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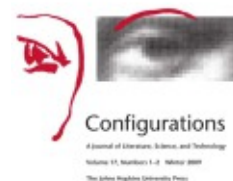
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Pythagoras in Paris: Petrus Ramus Imagines the Prehistory of Mathematics

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Abstract:

In 1566, Petrus Ramus and Jacques Charpentier, both professors at the University of Paris, clashed publicly over the tenure of a chair in mathematics at the Collège Royale. Over the course of their contest—conducted both in the courtroom and through printed pamphlets—both authors constructed histories of mathematics that would portray the science in a way most favorable to each and his claim upon the disputed chair. Ramus, in particular, devoted his *Prooemium mathematicum* to an ambitious (though quite tendentious) history, in which he transformed the figure of Pythagoras from an other-worldly number mystic into a practical schoolmaster, who taught mathematics precisely along the lines that Ramus insisted the professor of mathematics should do. Ramus's creative reimagination of Pythagoras had very little to recommend it as a historical hypothesis, but his developing interest in Pythagoras and Charpentier's later caustic reaction anticipate quite remarkably later debates over the mathematization of nature.

Mathematics, like the imagination, seems to inhabit a borderland. Just as the imagination was thought to stand between the senses and the reason, sensory in its form yet made of thought, not matter, so too is mathematics at once intelligible—the quintessential speculative science—and concerned with objects that are familiar from our own material world: triangles, circles, multiples of things, and so forth. For this reason, Plato put mathematics in an intermediate

place between the eternal Forms and the shifting world we live in.¹ The Platonist Proclus, in his influential *Commentary on the First Book of Euclid's Elements*, made the analogy between mathematics and the imagination explicit by arguing that geometrical reasoning was concerned not with the eternal Forms themselves nor with the imperfect material world, but with objects *in the imagination*.²

There is another, not unrelated way in which we can characterize mathematics as a half-way science: while it is a theoretical art, it has practical applications in measurement and everyday reckoning. To put this another way, it inhabits, at one and the same time, the provinces of body and spirit—a significant division. For one way we might understand the “mathematization of nature” associated with the scientific revolution of the seventeenth century is as a recasting of mathematics from a predominantly spiritual discipline (as it was understood by most Renaissance humanists) to a physical one.³

There is yet another way that mathematics falls into two worlds (which, again, is not entirely independent from the other ways of considering its divided character): while the theorems of mathematics are eternally true and linked to one another by chains of mathematical and logical argument, they nevertheless have a *history*. Pythagoras's theorem was true at any time in history, or prehistory—yet, as its name declares, it was discovered at a particular time and place, by a particular individual. The history of mathematics appeared as a genre of scholarship in the sixteenth century, at the very time that the divisions between pure and applied, theoretical and material, spiritual and corporeal were being renegotiated and in part as a vehicle for working through and taking a stand upon those contentious divisions. The history of mathematics allowed mathematicians, humanists, and teachers to reimagine mathematics itself and its place in the region straddling two worlds.⁴

The first modern history of mathematics, and the focus of this essay, was the *Prooemium mathematicum* of Petrus Ramus (1515–1572),⁵

1. Plato, *Republic*, sec. 510C–511D.

2. Proclus, *Commentary on the First Book of Euclid's Elements*, pp. 51–56 (pages 41–45 in Glenn R. Morrow, *Proclus: Commentary on the First Book of Euclid's Elements* [Princeton, NJ: Princeton University Press, 1970]).

3. The final end of this movement from the spiritual to the material was surely Newton's definition of geometry in the *Principia* as a species of mechanics.

4. This larger argument is the subject of my forthcoming book, *Defending Hypatia* (and is briefly sketched out in my article, “Histories of Science in Early-Modern Europe,” *Journal of the History of Ideas* 67 [2006]: 33–40).

5. While there were several earlier historical treatments of mathematics and mathematicians, some of which will be mentioned below, none could compare to Ramus's

first published in 1567 and republished two years later with small corrections as part of a much larger work.⁶ The work was Ramus's immense response to a drawn-out political battle with the Aristotelian Jacques Charpentier over the teaching of mathematics at the University of Paris. In the course of the speeches and polemics exchanged between the two men, the history of mathematics assumed an ever more central position, as each academic (amid name-calling and settling of old scores) tried to articulate his own vision of the nature of mathematics. The *Prooemium mathematicum* (addressed to the Queen Mother and pleading for direct royal intervention) was at once a defense of mathematics and an attack on his opponent. It carried on the dispute, using the weapons of historiography and textual criticism.

I shall argue here that the shadowy, ancient mathematician Pythagoras came to be used as a token in the historical contest between Ramus and Charpentier. For the latter, he stood in one place for the theoretical philosopher elevated far above the vulgar crowd, and elsewhere for the obscurantist mathematician, hiding his philosophy in the impenetrable cloak of mystical numbers, both recognizable caricatures of the ancient mystagogue.⁷ In the historical high point of the debate, the *Prooemium mathematicum*, Ramus set out entirely to reimagine the figure of Pythagoras, drawing him down from the heights of spiritual and unworldly mathematics into a much more bodily incarnation.

If Ramus's consideration of Pythagoras started off as a gambit in a bitter and rather unedifying squabble, as Ramus imagined and reimagined his biography, the ancient mathematician came to serve a much more important purpose. Ramus had long argued against the view of mathematics as a spiritual discipline (shared by scholastic and humanist authors), and had called for, and even attempted to provide, a new, reformed mathematics, quite different from the abstract reasoning of Euclid's *Elements*.⁸ His ideal mathematics would

Prooemium mathematicum in scale or ambition. Bernardino Baldi's unpublished *Vite de' matematici* has often been cited as the first such work, but it was, in fact, completed after *Prooemium* and uses it as a source.

6. Petrus Ramus, *Prooemium mathematicum* (Paris, 1567); Ramus, *Scholarum mathematicarum libri unus et triginta* (Basel, 1569).

7. See S. K. Heninger, *Touches of Sweet Harmony: Pythagorean Cosmology and Renaissance Poetics* (San Marino, CA: Huntington Library, 1974).

8. For a thorough survey of Ramus's various mathematical projects, see Reijer Hooykaas, *Humanisme, Science et Réforme: Pierre de la Ramée (1515–1572)* (Leiden: Brill, 1958); and Isabel Pantin, "Ramus et l'enseignement des mathématiques," in *Ramus et l'Université*, ed. Kees Meerhoff and Michel Magnien (Paris: Presses de l'École normale supérieure, 2004), pp. 71–86.

be no less necessarily true than that of Euclid, but would be immediately applicable in the world. Geometry would no longer be directed upward to the purely intelligible; for Ramus, it was simply the “art of measuring,” a practical skill that nevertheless (or, from Ramus’s point of view, for that very reason) deserved a place in the university arts curriculum.

Ramus’s reimagination of mathematics and its place in the university, worked out over many years and several publications, was accompanied by a rewriting (many times over) of the ancient history of the art.⁹ In the *Prooemium mathematicum*, Ramus tried to show that mathematics was not only the most ancient of all arts, but also that from the earliest date it had been central to a liberal education in *precisely* the way he had advocated in so many of his previous writings. In constructing this argument, he had very limited resources to draw upon. He was concerned to extract from the fragmentary narrative of antiquity a continuous story of mathematics, from its most primitive beginnings to historical times—at times pushing the evidence far beyond where it reasonably led. Through a combination of solid research, wishful thinking, and, it must be admitted, occasional falsification, Ramus constructed a coherent image of the past that supported his educational program: that mathematics in its formative beginnings (and hence in its essential nature) looked very much like the reformed mathematics he wished to have taught at the university.

Examining how Ramus and Charpentier used (and, perhaps, abused) the history of mathematics in this pivotal debate offers insights into the role of history and historical imagination in the development of the sciences during this period. In the sixteenth century, the applications of mathematics were limited: navigation, mercantile accounting, surveying and building, and so forth. None of these subjects was taught within the arts curriculum, nor considered appropriate study for the classes attending the university;¹⁰ it was no accident that Ramus devoted the second book of his *Prooemium* to refuting the charge that mathematics was “useless.” Imagining a past for mathematics amounted to imagining a world in which mathematics had a place; a representation of an ancient world in which

9. See Robert Goulding, “Method and Mathematics: Peter Ramus’s Histories of the Sciences,” *Journal of the History of Ideas* 67 (2006): 63–85.

10. For the problem of the relevance of mathematics in another university context, see Robert Goulding, “*Testimonia humanitatis*: The Early Lectures of Henry Savile,” in *Sir Thomas Gresham and Gresham College: Studies in the Intellectual History of London in the Sixteenth and Seventeenth Centuries*, ed. F. Ames-Lewis (Aldershot, UK: Ashgate, 1999), pp. 125–145.

mathematics was studied, taught, and valued would provide a model for contemporary practice. And such a model gained in significance the further back into the past it could be constructed: the beginning of mathematics was the surest guide to what it *ought* to be.

Ramus's reconsideration of Pythagoras was thus in line with his customary historiographical practice. As I shall show in this essay, his molding of the figure of Pythagoras in the *Prooemium mathematicum* served several ends. On one level, it allowed Ramus to address some of the ideological issues that lay behind his debate with Charpentier. What, for instance, was the source of legitimate authority within the principal university of the kingdom of France: intellectual merit or birth and royal patronage? Pythagoras, whom Ramus refashioned as the prototypical university professor, provided an unambiguous answer to a politically awkward question. More profoundly and more ambitiously, Ramus used Pythagoras to address the nature of mathematics itself and its place within the university. Pythagoras (perhaps unsurprisingly) emerged as a mathematical educator very much in Ramus's own cast, teaching an art that looked much like Ramus's own ideal mathematics. By reimagining Pythagoras in this way, Ramus showed both that his kind of mathematics (not the theoretical mathematics of the schools) had the most ancient pedigree, and that practically oriented mathematics deserved a place in the university.

Perhaps the most fascinating aspect of the entire encounter between Ramus and Charpentier is the tentative emergence of the concept of a fundamentally mathematical natural world. Ramus could not tame Pythagoras entirely; through Ramus's historical manipulations, the ancient may have come to resemble Ramus more and more, but Ramus himself was drawn into realms of speculation that had not been open to him before. During his protracted association with Pythagoras, Ramus went beyond his earlier, quite characteristic insistence that mathematics should be applicable to nature, arriving at a much more radical position that nature itself was, in some sense, mathematical. Quite unexpectedly, from this academic quarrel and its Pythagorean resolution there emerged the notion itself of the mathematization of nature. Charpentier's reaction to Ramus's new direction of thought—flat incomprehension—prefigures the chasm that would open up between scholastic Aristotelianism and the new mechanical philosophy of the seventeenth century.

On March 11, 1566, the Parlement of Paris ruled on the bitter dispute between Charpentier and Ramus. Ramus was professor of "Philosophy and Eloquence" at the Collège Royal, the institution of regius professors founded by François I to encourage the spread

of humanist studies at the University of Paris. At the root of the altercation was Charpentier's appointment to a chair in the Collège that had previously been occupied by a mathematician, Dampestre Cosel, a position in which Ramus took a special interest. As dean of the Collège, he had a duty to represent the professors' interests, and Charpentier's appointment was considered by many of his colleagues to be scandalous. But there were more immediately intellectual reasons for his involvement in the case.

Ramus was by now the most famous (or, at least, the most controversial) logician in Europe, celebrated and vilified for his caustic attacks on ancient learning, especially the philosophy of Aristotle. Ramus had in recent years become more and more preoccupied with mathematics, to the extent of straying from his broad remit of philosophy and eloquence to lecture on arithmetic and geometry. He was certainly no mathematician himself, and mastered what he could of the subject only with great difficulty. Nevertheless, as a student of Oronce Fine, Ramus was the heir of a tradition of reform-minded mathematicians at the university.¹¹ Moreover, his own reform of dialectic had led him to focus on mathematics as the key to a thorough-going reconstruction of the university arts curriculum.

His protégé Jean Pena, who held a chair of mathematics in the Collège before his premature death in 1558, had published important editions of Euclid's optical works during his brief tenure; after his death, Ramus began assuming unofficially much of the teaching of the mathematics professor. Since 1563, Pierre Forcadel, a practical mathematician, had held Pena's chair and assisted Ramus closely with his mathematical studies. By 1566, Ramus himself was teaching elementary classes in the rudiments of geometry and arithmetic, followed by readings of Aristotle's *Mechanics* and Archimedes' *Sphere and Cylinder*; and he told his allies that he intended in the future to cover optics as well.¹² However slender Ramus's mathematical talents may have been, his informal mathematical society within the Collège was achieving remarkable results.

Thus when Jacques Charpentier was appointed to the mathematical professorship, Ramus's plans that the Collège should continue

11. See Jean-Claude Margolin, "L'Enseignement des mathématiques en France (1540–70): Charles de Bovelles, Fine, Peletier, Ramus," in *French Renaissance Studies 1540–1570: Humanism and the Encyclopedia* (Edinburgh: Edinburgh University Press, 1976), pp. 109–155.

12. This is according to the testimony of Charpentier (*Orationes tres*, sig. E4v). He is not, of course, an objective source on Ramus's teaching, but he can be trusted here, since he is admitting, almost despite himself, that Ramus has adopted an ambitious mathematical curriculum. (In a final, catty remark, he laments that Ramus had made such an effort for so few students.)

to foster mathematical activity in the university were threatened. Charpentier had been Ramus's principal opponent within the university for most of his career. He was an Aristotelian (part of the source of the friction between the two men) and, despite a fashionable interest in reconciling the philosophies of Plato and Aristotle, thoroughly in the "scholastic" camp of the university. He taught entirely through the reading and commentary of Latin translations of philosophical texts, and his own publications paid no attention to the authentic texts of the philosophers. He also remained unmoved by the mathematical side of Platonism; in his natural philosophy he was an Aristotelian through and through. In a pamphlet he wrote against Ramus and his student Arnaud d'Ossat, Charpentier went so far as to proclaim proudly (though, as it turned out, rashly) that he himself was "*analphabêtos*" and "*ageômetrêtos*"—that is, illiterate in Greek and ignorant of geometry¹³—intending by these Greek words to differentiate himself from Ramus and his followers. From Ramus's point of view, Charpentier was a disastrous choice for a chair of mathematics in the Collège.

The events that brought Ramus and Charpentier before Parlement in March 1566 were complicated, and our knowledge of them are thoroughly colored by their protagonists. Charpentier had been preceded in the chair by the Sicilian Dampestre Cosel, who, while he knew some mathematics, was unable to speak either French or Latin. Ramus agitated successfully for his dismissal. According to Charpentier, when Cosel found his position to be untenable, he approached the cardinal of Lorraine (then acting as the king's agent for all matters pertaining to the Collège), tendering his resignation and recommending Charpentier as his successor, a suggestion that the cardinal acted upon.¹⁴ By Ramus's more jaded account, Charpentier bought the position from Cosel.¹⁵ In order to block Charpentier's tenure of the chair, Ramus obtained from the king, on March 8, an injunction stating that professors of the Collège had the right to examine all those who wished to join their ranks, and to reject those who failed to meet their standards. In order to impose this requirement on Charpentier, Ramus brought him before the court of Parlement on March 9, where he delivered his first, brief *Actio mathematica*, to

13. In Jacques Charpentier, *Ad expositionem disputationis de methodo, contra Thessalum Ossatum, Academiae Parisiensis Methodicum, Responsio* (Paris, 1564), fols. 3v, 11r-v.

14. Charpentier, *Orationes tres* (above, n. 12), sig. D4v.

15. Petrus Ramus, *La Remonstrance faite au conseil privé en la chambre du Roy, au Louvre le 18 janvier 1567* (Paris, 1567), pp. 14–15, cited by James Veazie Skalnik, *Ramus and Reform: University and Church at the End of the Renaissance* (Kirkville, MO: Truman State University Press, 2002), p. 83.

which Charpentier replied with the first of his three *orationes*.¹⁶ On March 11 they reconvened, Charpentier opening with his second *oratio*. At Ramus's insistence, Parlement then went into public session for the rest of the day, and he delivered his long, second *actio*, to which Charpentier replied with his third and final *oratio*. After deliberation, Parlement found in favor of Charpentier by issuing an *arrêt* confirming him as professor of mathematics.¹⁷ Parlement made some concessions to Ramus's demands. Throughout the case, Charpentier had argued that the subject matter of each chair was not fixed, so that there could be no objection to him teaching Aristotelian metaphysics instead of mathematics, as he intended.¹⁸ Parlement sided with Ramus, saying that there should be two permanent chairs of mathematics within the Collège, which could not be taken over for other disciplines. Moreover, they even agreed that prospective professors of the Collège should be required to submit to an examination, confirming the decree Ramus had obtained from the king. Yet this was hardly a victory for Ramus, at least so far as Charpentier's tenure was concerned: Parlement had conceded the general principles, only to subvert their particular application. For although the *arrêt* stipulated that Charpentier must teach mathematics while holding this chair (despite the fact, as they admitted, that he was woefully ill-prepared to do so, and, in fact, intended to teach philosophy instead), nevertheless Charpentier need only to lecture on *something* mathematical within the first three months of his tenure. This should not pose any difficulty to him (the *arrêt* went on), since he was an intelligent man, and, unlike eloquence, mathematics required no great skill, just the ability to draw with a pencil! Lastly, while new professors *in general* should submit to an examination, "for many very sound reasons and valid considerations" Charpentier was to be exempted from this requirement.

This was not the end of the matter, as Charpentier did not fulfill even the lax stipulations of the *arrêt*. According to Ramus, he had

16. The chronology of the case is complicated by the fact that Ramus made several errors in dating his orations according to the Roman style. The order of the speeches as I give them here is based on internal cross-references in the speeches.

17. The text of the *arrêt* is in Charles Waddington, *Ramus: Sa vie, ses écrits et ses opinions* (Paris, 1855), pp. 176–178. See also Isabel Pantin, "Teaching Mathematics and Astronomy in France: The Collège Royal (1550–1650)," *Science and Education* 15 (2006): 189–207, esp. 193, 202.

18. See particularly the second oration of Charpentier (*Orationes tres* [above, n. 12], sig. D4v). He claimed that even Ramus, professor of "Philosophy and Eloquence" (a position that had not existed before Ramus himself invented it), had taken the chair of a professor of Hebrew.

originally promised that he would lecture on Aristotle's *De caelo*, Proclus's *Sphere*, Euclid's *Elements*, and Sacrobosco. The undertaking he read into the *arrêt* said, however, that he would lecture on Aristotle and Proclus *or* Euclid and Sacrobosco. Near the very end of the three-month period, Charpentier began some lectures on *De caelo* and the elementary *Sphere* of pseudo-Proclus, thus, he claimed, satisfying the letter of the *arrêt*. Ramus was outraged, but the president of Parlement, Christophe de Thou, persuaded him not to bring another suit before the court.¹⁹ Instead, Ramus responded, in January 1567, by appealing directly to the Privy Council, and publishing the text of his suit.²⁰ This was his last attempt at legal redress; henceforth both men fought entirely through the printing press. Ramus, of course, was now the only one with a grievance and substantive complaints to air; Charpentier's responses devolved into little more than gratuitous personal abuse.²¹

The notion of appointing Charpentier to a chair of mathematics—and maintaining him there, despite his cavalier disregard of the terms of the chair—seems absurd, even capricious. Charpentier was, without a doubt, entirely unqualified to teach mathematics, just as Ramus so colorfully asserted in his many controversial pamphlets and orations related to the succession to the chair; moreover, as Charpentier himself admitted, he had obtained the chair without even the *intention* of teaching mathematics.

Modern scholarship has tended to take Ramus's side of the issue. His nineteenth-century biographer Charles Waddington saw Charpentier's actions as base and dishonorable, deliberately harming science out of a "cynisme révoltant," while Ramus, on the other hand, was motivated above all by his concern for academic honesty and rigor.²² Waddington's biography is never less than admiring of Ramus, so that his support for his subject's position is quite predictable. Walter Ong, by contrast, is generally dismissive of Ramus's mathematics. In one of the very few references in his monograph

19. Waddington, *Ramus* (above, n. 17), pp. 178–179; Jean-Eudes Girot, "La notion de lecteur royal: le cas de René Guillon (1500–1570)," in *Les origines du Collège de France (1500–1560): actes du colloque international (Paris, décembre 1995)*, ed. Marc Fumaroli (Paris: Klincksieck, 1998), pp. 43–108, esp. 70–71.

20. Ramus, *La Remonstrance* (above, n. 15), extracts from which are edited in Waddington, *Ramus* (above, n. 17), pp. 411–417.

21. Waddington, *Ramus* (above, n. 17), pp. 178–181. The only complete and accurate chronology of the case and the subsequent pamphlet war is found in Girot, "La notion de lecteur royal" (above, n. 17).

22. Waddington, *Ramus* (above, n. 17), p. 181.

to this aspect of Ramus's studies, Ong marveled at his "mysterious" growing interest in mathematics from the early 1560s, "mysterious because he was so ill-educated in mathematics."²³ And in his *Inventory* of Ramist texts, in describing Ramus's *Actiones duae*, he writes that Ramus's accusation of incompetence against Charpentier and Cosel "is interesting in view of the fact that incompetence was one of the grounds on which Ramus himself, twenty-two years before, had been suspended from teaching philosophy,"²⁴ thereby insinuating that the entire case was nothing more than a tit-for-tat act of revenge on Ramus's part. Yet even Ong had to admit that, so far as the substantive issue between him and Charpentier was concerned, Ramus was essentially correct: Charpentier knew "even less mathematics than Ramus," who at least had managed to inspire others to achieve what "he himself could not realize."

Despite their very different regard for Ramus, Ong and Waddington agreed that the substance of the dispute between him and Charpentier was the ability to teach mathematics. The two scholars concurred that Ramus should have won the case: Charpentier, by his own admission, knew nothing about mathematics. More recent scholarship has concentrated on the larger issues that lay behind the debate. In a recent study (2002), James Veazie Skalnik has argued that Ramus's central ideological commitment was to a notion of "merit" (which Skalnik associates with the court of François I) against a retrenching of aristocratic privilege. He argues that the motivations of both actors in the tussle over the chair can be illuminated by these opposing political or social ideologies.²⁵ Ramus's attack on Charpentier was thus prompted not so much by the need to safeguard mathematical teaching at the university, as by the irregular means by which the chair was obtained: namely, Charpentier had done nothing to *deserve* it. Charpentier, on the other hand, who reminded Parlement *ad nauseam* of his powerful patrons, stood for unashamed privilege. Skalnik's sympathies are with Ramus: Charpentier had obtained the chair through a private transaction and without "consideration of qualifications,"²⁶ and the outcome was a foregone conclusion anyway, since this confrontation between a François I meritocrat and the "elite oligarchy of the Old Régime" was decided by the "venal Parlement of Paris."²⁷

23. Walter Ong, *Ramus, Method, and the Decay of Dialogue: From the Art of Discourse to the Art of Reason* (Cambridge, MA: Harvard University Press, 1958), p. 27.

24. Ong, *Inventory*, p. 357.

25. Skalnik, *Ramus and Reform* (above, n. 15), pp. 81–87.

26 Ibid., p. 83.

27. Ibid., p. 87.

Jean-Eudes Girot, in his very careful study of the dispute, is the only modern scholar to conclude that, in fact, Charpentier's arguments were stronger than Ramus's, given the context in which they were made; that is, Charpentier judged his defense perfectly with respect to the political situation of 1560s Paris, and the verdict was the only one possible after all the arguments had been heard. According to Girot, the argument was really about *authority*: Charpentier insisted that the king (or his agent, the cardinal of Lorraine) could appoint anyone he wished to the Collège, to the position of a *royal* professor. The choice of the king was absolute; while he might listen to advice, he could in no way be compelled to take it. So also could he judge a candidate's qualifications according to any standard he pleased. Thus by raising opposition to Charpentier's appointment, Ramus was (according to Charpentier's presentation of his actions) only revealing his own anti-authoritarian bent. Just as Ramus delighted in subverting the authority of Aristotle and the ancients, he was now taking advantage of this situation to undermine the power of the king, substituting his own whim and the malleable opinion of a committee of professors.²⁸ Moreover, Charpentier argued that he had already been "put to the test" by his long successful career at the university. In trying to set up his own examination, Ramus was rejecting another source of established authority—the university—in favor of his own opinion. Finally, on the substantive matter of the institutional history of the chairs, Charpentier was correct, not Ramus: there was no clear identification of the subjects to be taught by each professor; thus there was nothing irregular in Charpentier not teaching mathematics, even though he succeeded to a chair formerly held by a mathematician.²⁹ In summary, though Ramus wanted to present himself as an intellectual reformer who was facing a stubborn sophist, Charpentier reframed the case as a confrontation between a loyal subject and a political partisan, or (as was constantly implied) a good Catholic and a disloyal Protestant.³⁰ However

28. Girot, "La notion de lecteur royal" (above, n. 17), pp. 73–74. Note, for instance, in Charpentier's first oration before Parlement (*Orationes tres* [above, n. 12], sig. B2r) that he equated Ramus's insistence on holding an examination with a desire to usurp regal powers for himself. In the third oration (*ibid.*, sig. D4r), he compared Ramus's tenure as dean to the madman who, just the other day, had gone running through the streets proclaiming himself king of France. Through this comparison, he associated Ramus, as usual, with unrestrained passions and delusions of grandeur, but also with treasonous ambitions.

29. Girot, "La notion de lecteur royal" (above, n. 17), pp. 79–81. Skalnik also acknowledges that Charpentier was correct on this and other points of institutional history and practice; see Skalnik, *Ramus and Reform* (above, n. 15), pp. 85–86n57.

30. Girot, "La notion de lecteur royal" (above, n. 17), p. 74.

specious his reasoning may have been, Charpentier brilliantly recast the terms of the debate. Presented with a Protestant Ramus who sought to limit the sovereignty of the king in favor of that of an assembly, Parlement could not but award the case to Charpentier.

By removing the debate from the realm of the history of science to that of political history, Girot provides an entirely coherent account, in which the motivations of all the actors are explained, and in which the *arrêt* of Parlement, granting Charpentier the chair even while recognizing his mathematical deficiencies, does not seem entirely perverse. Skalnik's social considerations are equally valuable, and I shall argue that the themes of legitimate authority and qualification to possess it are central issues in the debate, especially in Ramus's *Prooemium mathematicum*. It must be observed, however, that both treatments omit entirely any consideration of the intellectual substance of the debate. As already mentioned, insofar as it was about *anything*, the debate focused on the history, or rather the imagined *prehistory*, of mathematics, often expressed through the contested figure of Pythagoras.

The appearance of Pythagoras in the debate, and Ramus's intense interest in him in the *Prooemium mathematicum*, is somewhat surprising. In his early accounts of the history of mathematics, Ramus had said hardly a word about him. In the preface to his 1544 edition of Euclid's *Elements* (his first, brief attempt at a narrative of the origins of the art), Pythagoras's name appeared only once, in a list of mathematicians who flourished in Greece, long after the art originated among the ancient Hebrew patriarchs. Ramus presented an almost identical list some ten years later, in the preface to his *Arithmetic* of 1555.³¹ The traditional figure of Pythagoras, mystic and numerologist, held very little attraction for Ramus.³²

31. First mathematical preface, in Petrus Ramus, *Collectaneae praefationes*, pp. 120–121: “Hinc tot, tamque excellentia ingenia excitari, Thaletis, Pythagorae, Hippocratis, Platonis, Eudoxi, Ptolemaei, Euclidis, Archimedis, aliorumque innumerabilium coeperunt”; and second mathematical preface, *ibid.*, p. 121: “haec tandem Graecorum et Italarum, Thaletis, Pythagorae, Anaxagorae, Hippocratis, Platonis, Archytæ, Aristotelis, Euclidis, Philolai, Archimedis, reliquorum omnium (de quibus Proclus scripsit) celebrata gymnasia fuerunt.”

32. In his early neglect of Pythagoras, Ramus was following the lead of Johannes Regiomontanus, one of his most important predecessors in the historiography of mathematics. In his 1464 oration on the history of mathematics, the great German astronomer passed over Pythagoras in a single sentence, remarking that whatever Pythagoras had achieved with numbers and their mysteries, Euclid put arithmetic on a “much more worthy” foundation; see Regiomontanus, *Opera collectanea: Faksimiledrucke von neun Schriften Regiomontans* (Osnabrück: O. Zeller, 1972), p. 46. On Regiomontanus's oration, see James Byrne, “A Humanist History of Mathematics?: Regiomontanus's Padua Oration in Context,” *Journal of the History of Ideas* 67 (2006): 41–61.

Even a decade later, now thoroughly engaged in the teaching of mathematics in Paris and embroiled in his dispute with Charpentier, Ramus evinced almost no interest in Pythagoras. In his second *actio* against Charpentier (1566), Ramus provided the Paris Parlement with a brief history of mathematics from the patriarchal age. Pythagoras and his contemporary Thales figured only incidentally, their role as links between Egypt and Greece described in a single sentence. Ramus focused on another traveler to Egypt, Plato, whom he identified as the key figure responsible for the foundation of mathematics in Greece, both through his own efforts and through his support of the mathematicians in his Academy.³³

Ramus's new interest in Pythagoras in the *Prooemium mathematicum* was sparked by a polemical line of argument that Charpentier had introduced in the course of their dispute. Charpentier's unguarded, printed admission that he was "ungeometrical" and "unlettered" had haunted him throughout the hearing of the case and the ensuing pamphlet war. In his first oration, he rather feebly batted the offending words away: if he himself was illiterate, then Ramus was even worse.³⁴ In the third, he met them head on, giving his apparently ill-chosen words a novel twist: they were, he claimed, meant ironically. In Ramus, he explained, he had found a critic who pretended to universal knowledge, and in particular, expertise in mathematics. Ramus's claims did not, however, match up with reality. In fact,

I knew that he would often be struck dumb while at the lectern, that along the way he would mislay the very things he had just learnt from his teachers; that on countless occasions he had been forced to botch his way through a mathematical demonstration, because he hadn't practiced it enough; and that often in his lectures he would completely contradict something that he had affirmed with, it seemed, great confidence in an earlier lecture.³⁵

33. Ramus, *Collectanea praeftationes* (above, n. 31), pp. 419–420.

34. Charpentier, *Orationes tres* (above, n. 12), sig. B4r.

35. Ibid., sig. G3v: "Certo sciebam hunc in Cathedra Mathematica saepe obmutuisse, quod in via de manibus excidissent ea quae a magistris paulo ante acceperat; millies etiam inter docendum coactum fateri, Mathematicam descriptionem parum feliciter succedere, quod in hac non esset satis exercitatus; nec minus frequenter posteriore lectione ea omnino invertisse, quae superiore magna animi confidentia videbantur esse constituta." In the same vein, in the aftermath of the case, one of Charpentier's anonymous supporters recorded how Ramus lost the thread of a geometrical proof in front of his class, and, entirely out of resources, stood agape and "as dumb as a fish" in front of his bemused students (a story that cannot but command the sympathy of any teacher). In *Petri Rami insolentissimum Decanatum . . . Phillipica prima* (Paris, 1567), p. 9: "dum videlicet susceptae propositionis demonstrationem nulla ratione potuisti exponere, sed pisce mutior factus, illico de cathedra descendisti."

Ramus was, Charpentier concluded, just like the sophists who challenged Socrates, or like the so-called wise with whom Pythagoras had disputed. Both Socrates and Pythagoras were, of course, highly learned in the very disciplines in which their detractors pretended expertise. Yet they disarmed these false claimants to wisdom by adopting an ironic pose: Pythagoras said he was not wise, but a “lover of wisdom,” while Socrates professed to know only that he knew nothing. In neither case was this literally true: both men had positive, substantial knowledge that they passed on to their schools and that is studied to this day. Charpentier claimed he had meant to use the same ploy of false modesty with Ramus—of course (he now insisted) he was not truly illiterate and ungeometrical. But like Pythagoras and Socrates, he had in Ramus an opponent who was at once entirely ignorant of the arts he professed and absurdly confident in his skill at professing them—a situation in which irony was the only possible response.³⁶

Charpentier’s adoption of the role of Socrates, in particular, must have galled Ramus. Throughout his career, Ramus had taken the figure of Socrates as a model; he described his dialectic as a renewal of the ancient philosopher’s own practice, his critique of Aristotle and the other ancients a kind of “socratizing.”³⁷ In his *Prooemium mathematicum* (published the year after Charpentier’s speech), he would return many times to the Socratic philosophy that he had reintroduced to the University of Paris, identifying so profoundly with him that he equated his 1544 prohibition from teaching philosophy with Socrates’ trial: with the exception of the hemlock (a rather large exception, one might say), their sufferings had been identical.³⁸ Thus to Ramus’s ears, Charpentier’s self-identification with Socrates would have been outrageous. Moreover, Charpentier had combined this appropriation of Ramus’s hero with an equally absurd self-identification with Pythagoras, demoting Ramus to the role of a historical nobody, the fall guy in an improving historical anecdote. This, it seems, was the catalyst for Ramus at last to pay attention to Pythagoras and add him to his small pantheon of ancients worthy to be emulated.

Throughout his career, Ramus had insisted that mathematics was part of a liberal arts education. But the debate with Charpentier

36. Charpentier, *Orationes tres* (above, n. 12), sigs. G3r–v.

37. See Craig Walton, “Ramus and Socrates,” *Proceedings of the American Philosophical Society* 114 (1970): 119–139.

38. Petrus Ramus, *Scholae mathematicae*, p. 77.

raised the stakes considerably. As we have seen, the *arrêt* of the Paris Parlement had declared that mathematics was *not* an art of the same difficulty as rhetoric and required only the skill of drawing with a pencil; hence, it concluded, Charpentier (or just about anybody else with a modicum of intelligence) could teach it without any special training whatsoever. In the *Prooemium mathematicum*—his extended response to the events of 1566—Ramus insisted that mathematics was not just an art, but the foundation of *all* the arts. And it was in this context that Pythagoras, or at least a single phrase about Pythagoras in Proclus's *Commentary*, first attracted his attention. Proclus had written that Pythagoras had been the first to make mathematics a liberal art. Ramus expanded on this, saying that Pythagoras obtained renown not just for his discoveries in geometry and arithmetic, but "because he first brought the mathematical philosophy into the form of liberal art, and opened a school in which young people might receive a training both honorable and noble."³⁹ Proclus did not elaborate on what he meant by a "liberal art," but the meaning was sufficiently clear to Ramus, for whom the term was all but synonymous with an art taught in a school. Indeed, his repeated criticism of the other liberal arts had been that they were unteachable, because they did not observe the proper disciplinary bounds and order of presentation. Proclus's cryptic statement could only make sense to Ramus if Pythagoras had opened a school, where he had been the first teacher of mathematics to young men.

Proclus said nothing about the nature of Pythagoras's school; for information on this subject, Ramus turned to another text, the *Attic Nights* (*Noctes atticae*) of Aulus Gellius. There he found a very peculiar description of Pythagoras's system for selecting students worthy of admission to his school: he examined the shapes of their faces and the disposition of their bodies, applying physiognomic principles to determine their character and suitability as students. That is as much as Gellius tells us about this practice, and one might almost expect Ramus to omit this rather strange detail. In fact, however, he expanded upon it, combining it with another anecdote taken from the same source to conclude that Pythagoras's intention in examining his applicants in this way was "to ensure that unrefined,

39. Ibid., p. 7: "quod mathematicam philosophiam in speciem liberalis et ingenuae doctrinae primus redegerit, ludumque aperuerit, in quo iuventus tam honestas, tamque nobiles exercitationes haberet." See Proclus, *Commentary*, 65 (pages 52–53 in Morrow, *Proclus: Commentary* [above, n. 2]).

unperceptive and ungeometrical men should not abuse the leisure and learning dedicated to so liberal an art."⁴⁰

No one who had been following the debate between Ramus and Charpentier could miss the fact that *ageômetrêtos* was precisely the term that Charpentier had rashly used to refer to himself. Charpentier, far from being another Pythagoras, resembled those students the ancient mathematician had refused to teach. The physiognomic entrance exam that Ramus described so positively parallels the examination he wished to impose on all candidates for the Collège Royal, by which he had hoped specifically to exclude Charpentier. The connection in Ramus's thought between these terms and the undesirable elements of the University of Paris was reinforced a few pages later, when he recalled the famous sign over the door of Plato's Academy, forbidding entry to those without geometry. Plato, said Ramus, was emulating Pythagoras in keeping out the *amousoi*, *atheôrêtoi*, and *ageômetrêtoi*; yet the University of Paris (he regretted) made no efforts to keep such men out.⁴¹

As well as standing in for a more discerning Collège, Pythagoras's school provided a model for teaching at the University of Paris as a whole. From Diogenes Laërtius, Ramus learned that Pythagoras wrote three classes of treatises: *paideutikon*, *phusikon*, and *politikon*.⁴² Ramus was only concerned with the first, in which he imagined (absent any actual information about it) that Pythagoras set out the pedagogical principles of his school. More specifically, the "form of liberal learning" contained within the *paideutikon* was the division of the school into distinct ranks. After passing a period of silence, Ramus explained, the students abandoned their initial title, *akoustikoi*, and took on that of *mathêmatikoi*, from the knowledge of mathematics they had acquired during their years of silent study. Then, once they had mastered physical studies, they were called *phusikoi*. Finally, they studied the ruling of cities and states and were then called *politikoi*.

40. Ramus, *Scholae mathematicae* (above, n. 38), p. 7: "Non quosvis ait Gellius libro primo capite nono in disciplinam admittebat, sed *ephuseognômonei* ex oris et vultus ingenio . . . ne *amousoi*, *atheôrêtoi*, *ageômetrêtoi* otio et ludo disciplinae tam liberalis abuterentur." In Aulus Gellius, the anecdote about physiognomy occurs at the beginning of *Noctes atticae* I.9; at the end of this chapter on the Pythagoreans, Gellius records a saying of his friend Taurus, that modern philosophers were *amousoi*, *atheôrêtoi*, and *ageômetrêtoi* in comparison with the followers of Pythagoras.

41. Ramus, *Scholae mathematicae* (above, n. 38), p. 12.

42. See Diogenes Laërtius, *Vitae*, VIII.6.

Ramus claimed to be basing his account of the arrangement of the school on Gellius, but he made one significant change to the ancient account. Gellius had stated that the students received their titles when they *began* to engage in a particular activity, so that the *mathêmatikoi*, for instance, were so called once they started to study mathematics and for so long as that was their primary occupation.⁴³ Ramus, on the other hand, wrote that they received their titles on *completion* of those studies. According to his account, the students completed a mathematical education while still *akoustikoi*; then, as *mathêmatikoi*, they studied the natural world; when those studies were finished, they became *phusikoi*. As Ramus reinterpreted them, the titles marked off discrete units within the Pythagorean curriculum: mathematics was something to be mastered before moving on to the next subject on the syllabus.

In Ramus's account, Pythagoras's pedagogical instincts (as supposedly recorded in his *paideutikon*) conformed precisely with his own. Ramus required just such a strict division of curriculum subjects by his second "law of method," the "law of justice," or homogeneity (in Greek, *kath'auto*). It was by application of this law that he could lambaste Aristotle on almost every page of his *Scholae in liberales artes* for including logical material in the *Physics*, or theology in the *Metaphysics*. He made the contemporary relevance of Pythagoras's curriculum explicit, writing: "If only that *paideutikon* of his, the foundation of a liberal institution, had been a little more carefully observed, then our schools would not have lacked the true elements of humane learning for so long."⁴⁴

Ramus trumpeted the virtues of Pythagoras's school both because it took the liberal art of mathematics as the foundation of all learning, and because it supposedly imposed a rigid, Ramist distinction among disciplines. But there was yet another way in which he imagined that Pythagoras had been the perfect Ramist professor: immediately following the passage just quoted, Ramus explained that, in Pythagoras's day, there were no studies of grammar, rhetoric, or dialectic; instead, the *initia* and *elementa* of learning were in mathematics, the completion in physics. (Politics, he explained, was an extra subject that could be studied after the principal studies.)

43. Gellius, *Noctes atticae* (above, n. 40), I.9: "Hi dicebantur in eo tempore *mathêmatikoi*, ab his scilicet artibus quas iam discere atque meditari inceptaverant."

44. Ramus, *Scholae mathematicae* (above, n. 38), p. 8: "Cuius utinam *paideutikon* illud liberalis et ingenuae institutionis fundamentum, paulo diligentius ab hominibus attendetur, propria humanitatis elementa tandiu a scholis nostris nequaquam abessent."

In the modern university, Ramus accepted, the elements need to be learnt from grammar, rhetoric, and dialectic,⁴⁵ but still, he argued, there was no excuse for omitting mathematics and going straight to physics and politics. Mathematics was the *elementa et fundamenta* of physics and politics, and Pythagoras did not think anyone could become a physicist or politician without first mastering mathematics. It was a scandal that graduates of the University of Paris could be called “masters” when Pythagoras would not recognize them as educated even in the rudiments of philosophy.

It seems, then, that Ramus’s ideal curriculum—if the Pythagorean *schola* were transferred to the banks of the Seine—consisted of training first in the linguistic arts of the *trivium*—grammar, rhetoric, and dialectic—a concession to necessity; then mathematics, and finally physics, each taught in discrete, consecutive units. After that, students could pursue other subjects like politics. But Ramus did not discover this admirable curriculum for the first time in Gellius; in fact, this was *precisely* the curriculum he had advocated in his oration *Pro philosophica disciplina* of 1551, marking his return to philosophical teaching and writing—and also written, as it happens, in response to continuing obstruction from Charpentier and others.

In that oration, Ramus outlined a seven-year course of study, divided into distinct stages, which he proposed as a model of reform for the University of Paris.⁴⁶ Students would move from the study of language to dialectic in the fifth year, mathematics in the sixth, and physics in the seventh. In accordance with Ramus’s strictures on “homogeneity,” the subjects at each stage were to be kept rigorously apart from each other—there was to be no teaching of rhetoric in a grammar course, for instance, or vice versa.⁴⁷ Nevertheless, each successive stage would build on that which had gone before. The use of the three linguistic arts pervaded all the subsequent philosophical study, even if their teaching was to be carefully segregated. Students engaged in learning mathematics would be expected to master geometry, of course, but also would be required to declaim on mathe-

45. In his *De moribus veterum Gallorum* (Paris, 1559), fols. 44v–45r, Ramus claims that the ancient Gauls taught the liberal arts in their native language; if they had written down their teachings, it would be possible for the French to learn the arts in the vernacular, without the years now needed for the study of Latin and Greek grammar.

46. The text of the oration is in Ramus, *Collectaneae praefationes* (above, n. 31), pp. 255–323; see Waddington, *Ramus* (above, n. 17), pp. 73ff for the context of the oration.

47. Ramus, *Collectaneae praefationes* (above, n. 31): “Nec in isto rhetorico studio grammaticas regulas permiscemus” (p. 170), and “et Dialecticae inventionis dispositionisque praecepta, quae Rhetores in rhetoricis artibus parum distincte confuderant, in dialectica arte proprie et perspicue tradimus” (p. 171).

mathematical subjects (much as Ramus himself would later do in the *Scholae mathematicae*). And the “physics” studied in the final year would have a much more mathematical flavor than traditional university teaching of natural philosophy. Aristotle’s *Physics*, the standard university text, he dismissed as being merely filled with captious logical arguments; instead, students would extract the natural phenomena from Aristotle’s *Meteora*, *De anima*, and *Parva naturalia* (suppressing all of Aristotle’s irrelevant arguments) and master Euclid’s *Optics*, *Catoptrics*, and work on musical harmonies so that a “true physics, founded on mathematical reasoning, will be taught and practiced.”⁴⁸

Of course, when he wrote the *Pro philosophica disciplina* in 1551 and described his ideal curriculum, Ramus was not thinking of Pythagoras; indeed, it seems that he had hardly given any thought to him at all at this point. But in the *Scholae mathematicae*, with a little bending of the historical evidence, Ramus was able to claim Pythagoras as the originator of the very reforms he wished to institute in the university, molding Pythagoras’s school until it looked like the ideal university of the 1551 oration. Parrying Charpentier’s presumptuous self-identification with Pythagoras, Ramus showed that Pythagoras actually prefigured Ramus, while Charpentier was the “ungeometrical” student excluded from a true liberal education. In Pythagoras, Ramus both found a wry rejoinder to Charpentier⁴⁹ and, much more importantly, discovered (or planted) deep historical roots for the Ramist intellectual and educational program.

As well as making Pythagoras the original Ramist schoolmaster, Ramus also cast him as the first to construct a collection of theorems that looked much like the *Elements*, the first “elementator.”⁵⁰ His point, once again, was to draw a direct line between the Ramist program and the very beginnings of mathematics. Ramus had devoted his own career as a master of the liberal arts to writing textbooks, or to improving upon those already written by making them clearer and more “methodical.” His dialectic, under almost annual revision, grew out of the humanist dialectics of Valla and Agricola,⁵¹ and his

48. Ibid., p. 177: “[volumus] Physicam veram, mathematicis rationibus fundatam doceri et exerceri.”

49. Two years later, Ramus would use a similar line against the Aristotelian Jakob Schegk, whom he enjoined to keep a modest “Pythagorean silence” until he had mastered sufficient mathematics to express a worthwhile opinion on philosophy; see *ibid.*, pp. 205–206.

50. This is Ramus’s term for any author of geometrical *Elements*, translating Proclus’s *stoikheîôtês*.

51. Ong, *Ramus* (above, n. 23), especially chaps. 5 and 10.

work on mathematics began with an edition of Euclid's *Elements* and continued to be revised, in accordance with his methodological principles, until the end of his life.⁵² In his reconstruction of the proto-history of mathematics, Ramus imagined that Pythagoras, the first teacher of mathematics as a liberal art, would have occupied himself in much the same way. But he had very little evidence that Pythagoras had written a textbook on mathematics. According to Proclus, the very first person to write a collection of *Elements* was Hippocrates of Chios, who flourished a generation or more after Pythagoras.⁵³ In order to secure Pythagoras's position as the founder of the tradition of mathematical textbooks, Ramus gently massaged the evidence over the course of the *Scholae mathematicae*, making Pythagoras as a kind of "proto-elementator" standing at the head of the line of historically attested authors of mathematical *Elements*.

Ramus's biography of the first attested elementator, Hippocrates of Chios, described his colorful life and surveyed all his mathematical achievements, but singled out his authorship of a book of *Elements* as the most important of all his achievements. It was here that Ramus, while ostensibly describing the magnitude of Hippocrates's accomplishment, reintroduced and reimagined Pythagoras once again:

The first teacher of mathematics in a school was Pythagoras, but (as it is only fair to believe about the very beginnings) he was not entirely proficient, so that he is not called an "elementator"; but whatever the case may have been, Hippocrates was not at all put off by the greatness of Pythagoras, and increased the stock of mathematical learning, improving them with an *Elements* that had a more complete and richer order and method.⁵⁴

Ramus makes a number of assumptions here. Pythagoras and Hippocrates are both imagined to be teachers, whose primary concern was to impart mathematics to their students; he takes for granted his earlier portrayal of Pythagoras the schoolmaster. Hippocrates sur-

52. Walter Ong, "Christianus Ursitius and Ramus' New Mathematics," *Bibliothèque d'humanisme et renaissance* 36 (1974): 603–610.

53. Proclus, *Commentary*, 66 (page 54 in Morrow, *Proclus: Commentary* [above, n. 2]): "Hippocrates wrote a book on elements, the first of whom we have any record who did so."

54. Ramus, *Scholae mathematicae* (above, n. 38), p. 10: "Primus mathematicae in schola magister Pythagoras fuit, sed ut de primis initiis credi par est, minus distinctus, ut stoikheiotês ideo non appelletur: sed tamen quidquid sit, Hippocrates Pythagorae magnitudine minime deteritus mathematicum magisterium auxit et exornavit elementis ordine, viaque pleniore et uberiore deductis."

passed Pythagoras not in any specifically mathematical way, but in devising a better textbook. Ramus (in another unspoken, probably unconscious assumption) connected the compilation of mathematical *Elements* with the *teaching* of mathematics; it would be possible to attribute very different motives to Hippocrates: that he wanted to gather all known, fundamental theorems for the reference of practicing mathematicians, for instance.⁵⁵ But this did not occur to Ramus. Hippocrates' book of *Elements*, like that of Euclid, was a textbook, and its success was to be judged by criteria like clarity and order.

Ramus cast Hippocrates as a teacher much like himself, concerned with producing methodical textbooks for his students. Like Ramus, he also was unafraid to criticize his elders. Hippocrates (in his reading) was not scared off by Pythagoras's reputation; to the contrary, he boldly surpassed him, producing a better version of the *Elements*. There is, again, a clear analogy with Ramus, who criticized the ancients (including Euclid, the elementator par excellence), always to the end of surpassing them as a teacher. Hippocrates showed no arrogance in surpassing Pythagoras, only a kind of filial piety. In this and his subsequent remarks on later elementators, Ramus provided cover for himself against charges of *odium* and *invidium* for his own exuberant "correction" and "emendation" of Euclid, to say nothing of the suggestions of treason that Charpentier had raised.⁵⁶

Ramus reimagined Hippocrates not only because he wished to draw a resemblance between himself and the ancient elementator. His surpassing of Pythagoras was, in Ramus's historiography, a *normal* event: the story of Hippocrates contributed to Ramus's narrative of mathematical progress. From his earliest writings on mathematics, Ramus had allowed the possibility of progress in the art, even as he changed his mind from time to time about the *type* of progress that was possible.⁵⁷ Charpentier, on the other hand, rejected the very

55. Wilbur R. Knorr connects Hippocrates's systematization of geometry with the problem of squaring plane figures. In his view, Hippocrates was concerned to catalog the techniques already known for squaring rectilinear figures, in order to narrow down the approaches to squaring curvilinear figures, especially *lunules* (of which Hippocrates squared three of the five quadrable types) and the circle itself. See Knorr, *The Ancient Tradition of Geometric Problems* (New York: Dover, 1986), pp. 40–41.

56. Ramus wrote of Theudius, the third elementator in Proclus's catalog, that he "did not consider it odious or invidious to correct the *Elements* of Pythagoras and Hippocrates, or of his predecessor Leon" (see Ramus, *Scholae mathematicae* [above, n. 38], p. 19: "Theudius . . . nec odiosum sibi, nec invidiosum putavit Pythagorae, Hippocratis, Leontisque *stoirkheïōsin* corrigere et emendare").

57. See Goulding, "Method and Mathematics" (above, n. 9).

possibility of mathematical progress; in his third, victorious oration against Ramus, he associated the desire to surpass the ancients with the envy and arrogance peculiar to Ramus and his followers.⁵⁸ In the *Scholae mathematicae*, Ramus responded to Charpentier's criticisms by citing history, showing that the historical record bore witness to undeniable mathematical progress. Pythagoras's famous elation over his discovery of his eponymous theorem (offering a hecatomb of cattle in sacrifice) was intelligible only if new discovery was possible.⁵⁹

The chains of elementators that Ramus listed repeatedly in the *Scholae mathematicae* were intended to reinforce this model of intellectual progress. Pythagoras, as a proto-Ramist mathematician, belonged in this main narrative even if, in the passage cited above, he could only be claimed as a writer of textbooks, not a fully fledged elementator—at least not yet. For even as Ramus admitted, Pythagoras was not an elementator, though he attributed to him a substantial written mathematical work that looked very much like a collection of elements. Hippocrates was (according to Ramus) building upon and improving some sort of Pythagorean mathematical record, though he was deliberately vague about its precise nature (i.e., “whatever the case may have been”).

This was the starting point of Ramus's assimilation of Pythagoras into the line of elementators. In his next significant reference to Pythagoras, he wrote that Leon (Proclus's second elementator, successor to Hippocrates) was the “third master and teacher of mathematical philosophy, and also a writer” who surpassed Pythagoras and Hippocrates in his attention to utility.⁶⁰ Here, Ramus has placed Pythagoras first in a series of mathematical *writers*, if not elementators. Continuing the list, Ramus wrote that Theudius (the third elementator listed by Proclus) corrected the *Elements* of Pythagoras, Hippocrates, and Leon⁶¹—now unambiguously attributing the first written *Elements* to Pythagoras. Shortly after that, he wrote: “Pythagoras, if I may also count him as if he were an elementator

58. Charpentier, *Orationes tres* (above, n. 12), sig. G2r.

59. Ramus stressed that mathematical progress was continuous, by noting that Pythagoras himself was unaware of the more general, superior theorem that became *Elements* VI.31; if Pythagoras's theorem was worth the sacrifice of a bull, then, Ramus thought, the anonymous VI.31 deserved at least a thousand (see Ramus, *Scholae mathematicae* [above, n. 38], p. 7).

60. Ibid., p. 17: “Leo igitur tertius mathematicae philosophiae non solum magister et doctor, sed scriptor Pythagora et Hippocrate usus laude perfectior et accuratior fuit.”

61. See note 56 above.

. . . Hippocrates emulated his fame, by writing down and publishing an *Elements* furnished with demonstrations.”⁶²

The transformation of Pythagoras was completed at the beginning of book 3 of the *Scholae mathematicae*, where Ramus included Pythagoras without comment at the head of the list of elementators, as if it were an established historical fact.⁶³ However, it must be repeated, there was no historical evidence that Pythagoras ever wrote a collection of *Elements*, nor any other mathematical text. Ramus was not simply making an error when he included Pythagoras in a lineage of mathematical authors, because it took considerable effort and special pleading to establish him in this newly imagined role, and such a labor was not undertaken on a whim. If Pythagoras was to be the model Ramist schoolteacher, then he *must* have been concerned to present his material as clearly and “methodically” as possible—and therefore he must have written a textbook. It was only fitting as well that an ancient Ramist mathematician should illustrate Ramus’s conviction of progress. His sympathy, even his identification with Pythagoras are evident. But Ramus also praised those who inevitably surpassed Pythagoras; in this way, he not only highlighted the possibility of mathematical advancement, but also justified through history itself his own critical stance toward the mathematical past.

When he invented the Pythagorean “*Elements*” out of little more than thin air, Ramus pushed back the beginnings of recorded mathematics to a primitive era, in which the art was much closer to its original (and hence natural) form. As I have argued elsewhere, Ramus borrowed his framework for the history of mathematics from the histories he had constructed for other liberal arts, particularly dialectic: a model built around cycles of progress and decay.⁶⁴ In the earliest days, according to Ramus, dialectic was natural and untaught, the mind reflecting naturally the divine, logical structure of the world. The first teachers of dialectic (among whom Ramus counted Prometheus and Zeno of Elea) were excellent *practitioners*

62. Ramus, *Scholae mathematicae* (above, n. 38), p. 19: “Pythagoras, ut hunc etiam tanquam *stoikheiotên* numerem . . . Hippocrates istam laudem aemulatus, elementa demonstrationibus exornata descripsit et publicavit.”

63. *Ibid.*, p. 77. Ramus’s position did vacillate, however. On page 21, he provided a list of elementators in which Euclid took the fifth place, just as in Proclus, without any mention of Pythagoras. In the conclusion to book 1, Ramus divided mathematicians into three classes: elementators (in which Pythagoras does not appear); those who have authority because of their schools (Pythagoras, Plato, and Aristotle); and those who extended the utility of mathematics.

64. Goulding, “Method and Mathematics” (above, n. 9).

of the natural art, which they codified into a discipline to teach to others, always respecting the natural form of reasoning. A great disaster befell dialectic in the person of Aristotle, who out of arrogance promoted his own artificial contrivances (*commentitia*, a favorite Ramist term) over the training of natural reason. Since then, dialectic had been in constant decline, as its practitioners, abandoning their own natural talents, applied themselves to learning only Aristotle's fictions.

In the version of the history of mathematics Ramus had developed by the time of the Charpentier debate, the history of this art looked much like that of dialectic. The first human beings in Eden pursued mathematics as a natural art. After a long period of more or less unsullied "natural mathematics," a great change came with the *commentitia* of Euclid and his commentator Theon. Their crime was to disorder the older *Elements* to such an extent that demonstrations had to be introduced in order to explain why propositions were true. In a natural mathematics, as Ramus maintained to the end of his life, each proposition would be stated in its correct, natural context and would be accepted as self-evident, without the need for any demonstration. (It must be noted that Ramus could never quite resolve his reverence for the primitive and "natural" with his insistence that mathematics had undergone change and progress toward a more complete, better condition.)

In the *Scholae mathematicae*, Ramus blamed the decline of mathematics not on Euclid, but largely on Plato a generation before him. According to this new version of the history, the decline of mathematics was not so much a result of individual failing or arrogance, but an effect of the growing philosophical drive toward the theoretical over the practical. Plato did not originate this process, but he gave it definite form in his philosophical system, amplifying the drive toward abstraction in subsequent generations. The professional delight that philosophers took in elaborate demonstration was one aspect of the theoretical turn, which contaminated mathematics as well as the once-pristine natural art after becoming obscured by ever more complicated and sophisticated proofs. In the historiography of the *Scholae*, Euclid and his *Elements* represented the end point of a long decline.⁶⁵

Mathematics *before* Plato (and certainly before Euclid) was thus more authentic, although the seeds of its later corruption could be

65. In order to make this argument, Ramus had to show that Euclid was not a contemporary of Plato's, as was generally believed. A full account both of Ramus's anti-Platonic move in the *Scholae mathematicae* and his redating of Euclid will be found in my forthcoming book.

found even in the earliest period. Proclus recorded, for instance, that Hippocrates of Chios was the first to use reductions to the impossible. For Ramus (as for other Renaissance writers on mathematics), indirect proof was much inferior to direct demonstrative proof.⁶⁶ He interpreted Proclus's statement to mean that Pythagoras and other early mathematicians must have had direct proofs for their theorems, which indicated the nature of the thing itself, rather than merely persuading that it cannot but be the case *per accidens*.⁶⁷

Thus Pythagoras's supposed *Elements* emerged during the natural, relatively unspoiled period of mathematical activity before the advent of Platonism, and even before one of the first significant departures from mathematical simplicity. Despite its loss and effacement by later, decadent *Elements*, Pythagoras's textbook represented the possibility of a mathematics that taught directly, by showing rather than proving—the mathematics Ramus himself attempted to reconstruct in his own *Arithmetic* and *Geometry*. In yet another sense, then, Pythagoras was a model mathematician for Ramus; Ramus's own *Geometry*, though never completed to his satisfaction,⁶⁸ can nonetheless be seen as an attempt to recover a pre-Hippocratean mathematics.

Finally, and quite surprisingly, Ramus found in Pythagoras a kind of "earthy" primitivism, a sort of mathematics in the body, which is, to say the least, paradoxical, given Pythagoras's reputation even in the Renaissance for abstraction and mysticism. Throughout the *Scholae mathematicae*, Ramus was drawn repeatedly back to the image of Pythagoras sacrificing a bull, or a hecatomb of bulls, in celebration of his discovery of his famous theorem. The first time he mentioned this, he added that "[t]he loves of mathematics are at first bitter and difficult, yet eventually filled with pleasure."⁶⁹ This lover's lament reflects Ramus's own passionate relationship with mathematics. His first prolonged encounter with the *Elements* brought on acute back pain, halfway through book 10, at which he "threw away [his] drawing-board and ruler, and burst out in rage against mathematics,

66. See Robert Goulding, "Polemic in the Margin: Henry Savile and Joseph Scaliger on Squaring the Circle," in *Scientia in Margine: Études sur les marginalia dans les manuscrits scientifiques du moyen âge à la Renaissance*, ed. D. Jacquart and C. Burnett (Geneva: Librairie Droz, 2005), pp. 241–259.

67. Ramus, *Scholae mathematicae* (above, n. 38), p. 96.

68. See Ong, "Christianus Ursitius" (above, n. 52), for Ramus's continuing substantial edits right up to his death.

69. Ramus, *Scholae mathematicae* (above, n. 38), p. 7: "Amores nempe mathematici sunt illi acerbi primum difficilesque, tandem voluptatis plenissimi."

because it tortures so cruelly those who love it and are eager for it.”⁷⁰ Pythagoras, and Thales before him, made grand, sacrificial gestures, carried away by the bitter love of mathematics. Eratosthenes would later put up a votive tablet for the same reasons; and Archimedes, by running naked through the streets, sacrificed his body and soul, his very reputation among his fellow, uncomprehending citizens.⁷¹

Perhaps Ramus’s cramp in the spine does not compare with the sacrifices made by these legendary mathematicians, but at the peroration of the *Prooemium mathematicum*, which closes the third book of the *Scholae mathematicae*, he promised to repeat Pythagoras’s sacrifice, a hecatomb of cattle to those who can “make mathematics easy for boys, accessible to ordinary working men, and not only marvelous to know and use, but popular.”⁷² Ramus’s admiration and physical sacrifice, in other words, was reserved for those who could make mathematics itself more earthy and physical. Pythagoras, who made such a grand physical gesture on discovering a theorem about a triangle, who examined his prospective students through their physical features, who wrote the first elementary textbook of geometry, showing the way directly and simply to the truths of mathematics—*this* Pythagoras, constructed in Ramus’s historical imagination, was a fitting model for the reformed physical mathematics that Ramus himself sought. A great Ramist systematizer of mathematics would, in fact, be a second Pythagoras (since, as Ramus had shown, Pythagoras was in some sense a *first Ramus*). It would be entirely appropriate if he were honored with a Pythagorean sacrifice. Such a reformation of mathematics as a whole deserved more celebration than the discovery of a theorem in geometry, even one as fundamental as Pythagoras’s. For by introducing Pythagoras’s *method* in teaching and mathematical presentation, more than any actual geometrical results, the University of Paris would be refounded on Pythagorean principles.⁷³

70. From his 1563 *Oratio de professione sua* (Ramus, *Collectaneae praefationes* [above, n. 31], p. 409). See Pantin, “Ramus et l’enseignement” (above, n. 8), p. 77; Waddington, *Ramus* (above, n. 17), p. 108; Goulding, “Method and Mathematics” (above, n. 9), p. 74.

71. Ramus, *Scholae mathematicae* (above, n. 38), p. 32.

72. *Ibid.*, p. 112: “a quibus mathematicas artes pueris faciles, opificum vulgo familiares, cognitione denique et usu non tantum mirabiles, sed etiam populares factas esse videmus.”

73. *Ibid.*, p. 13: “Ergo Pythagoras Academiae Parisiensi mathematicas optabit: Ergo Plato in Academia Parisiensi mathematicas artes desiderabit; et uterque Parisiensem Academiam, tum Pythagoream et Platonicam esse iudicabit, cum mathematicis primas in philosophia detulerit.”

Despite his historical reimagining of Pythagoras, there were some aspects of his teaching that were antipathetic to Ramus's own philosophical convictions and yet could not be entirely ignored. Foremost among these was Pythagoras's reputation for abstraction, in the sense that he considered mathematical objects abstracted from the physical world and accessible by the action of the mind alone. Ramus was able to gloss over this error, because he elided Pythagoras's flight away from the physical world into his pursuit of mathematically more general propositions.⁷⁴ In other words, Ramus conveniently conflated (as he so often did) the ontologically and the logically prior.

He faced the same problem when he criticized Proclus's philosophy of mathematics, as presented in his *Commentary* on Euclid. According to Proclus, the mind's knowledge of mathematics does not originate in any sort of observation or discovery, nor does it require any assistance from the senses; rather, it is inborn, placed there by nature.⁷⁵ Such was Proclus's opinion that, claimed Ramus, he held against the doctrine of both Aristotle and Plato. But in fact

we have discussed this matter [the origin of mathematics] at length, following the opinion of Plato and Aristotle. That is, that God and Nature have given the mind the faculty of perceiving all things, just as they gave the eye the faculty of discerning all colors. But they did *not* give the mind the forms of things themselves, just as they did not give the eye the actual appearances of the colors.⁷⁶

It seems odd, to say the least, to associate this essentially Aristotelian position with Plato. Moreover, the position that Proclus presented in the *Commentary* was clearly meant to be an explication of the mathematical division of the soul in the *Timaeus* and the divided line of the *Republic* and so intended to elucidate Plato's own position and, quite evidently, refute Aristotle's. Ramus's unusual grouping of Plato and Aristotle united against Proclus is explicable if we bear in mind that Ramus had interpreted Platonic reminiscence as a historical process.⁷⁷ Mathematical knowledge, Ramus thought, was something

74. Ibid., p. 6.

75. Proclus, *Commentary*, 12–17 (pages 10–15 in Morrow, *Proclus: Commentary* [above, n. 2]).

76. Ramus, *Scholae mathematicae* (above, n. 38), p. 83: "hac de re abunde dictum est a nobis e sententia Platonis et Aristotelis, animo facultatem omnium rerum percipiendarum a Deo et natura datam esse, ut oculo facultatem omnium colorum cernendum, non autem animo formas rerum, ut nec oculo species colorum."

77. See Goulding, "Method and Mathematics" (above, n. 9), pp. 72–73.

regained over long periods of time through mathematical activity, which involved observation of the world. Through this process, humanity as a whole progressed toward a natural expertise in mathematics—a *recovery*, because this same expertise had been held by the first human beings, their minds not yet corrupted by *commentitia*. It was his interpretation of reminiscence as a series of historically distinct acts of realization that allowed Ramus to unify the opinions of Plato and Aristotle on the nature of mathematical cognition.

He attributed Proclus's notion of preexisting mathematical realities not to Plato, but to the *somnia pythagoreorum*, the "dreams of the Pythagoreans." He made this association *not* because of the Pythagorean reputation for abstraction, but because a commitment to such a model of mathematical knowledge required one to accept the transmigration of souls. (Why Ramus might think this was the case will be explored below.) Moreover, he was moved to bring up the Pythagoreans in this context, because he associated this passage on Proclus's philosophy of mathematics with another, on the origins of the word "mathematics."⁷⁸ Proclus claimed that the Pythagoreans gave the art this name. As Ramus explained it, the Pythagoreans considered all arts to be recollection; but the word "*mathesis*" meant a particular kind of recollection, whereby the eternal "*rationes*" within the soul were recovered. Mathematics, therefore, was given its name, because it brought about that kind of recollection, although, as Ramus remarked sharply, "no one so far has ever found this recollection to be so productive that by its help he has been able to learn any art without study or hard work."⁷⁹

Ramus has distorted the passage from Proclus a little here. There is nothing in the original text to suggest that the Pythagoreans identified a particular *type* of *mathesis*—that which recovers the eternal reasons in the soul—with mathematics; rather, Proclus, after very briefly relating the Pythagorean origin of the name, and the fact that the followers of Pythagoras thought of learning as recollection, then turned to Plato and the slave boy of the *Meno*. This Platonic reminiscence—the real reason why mathematics is named after *mathesis*—simply could not be assimilated to Ramus's anti-idealistic construal of Plato's philosophy.⁸⁰ He thus seized on the Pythagoreans as the

78. Proclus, *Commentary*, 45–47 (pages 37–38 in Morrow, *Proclus: Commentary* [above, n. 2]).

79. Ramus, *Scholae mathematicae* (above, n. 38), p. 83: "Recordatio ista adhuc in nemine tam felix inventa est, ut eius beneficio sine studio et labore ars ulla praeciperetur."

80. For Ramus's creative rereading of Platonic metaphysics, see Nelly Bruyère, *Méthode et dialectique dans l'œuvre de La Ramée: Renaissance et âge classique* (Paris: J. Vrin, 1984), pp. 262–264.

culprits; yet, given their importance in the rest of the *Prooemium mathematicum*, they now had to be rescued from this inconvenient metaphysics. He absolved them by considering both Aristotle's and the Pythagorean positions as extremes taken for the sake of a larger argument. Aristotle wrote (as Proclus cited him in the passage under discussion) that the soul was an empty tablet. But he did not strictly mean that; it certainly has, as Aristotle himself says elsewhere, in-born faculties to learn the arts. He adopted his exaggerated position in reaction to the position of the Pythagoreans, who had overstated *their* case. In the end, both the Pythagoreans and Aristotle ended up somewhere in the middle:

since Aristotle himself says that there are natural virtues and a natural logic, so that he allows our minds to have not only the faculties for virtues and arts, but even in a way the seeds and beginnings of them. And the soul is not a completely empty tablet, but even naturally scattered with colors and outlines. And so I can rather forgive the Pythagoreans here, who were just a little zealous in promoting the immortality of the soul, and accordingly also promoting its divine faculty. It is really Proclus that I blame, who rejected Aristotle and Plato's discernment in finding a better and more reasonable opinion.⁸¹

That is, the Pythagorean position was just a little exaggeration, stemming from the laudable goal of asserting the immortality and divine faculty of the soul. Even Aristotle's reaction to it can be seen as an overreaction to compensate for this extreme position. The Pythagoreans can thus be given the benefit of the doubt; Proclus, on the other hand, having Plato and Aristotle's correct position at hand, can have no excuse for adopting the exaggerated position of the Pythagoreans.

These two instances by no means exhaust Ramus's writing on Pythagoras and the Pythagoreans. In his *Scholae metaphysicae*, issued in 1569 in a volume accompanying the expanded *Scholae mathematicae*, he returned to the Pythagoreans dozens of times (though rarely Pythagoras himself) as he performed his chapter-by-chapter hatchet job on Aristotle's *Metaphysics*. By and large, however, he followed the pattern already seen here: to claim Pythagoras as his own when he could, or else to explain away offending ideas as an aberration

81. Ramus, *Scholae mathematicae* (above, n. 38), p. 83: "cum Aristoteles ipse naturales virtutes et naturalem logicam dicat, ut non tantum facultates virtutum et artium, sed initia quaedam et semina nostris animis attribuat, nec animus tabula plane nuda sit, sed pigmentis etiam quibusdam et lineamentis naturaliter aspersa. Quare pythagoreis hic nonnihil ignosco animi immortalitatem, proindeque divinam facultatem paulo cupidius efferentibus; Procli vero elenchum improbo, qui melioris sententiae justiorisque iudicium a Platone et Aristotele propositum repudiari."

or mistake. When neither gambit was possible, he adopted other, rather extraordinary tactics; for instance, he found Pythagoras's list of ten pairs of opposites (male/female, odd/even, square/oblong, and so forth) to be utterly bewildering. Accordingly, he shifted the focus to Aristotle, whom he claimed had plagiarized his ten categories from this list.⁸²

The last two books of the *Metaphysics*, where Aristotle critiques the Pythagorean notion of numbers as forms, might have given Ramus some trouble; instead, he breezed through these books, loudly complaining that the *Metaphysics* was too long and that he was tired of it. At the beginning of his commentary on book 13, Ramus noted that the commentaries of Alexander of Aphrodisias and Aquinas did not cover these books, and for a moment he entertained a wild hope that they might be spurious—until he had to acknowledge several other ancient commentaries that treat them as genuine parts of the *Metaphysics*.⁸³ In any case, despite (or because of) the Pythagorean material in these books, Ramus had very little of substance to say. His entire commentary on these books can be summarized in a single sentence buried in the text: "Aristotle doesn't like the dreams of the Pythagoreans, and neither do I."⁸⁴ But he dismissed Aristotle's arguments as repetitive: the philosopher had already demonstrated that immaterial Forms could not be substances or causes (in earlier books of the *Metaphysics*); why bother making the same arguments now for *numbers*? Thus the single most problematic element of Pythagoras's philosophy, and the most thorough refutation of it, Ramus dismissed in a histrionic display of irritation.

Ramus's attitude to Pythagoras after the *Prooemium mathematicum* remained entirely consistent. His arguments were tendentious, without a doubt, but still stayed true to the precise historical vision that he forged in the pages of the *Prooemium*. He reimagined Pythagoras as a great mathematical primitive who, by nature, taught a Ramist curriculum of the arts. Everything that could be made to fit that model was put to service; anything that was irreconcilable (and that included what most would consider to be the characteristic Pythagorean doctrines) had to be explained away, or simply made to disappear in a polemical haze. One can admire Ramus's thoroughness, if not always his historical or philosophical reliability. Nevertheless, the result was a vision of mathematics as a living discipline, one that

82. Petrus Ramus, *Scholae in liberales artes* (Basel, 1569), cols. 845–846.

83. *Ibid.*, cols. 972–973.

84. *Ibid.*, col. 990: "Verum somnia Pythagorea Aristoteli displicent, neque mihi placent."

could be realized again, if only the Ramist curriculum of studies was implemented in the university. It is a reformer's manifesto written in the language of history, thus much more compelling than the rhetorical and polemical modes in which he had previously expressed it. Given Ramus's increasing marginalization in the university after his defeat over the Charpentier chair, there is something almost poignant about his discovery of an authentic school, flourishing under his pedagogical principles, deep in the legendary past.

When Ramus claimed Pythagoras as his own in the *Scholae mathematicae*, he also assigned Charpentier a new historical role: that of Aristippus. This follower of Socrates who founded the hedonistic Cyrenaic school had become a well-known figure in Renaissance introductions to mathematics.⁸⁵ Aristippus derided mathematics as worthless, at least in comparison to the practical arts; it not only failed to produce anything of value, but unlike even carpentry or cobbling, it refused to take into account the notion of value at all.⁸⁶ Extreme circumstances led to his change of heart, however. Cast by a shipwreck onto a deserted shore (of Rhodes, as he later discovered), Aristippus saw mathematical diagrams drawn in the sand and immediately announced to his companions that they would be safe, since such marks could only have been made by civilized men.⁸⁷ The pleasure-addicted hater of mathematics was thus in the end humbled and forced to recognize that mathematics was a civilized, liberal pursuit.

The second book of the *Prooemium mathematicum*, devoted to defending mathematics against the charge of *inutilitas*, referred all criticisms that mathematics was useless to "Aristippus," Ramus's transparent sobriquet for Charpentier. Aristippus, wrote Ramus, teaches Aristotelian physics,⁸⁸ but is so unaware of its mathematical basis that he is like a blinded Polyphemus, his classroom a kind of Cyclops's cave.⁸⁹ This Aristippus, like his historical namesake, criticizes mathematics for saying nothing about the good and the beautiful; for such obtuseness he would be thrown out of any decent university, such as those in Germany.⁹⁰ He is a *varius homo*, a chameleon, who one moment is a scholastic and the next plays the courtier.

85. See Goulding, "Testimonia humanitatis" (above, n. 10).

86. Aristotle, *Metaphysics* III.2.

87. Vitruvius, *De architectura* VI., praef.

88. Ramus, *Scholae mathematicae* (above, n. 38), p. 46.

89. *Ibid.*, p. 49.

90. *Ibid.*, p. 71.

He will slander mathematics, much to the displeasure of his patron,⁹¹ and then, when he must, he will adopt a feigned philosophy and sing its praises.⁹²

These last observations led Ramus to the story of Aristippus in the shipwreck.⁹³ The usual interpretation of this story was that Aristippus had always secretly acknowledged that mathematics was a civilized art, even though he admitted it only *in extremis*. Charpentier, the hater of mathematics angling for a chair in the subject, could clearly be represented by this story, but such a charitable reading of Aristippus's motives would hardly suit Ramus's purposes. Therefore, continuing his earlier characterization of Charpentier as fickle, Ramus quoted a verse from Horace, that "Aristippus could accommodate himself to every condition, rank and circumstance."⁹⁴ In his poem, Horace related how Aristippus was teased by a Cynic for his enjoyment of royal luxury. The Cyrenaic replied that he worked hard entertaining the king and received regular reward, while his critic had to beg and received less than him. Ramus's Aristippus, then, was a paid lapdog of the gentry, presenting himself for the chair of mathematics only to win his masters' admiration and patronage. The use of the myth allowed Ramus to make the charge obliquely without offending Charpentier's powerful backers themselves, such as the cardinal. (Perhaps also the rather pathetic figure of the Cynic in Horace's story was Ramus himself, aware that his defeat and loss of patronage had reduced him to begging scraps at the tables of the great.)

Charpentier, as one might expect, bristled at his characterization as a latter-day fawning Aristippus, and in his *Admonitio ad Thessalum*, written in reaction to the *Prooemium*, he rejected the title angrily. The name-calling had escaped the bounds of Ramus's book; Charpentier reported that Ramus's students had begun to use the name in public, accusing Charpentier of following Aristippus in his belief that the mathematical arts have no goal.⁹⁵ This, he claimed, was not true, although if it were true, he would simply be repeating the opinion of Plato and Aristotle: that mathematics has no *practical*

91. That is, the cardinal of Lorraine, who was Ramus's patron until Ramus converted to the reformed religion. Throughout the case, even as Charpentier mocks him for having lost his patron, Ramus affects that he and the cardinal remain close.

92. Ramus, *Scholae mathematicae* (above, n. 38), p. 74.

93. *Ibid.*, p. 75.

94. Horace, *Epistulae* I.17: "Omnis Aristippum decuit color et status et res."

95. Jacques Charpentier, *Admonitio ad Thessalum, Academiae Parisiensis methodicum de aliquot capitibus Prooemij mathematici* (Paris, 1567), fol. 18v.

goal. He then turned to the second book of the *Prooemium mathematicum*, where Ramus had so vigorously attacked him in the figure of Aristippus. There, he found no “end” of mathematics worthy of the name—just base, illiberal applications. Charpentier insisted that the only application of mathematics is that which Proclus, Plato, and Aristotle (whether Ramus liked it or not) had proclaimed: the elevation of the soul to mathematical objects, which lie at a midpoint between sense objects and the entirely immaterial.⁹⁶

Charpentier did not overlook Ramus’s attempt to excuse the Pythagoreans from their doctrine of recollection: Ramus, he said, falsely accused Proclus of misrepresenting the Pythagorean position. He accused Ramus—and this gets to the heart of Ramus’s “historical method”—of being unable to distinguish between historical truth on the one hand, and philosophical or dogmatic truth on the other:

“But I don’t like this idea of recollecting a previous life that Proclus repeats from Pythagoras in this passage,” you say. Well, neither do I. . . . But the issue between us here is not whether it is true, but only whether Proclus accurately set out the explanation of this name [mathematics, that is] according to the Pythagoreans, who came up with this notion of recollection.⁹⁷

Staying with the Pythagoreans, Charpentier turned to a passage in the *Prooemium mathematicum* that hit close to Charpentier’s own field of natural philosophy. Ramus argued, or asserted, that “Aristippus” was unqualified to teach the natural philosophy of Plato or Aristotle, because every aspect of the philosopher’s physics was grounded in mathematics.⁹⁸ The notion of a mathematical physics is, of course, very significant for the emergence of early modern science. But it is only fair to say that Ramus was at least encouraged to adopt this position simply to discomfit Charpentier and other teachers of Aristotelian natural philosophy; he found no difficulty in making the case for the Plato of the *Timaeus*, of course. The case for Aristotle, on the other hand, was rather more ad hoc. The philosopher used frequent examples from the geometers throughout his philosophy, relied on geometry to explain the rainbow in the *Meteora*, and in his *Physics* dealt with rest and motion, a subject treated more precisely and mathematically in his *Mechanics* (a work that

96. Ibid., fol. 22r.

97. Ibid., fols. 46v–47r: “At mihi, inquires, ista displicet recordatio vitae superioris, quae ex Pythagora a Proclo eo loco est repetita. Et mihi quoque. . . . Sed non quaeratur nunc inter nos an ea vera sit: sed tantum an ratio huius nominis a Proclo accomodate fuerit exposita ad mentem Pythagoreorum, qui eius recordationis authores sunt.”

98. Ramus, *Scholae mathematicae* (above, n. 38), pp. 46–47.

Ramus himself taught to his students). This would hardly be sufficient to maintain that Aristotle's physics was *essentially* mathematical, but, for Ramus, it sufficed. And the mathematization of physics could, he inevitably claimed, be traced back to the Pythagoreans: the axiom of physics that all things move to their place of rest at right angles was intimated by the Pythagoreans in their making the figure of earth as a cube.

Charpentier made short work of Ramus's Pythagorean, mathematical physics. In doing so, he revealed some fascinating details of the direction Ramus's thought was taking after the publication of the *Prooemium mathematicum*. His attack also exposed just how difficult it was for anyone at this time (including Ramus) to imagine what a mathematized world might look like. Ramus had insisted that the Pythagorean school had based its physics on mathematics, and that Aristotle had followed its example. In reply, Charpentier distinguished, again, between the historical and philosophical truth. He allowed that Ramus might well be right that Pythagoras (if not Aristotle) explained the world in this way. There seemed to be no doubt, *historically*, that the Pythagoreans explicated nature by numbers and figures. But Ramus had misconstrued the *philosophical* significance of this position and thereby misinterpreted the significance of their actions.⁹⁹ The ancient philosophers only described nature in the language of mathematics, because numbers and geometrical figures had an almost proverbial *obscurity*. As Charpentier went on to explain, Pythagoras and his followers used mathematics as a veil or a kind of cipher to keep the vulgar away from their philosophy; only those initiated into Pythagoras's own geometrical teaching were able crack the code and access the truths hidden beneath the geometry and arithmetic.¹⁰⁰ Charpentier professed to be frankly bewildered that Ramus should find such an approach laudable. And, even if Plato had been guilty at times of the same obscurity in the *Timaeus*, it was ludicrous to claim that Aristotle had engaged in the same deliberate obfuscation.¹⁰¹ If the new philosophers of the seventeenth century saw nature as a code waiting to be cracked (as Peter

99. It is worth noting that this is an error opposite to the one Charpentier pointed out earlier, where he accused Ramus of fudging the historical fact of Pythagorean metempsychosis, because of his philosophical distaste for it.

100. Charpentier, *Admonitio ad Thessalum* (above, n. 95), fol. 58r: "Sicque Pythagoreorum institutio et paedia, erat posita in mathematicis, quoniam, ut dixi, Philosophiae mysteria, quae volebant a suis tantum intelligi, illi per numeros et figuras explicabant."

101. *Ibid.*, fols. 58r–59v.

Pesic has argued),¹⁰² an Aristotelian like Charpentier saw the mathematical explanation of nature as the *imposition* of a cipher onto a plaintext world.

It may be that Ramus had been led to adopt a mathematical view of nature in part to set himself apart from his Aristotelian opponent. He had, of course, always viewed mathematics as primarily directed to practical use in the world; the mathematical natural philosophy of the *Prooemium mathematicum* was, in a sense, a pointed restatement of that fundamental conviction. But his long meditation on the figure of Pythagoras and his teachings seem to have turned him toward a quite original position, in which mathematics became the language and the *substance* of the physical world. Charpentier reported that Ramus's lectures on geometry delivered after the *Prooemium mathematicum* (and never collected or published) had taken a bold new turn:

Or is it that you would take refuge in something that (as I hear) you recently maintained in a public lecture on geometry? You said that the subject of arithmetic and geometry (quantity, in other words) is not some accident of that substance which constitutes a natural body, but is in fact the natural body's principle and foundation itself. Now, even though many people I trust told me that you said this several times in your lecture, and even though I can guess where you want to go with this opinion, at least as far as religious questions are concerned, still, this seems to me so absurd and so monstrous an opinion that I simply wouldn't dare to ascribe it to anyone, even to you.¹⁰³

If Charpentier's report is to be trusted, Ramus eventually achieved complete identification with Pythagoras. Only a year before he had been entirely indifferent toward him; then he remade the ancient philosopher in his own image, carefully separating out the aspects of his thought that he found unpalatable. Finally (according to Charpentier), Ramus subsumed even those features into his worldview.

102. Peter Pesic, "Secrets, Symbols and Systems: Parallels between Cryptanalysis and Algebra, 1580–1700," *Isis* 88 (1997): 674–692.

103. Charpentier, *Admonitio ad Thessalum* (above, n. 95), fols. 60r–v: "An ad id confugies quod audio nuper in explicatione geometriae tibi factum esse familiare? Arithmeticae scilicet et geometriae subiectum, quod quantum dicitur, non esse affectionem eius substantiae ad quam naturale corpus refertur, sed eius principium atque fundamentum. Equidem etsi permulti fide dignissimi, mihi testati sunt, hoc a te saepe in tuis praelectionibus esse praedicatum facileque suspicer hac nova opinione quorsum in his quae ad religionem pertinent velis evadere, haec tamen mihi tam absurda est tamque monstrosa, ut non audeam tibi eam hoc loco ascribere." The religious implication was the denial of substance and accident, which would undermine the doctrine of transubstantiation of the elements of the Eucharist.

The mathematical foundations of physics would become a central issue in the development of natural philosophy, within just a few years of the Ramus–Charpentier debate. The two nonmathematicians involved in this conflict explored the subject of the mathematical basis of the sciences largely through the historical imagination. In order to defend mathematics, Ramus tried to imagine a time and situation in which mathematics was not just useful, but central to the teaching of all the arts. He had been concerned with mathematics and its connection to the world since his very first writings. But in this debate, his fixation on the person of Pythagoras as a founder both of mathematics and of the Ramist method in the arts drew him closer to the ancient philosopher’s mathematical realism. Charpentier’s opposition to Ramus over his mathematical physics was, in one sense, philosophical and religious, but his central point was also historical: that Pythagoras used mathematics to conceal knowledge, not to convey or discover it. There is some irony in the fact that Charpentier, although often a better historian than Ramus, was here defeated by a lack of imagination. Ramus’s construction of Pythagoras was a piece of thoroughly partisan historiography. Through his reimagining of the mathematical past, however, he inadvertently stumbled on a most fruitful path for the future development of the sciences.