me', explains Herodotus, 'that once it was discovered, geometry passed over from here [i.e. from Egypt] to Greece' (*Δοκέει δέ μοι ἐνθεῦτεν γεωμετρίη εὑρεθεῖσα ἐς τὴν Ἑλλάδα ἐπανελθεῖν*, 2.109). Franciosi compares this passage in Herodotus – which is the earliest mention we have in Greek of the concave sundial (*πόλος*) and the twelve-part day – with Aristophanes' use of the *πόλος* (in frr. 5 and 163). His claim is that the instrument was thus well known in Greece in the fifth century and perhaps even an invention resulting from the geometric nature of early Greek astronomy.[32] For our purposes, it is particularly instructive that Franciosi's assessment of these disciplines relies at least in part on the nature and use of the *πόλος*; the importance of tools and instruments to the disciplinary status of ancient *technai* is, of course, a significant part of my argument in this paper.

These two disciplines (geometry and astronomy) are related elsewhere in the tradition as well. Plato relates, for example, that Hippias gave lessons not only 'concerning the stars and the lunar cycles' (*τὰ περὶ τὰ ἄστρα τε καὶ τὰ οὐράνια πάθη*, *Hp. Mai.* 285c1), but 'about geometry' (*περὶ γεωμετρίας*, 285c3).[33] Likewise,

[28] J.W. Spaeth, Jr., 'A note on Aristophanes *Clouds* 143–152', *CJ* 29 (1933), 135–6.

[29] Ath. 9.491c–d attributes to Hesiod an early work on astronomy (= Hes. fr. B1 DK); Hippoc. *Aer*. 2.16–18 admits that meteorology and astronomy contribute 'not a small share to medicine, but in fact a whole lot' (*ὅτι οὐκ ἐλάχιστον μέρος ξυμβάλλεται ἀστρονομίη ἐς ἰητρικὴν, ἀλλὰ πάνυ πλεῖστον*). See D.R. Dicks, *Early Greek Astronomy to Aristotle* (London, 1970); G.E.R. Lloyd, 'The definition, status, and methods of the medical *τέχνη* in the fifth and fourth centuries', in Bowen (n. 22), 249–60.

[30] Lloyd (n. 4), 33.

[31] Pl. *Phdr.* 274c; Diod. Sic. 1.69.81; Strabo 17.3; Arist. *Metaph*. A 1.981b23. T.L. Heath, *A History of Greek Mathematics, Volume I: From Thales to Euclid* (Oxford, 1921), 121–2.

[32] F. Franciosi, 'Herod. 2,109. Astronomia come scienza esatta e parti del giorno', *A&R* 27 (1982), 170–83.

[33] Cf. Pl. *Prt*. 315c. For astronomy and geometry as related inquiries, Lloyd *MRE*, 169–200 and Lloyd (n. 4), ch. 2 provide excellent and thorough treatments.

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in Xenophon's *Memorabilia*, Socrates praises the practical uses of geometry for measuring land (4.7.2) and astrology (4.7.4) for telling time, navigating at night, and distinguishing the seasons; but, Xenophon recalls, 'he rejected the study of more complex geometrical figures, saying that he saw no use in them' (*τὸ δὲ μέχρι τῶν δυσσυνέτων διαγραμμάτων γεωμετρίαν μανθάνειν ἀπεδοκίμαζεν. ὅ τι μὲν γὰρ ὠφελοίη ταῦτα, οὐκ ἔφη ὁρᾶν*, 4.7.3), and he strongly advised against studying astronomy (*τὸ δὲ μέχρι τούτου ἀστρονομίαν μανθάνειν … ἰσχυρῶς ἀπέτρεπεν*, 4.7.5), again on the grounds that 'he saw no use in these matters' (*ὠφέλειαν μὲν γὰρ οὐδεμίαν οὐδ' ἐν τούτοις ἔφη ὁρᾶν*, 4.7.5).[34] The same attitude towards geometry and astronomy appears in Isocrates, who praises 'those who busy themselves with astrology and geometry and these sorts of studies' (*τοὺς περὶ τὴν ἀστρολογίαν καὶ γεωμετρίαν καὶ τὰ τοιαῦτα τῶν μαθημάτων διατρίβοντας*, *Antid.* 261), but argues that 'neither of these has any use for either private or public life' (*οὐδὲν γὰρ αὐτῶν οὔτ' ἐπὶ τῶν ἰδίων οὔτ' ἐπὶ τῶν κοινῶν εἶναι χρήσιμον*, 262).

As the scene in *Clouds* continues, Strepsiades voices the same practical concerns, asking, 'What is the use of this?' (*τοῦτ' οὖν τί ἐστι χρήσιμον;* 202), and the student explains, as in Herodotus' account, that the device is used 'to measure out the earth' (*γῆν ἀναμετρεῖσθαι*, 202). When in response Strepsiades inquires whether the purpose of this is to measure out 'land for allotments' (*πότερα τὴν κληρουχικήν;* 203), the word *κληρουχικός* appears to be another comic coinage by Aristophanes. Such words with the termination *-κός* (usually *-ι-κός*) were the subject of a study, now a century old, by Peppler, who credited them to the rising influence of philosophers and sophists, and who recognized Aristophanes' comedic use of these adjectives to mark the conflict between old and new cultures and fashions.[35] Though Peppler neglected to discuss the instance in line 203, he noted a handful of other examples in *Clouds*: when Socrates asks Strepsiades whether he has a good memory (*εἰ μνημονικὸς εἶ*, 483), when Strepsiades is instructed to come up with 'a device for cheating' (*νοῦς ἀποστερητικός*, 728), when he claims later to have discovered 'a device for cheating on interest payments' (*ἔχω τόκου γνώμην ἀποστερητικήν*, 747), when he chides Phidippides for his 'antiquated notions' (*φρονεῖς ἀρχαιϊκά*, 821) and elsewhere.[36] While Aristophanes may be prone to inventing mock-intellectual terms or scientific jargon of this nature – his *phrontistērion* is another obvious example – the terms *ἀστρονομία* and *γεωμετρία* possess clear intellectual currency.

Next, there is little doubt that Strepsiades' inquiries concern various physical objects lying about the *phrontistērion* – and thus the comic stage, as elaborated in Brumbaugh (218–21) – though the exact nature of these objects is left to the readers' imagination. This much is clear from Aristophanes' text itself: lines 200–1 contain two forcefully demonstrative pronouns, 'this *here*' (*αὑτηί* and *τουτὶ*), both

[34] Dover, xlv and ad 332 notes the importance of astronomy (and meteorology) in ancient medicine, citing Hippoc. *Aer. passim* and Pl. *Symp*. 188a–b.

[35] Cf. Ar. *Eq*. 18 and 1378–81; Thuc. 1.18.2, 1.93.3, 1.84.3, 3.58.1, 7.21.3, 8.6.3; C.W. Peppler, 'The termination *-κός*, as used by Aristophanes for comic effect', *AJPh* 31 (1910), esp. 432–8; C.C. Jernigan, 'Incongruity in Aristophanes' (Diss., Duke University, 1939), 42–4. More recently, see Dover ad 318; O'Regan (n. 17), 83; and Hubbard (n. 12), 494.

[36] Cf. 1172–3 and 1258; Peppler (n. 35) 434–5; Dover ad 728.

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with the deictic -*ί* suffix.[37] Beginning with the scholiasts, generations of readers have imagined these tools in various ways. One ancient commentator, for example, explains that, 'upon entering, [Strepsiades] sees the instruments of the philosophers: a slab or globe or drawing' (*Σ*[M] ad 200: *εἰσελθὼν ὁρᾷ τὰ τῶν φιλοσόφων σκεύη, ἄβακα ἢ σφαῖραν ἢ ζωγραφίαν*); others list 'a tablet and a globe' (*Σ*[NE] ad 200: *πίνακα καὶ σφαῖραν*). Dover (ad 201) challenges in particular the inclusion of a 'globe' among these instruments, agreeing instead with *Σ*[V], which lists 'some geometrical figures and tablets' (*διαγράμματά τινα καὶ πίνακας*).[38] Regarding geometry, Dover (ad 202) explains that the objects onstage may have included 'rulers, set-squares, and compasses … and also probably sighting instruments.' Merry's 1879 commentary envisioned 'sundry philosophical instruments, such as some sort of celestial globe to designate *Astronomy*, an *abacus* to represent *Geometry*'.[39] Henderson's and Arrowsmith's translations, like others, supply the necessary stage directions to complement the two deictic demonstratives in 200–1: Henderson indicates that Strepsiades is 'pointing at the instruments', and Arrowsmith more elaborately that he is 'staring at various maps and instruments on the walls' and 'pointing to surveying instruments'.[40] The actual props used onstage are less relevant to my point than the fact that both disciplines are defined in terms of their respective tools, which the student collectively names 'astronomy' and 'geometry'. Aristophanes thus concretizes these disciplines in two distinct ways: (1) by naming them *ἀστρονομία* and *γεωμετρία*, according to current trends in scientific education, and (2) by showcasing on stage a recognizable set of physical instruments for practice and measurement.

I would like to conclude by returning briefly to the controversy surrounding the origins of Greek rhetoric, which arose earlier in my preliminary discussion of naming disciplines. The studies of Schiappa and Cole, now nearly twenty years old, argued that the absence of the word *ῥητορική* before Plato (*Grg*. 448d9, *c*. 385 B.C.) suggests the strong possibility that no single, unified discipline of persuasive speechmaking and argumentation existed in the fifth century.[41] In response to their revised history of rhetoric, I would propose a useful parallel (albeit a generation apart) between Aristophanes' conception of disciplines in the *Clouds*, as I have explored above, and Plato's attempt at a synthetic rhetoric in the *Phaedrus*. Scholars

[37] I am once again happy to acknowledge the anonymous referee at *CQ* for helping me to articulate more clearly this part of my argument.

[38] For *διαγράμματα* as 'geometrical figures', see Xen. *Mem*. 4.7.3, and Pl. *Phd.* 73b. Dover, ad loc. notes, 'In view of what the Greeks did know and could measure in Ar.'s time (cf. p. xl) instruments for accurate sighting and alignment, coupled with accurate time-measurement, must have existed.' Lloyd *MRE*, 181–4 discusses particular improvements in astronomical instruments early in the fourth century. Cf. D.R. Dicks, 'Ancient astronomical instruments', *Journal of the British Astronomical Association* 64 (1953–4), 77–85.

[39] W.W. Merry, *The Clouds* (Oxford, 1879), ad 183; Brumbaugh, 219. A similar exchange occurs between Pisetaerus and the geometer Meton in *Birds* (992–1018), when the latter arrives on stage bearing a panoply of mathematical devices. 'Tell me', asks Pisetaerus, 'what is this stuff of yours?' (*Εἰπέ μοι, ταυτὶ δέ σοι τί ἐστι*; 998); and Meton replies by explaining the purpose of the 'straight-edges for the air' (*Κανόνες ἀέρος*) and 'compass' (*διαβήτην*). The 'compass' (*διαβήτην*) also appears in *Clouds* (178) as Socrates' mischief-making tool: Brumbaugh, 218.

[40] J. Henderson (ed.), *Aristophanes: Clouds, Wasps, Peace* (Cambridge, MA, 1998), ad loc.; W. Arrowsmith (tr.), *Aristophanes: The Clouds*, in id., R. Lattimore and D. Parker (edd.), *Four Plays by Aristophanes* (Harmondsworth, 1962), 36–7.

[41] See nn. 10–11 and 14 above, and the recent summary by T. Poulakos in 'Modern interpretations of Classical Greek rhetoric', in Worthington (n. 12), 16–24, at 19–20.

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have commonly recognized in this dialogue (especially 266c–267c) one of the earliest attempts to classify the persuasive techniques of individual sophists, who otherwise 'shared few if any common doctrines, principles, or methods.'[42] Lloyd, Charlton and others have argued that Greek science developed alongside – and, in some ways, in reaction to – developing principles of argumentation in the fifth century, and Solmsen has vividly described the thrill and ferment of what he somewhat fancifully characterizes as 'the Greek enlightenment': 'The pleasure of theorizing and discovering at every turn a truth not previously brought to light would prove attractive to bright minds in this age when traditional opinions were discredited and the individual intellect felt emancipated.'[43] But, he complains, 'No attempt is ever made to integrate a large number of these newly uncovered verities'. As far as we can tell, this process of synthesis belongs to the fourth century, when the individual elements of persuasive speech were first brought into relation with one another, combined into a comprehensive discipline, and given the name *ῥητορική*.

During the discussion of 'rhetoric' in *Phaedrus*, Socrates makes precisely this point, lamenting (like Solmsen) the lack of synthesis in contemporary treatments of persuasion. In particular, he alludes to the scattered nature of persuasion by noting two contrasting 'forms' of inquiry (*δυοῖν εἰδοῖν*, 265c9): 'if only some art could understand their nature, it would not be a thankless task' (*εἰ αὐτοῖν τὴν δύναμιν τέχνῃ λαβεῖν δύναιτό τις, οὐκ ἄχαρι*, 265d1). These two 'forms' are the processes of collection and division for which the scene is famous:[44] on the one hand, 'seeing things scattered all around, to collect them into a single notion' (*Εἰς μίαν τε ἰδέαν συνορῶντα ἄγειν τὰ πολλαχῇ διεσπαρμένα*, 265d3–4); and, on the other hand, 'to be able to separate [them] by species according to their natural joints' (*Τὸ πάλιν κατ' εἴδη δύνασθαι διατέμνειν κατ' ἄρθρα ᾗ πέφυκεν*, 265e1–2). These two complementary skills are critical to the disciplinary notions of rhetoric and dialectic that emerge from the ensuing discussion, in which Socrates and Phaedrus attempt to collect the tools and techniques of persuasion into a new arrangement: in successive paragraphs they list Lysias, Thrasymachus, Theodorus, Evenus, Tisias, Gorgias, Prodicus, Hippias, Polus and Licymnius, alongside their various contributions to the discipline of persuasive speaking – Socrates calls it 'the art of words' (*ἡ λόγων τέχνη*, 266c3), but it is Phaedrus who first calls it 'the rhetorical' (*τὸ ῥητορικόν*, 266c8), opposed to 'the dialectical form' (266c7–8). This catalogue of teachers and intellectuals is a critical element of the emerging discipline of persuasion, pointing to an acknowledged group of experts in a field, while also indicating exactly where the unique expertise possessed by each of them lies. The need for a discipline to boast not only a name and a distinct body of knowledge but also a group of experts emerges from *On Ancient Medicine* as well: 'perhaps [medicine] should not be reckoned to be a *technē*, for it is not proper

[42] Schiappa, 10–12, supporting a claim first made in George Grote's *History of Greece* (London, 1851[2]), 495. Cf. M. Untersteiner, tr. K. Freeman, *The Sophists* (Oxford, 1954), who treats the sophists as individuals, and G.B. Kerferd, *The Sophistic Movement* (Cambridge, 1981), 11. Ford (n. 15), 10 makes the similar point about poetry that there was, 'as far as the evidence permits us to see, no unitary notion', in Archaic Greece. These points are made in contrast to the tradition according to which, as Lloyd *MRE*, 80–1 puts it, 'most of the major sophists of the late fifth and early fourth centuries included rhetoric among the subjects they claimed to teach'.

[43] F. Solmsen, *Intellectual Experiments of the Greek Enlightenment* (Princeton, NJ, 1975), 146–7; Lloyd *MRE*, ch. 2; Charlton, 49.

[44] e.g. recently, K. Dorter, 'The Method of Division and the Division of the *Phaedrus*', *AncPhil* 26 (2006), 259–73.

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to call someone a "practitioner" of something about which nobody is ignorant but with which everybody is acquainted by use and necessity' (*Εἰ δὲ μὴ τέχνη αὐτὴ νομίζεται εἶναι, οὐκ ἀπεικός· ἧς γὰρ μηδεὶς ἐστιν ἰδιώτης, ἀλλὰ πάντες ἐπιστήμονες διὰ τὴν χρῆσίν τε καὶ ἀνάγκην, οὐ προσήκει ταύτης οὐδένα τεχνίτην καλέεσθαι*, *VM* 4.1–3). In my translation, I have exercised Denniston's advice regarding inverted commas in order to point out the author's self-conscious definition of 'practitioner' (*τεχνίτης*) as someone with a uniquely esoteric body of knowledge. As Schiefsky explains, 'the existence of a distinction between lay people and professionals was widely held to be a reliable sign of the existence of a *technē*, and a discipline which did not involve such a distinction might have its status as a *technē* called into question'.[45] For this reason, after making this rare concession, the author of *On Ancient Medicine* turns to the subject of 'medicine according to common consent … which has both a name and experts …' (*τὴν ὁμολογουμένως ἰητρικὴν … ἣ καὶ οὔνομα καὶ τεχνίτας ἔχει …*, *VM* 5.1–2) It seems that not only must a discipline have a name and a group of expert practitioners, but there must also be some form of consensus among them (*ὁμολογουμένως*) regarding its domain.

It is worth noting that the brief exchange in *Phaedrus* contains these essential, disciplinary elements: a catalogue of acknowledged experts on a certain topic, a detailed list and description of the relevant tools and instruments (that is, the persuasive styles and techniques themselves), and a discussion of what to call that list in order specifically to teach it. Socrates frames his idea of 'collection' in these terms: 'seeing things scattered all around, to collect them into a single notion', he writes, 'in order that by defining each one you may clarify whatever you might wish to teach' (*Εἰς μίαν τε ἰδέαν συνορῶντα ἄγειν τὰ πολλαχῇ διεσπαρμένα, ἵνα ἕκαστον ὁριζόμενος δῆλον ποιῇ περὶ οὗ ἂν ἀεὶ διδάσκειν ἐθέλῃ*, 265d3–5). A clearer articulation of a discipline in the making is hard to imagine! If I am correct in identifying the genesis of a rhetorical discipline with the style of synthesis that we encounter in Plato's *Phaedrus*, then here in Aristophanes' *Clouds* (200–3) is a ready prototype for that process of bringing together various tools under a single disciplinary title.

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[45] Schiefsky (n. 9 [1999]), 27.

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