ARTS OF CALCULATION
QUANTIFYING THOUGHT IN EARLY MODERN EUROPE

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CHAPTER 3

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THE THREE-DIMENSIONAL SELF:
GEOMETRY, MELANCHOLY, DRAMA

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THE GEOMETRY OF DISORIENTATION

Work on mathematics in recent studies of Renaissance culture, aesthetics, and literary form has focused primarily on the conceptual orientation enabled by the expansion of mathematics. Recalling Ernst Robert Curtius's comment in his survey of numerical composition, "[n]umbering, counting, enumerating are means of intellectual orientation,"[1] these studies have offered a range of new insights into organizational models subtending the arts of calculation in the Renaissance, whether it be the "subtext of form," the "rise of aesthetic rationalism," the "plots" of culture and consciousness, or what a number of historians have called the quantifying "*mentalité*" of Renaissance culture.[2] But rather than focus on the orienting structures of calculation for the development of aesthetics and rationalism, this essay does the opposite: that is, it examines the disorienting dimensions of quantification as they informed representations of emotional and aesthetic complexity. Through the analysis of a little known, early seventeenth-century allegorical drama set in the space of Euclidean geometry, this essay will argue for melancholy as a spatially and arithmetically imagined disposition in a period of rapidly expanding mathematical knowledge.

In the anonymous academic drama, *Blame Not Our Author* (ca. 1613), while all the characters are geometric shapes and instruments of

mathematic practice, the two central characters, Quadro and Regulus (the "ruler"), are self-professed melancholics.[3] This drama is about mathematical figures inhabiting the two-dimensional space of a geometric textbook, newly subject to manipulation and torture by so many hands of carpenters, navigators, peddlers, political strategists, translators, printers, poets, and other meddling inhabitants of the three-dimensional world. Importantly, the play stages the state of melancholy as a function of the irrationality of measured space in an otherwise ideal Euclidean cosmos, highlighting the tensions between mathematic ideality and increasingly diverse and incommensurate "performances" of math. But in addition, the play foregrounds irrational dimensions of geometric structure and geometric *thinking* (and not simply practice) often commented on—as we will see—in mathematic and scientific discourses of the period. As such, this learned and imaginative play offers just one contribution to a history of quantification that marks what might be called (to invert Timothy Reiss) "the rise of aesthetic irrationalism" (see n. 2).

Blame Not Our Author was composed in English and found in the archives of the Venerable English College in Rome (a college run by Jesuits for English recusants). Given the location and general time of composition (dated by Suzanne Gossett between 1613 and 1633), it is important to note the deep topicality of a play about measurement, space, and authority, in terms of Catholic and Protestant, humanist and scholastic, Ptolemaic and Copernican debates. This drama of spatial ruination, as the reader will see, is a fascinating vehicle for articulating ideological schisms in religion, politics, science, and education, and underscores the spatial and psychological dislocation of English recusants in Rome, a number of whom came from the universities of Oxford and Cambridge.[4] More generally, academic dramas were a staple of Jesuit learning, and this play reflects aspects of the Jesuit Curriulum (*Ratio Studiorum*, 1599) in which students studied Euclid for a full year in relation to physics, geography and astronomy, something to keep in mind as we explore the play's relationship to issues in early seventeenth-century scientific debate. But such a historicist reading is, in important ways, only the beginning of the story. For the play is all the more curious as a document about the productive complexity of geometry itself. Geometry in it serves as a vehicle for the articulation of affect, underscoring tensional, imaginative, and vividly quantified models of subjectivity. In the play, it is almost as if the instruments and shapes surrounding "Melancholy" in Albrecht Dürer's *Melencolia I* (1514) have come to life (figure 3.1).

Figure 3.1   Albrecht Dürer, *Melencolia I*, 1514. Engraving, Grunwald Center for the Graphic Arts, UCLA.

This is a figure that could certainly use the company. For Dürer's solitary, frustrated, and melancholic quantifier is, as we see later, not alone in her plight. While the traditional humoral disequilibrium of Galenic physiology (the excess of black bile) is clearly manifest in the dark shades of the figure's skin and sun, this iconography is fused with the abstract coordinates, signs, and instruments of quantification. In what would become a common visual trope, the compass points inward, aligning acts of geometric self-figuration with interior

rupture.[5] Art historians Raymond Klibansky, Erwin Panofsky, and Fritz Saxl collectively argue that Dürer's "undertaking to characterize Melancholy as Geometry, or Geometry as Melancholy" drew on an earlier tradition of German iconography linking measurement and despair with Saturn (ruler of both), and on sixteenth-century scholastic psychology, which posited a melancholic predisposition not only for genius, following Aristotle, but for mathematics in particular. More suggestively, they posit that *Melencolia I* "revealed an inner affinity" between mathematics and melancholy, pointing out that what we see here is a being "whose thoughts 'have reached the limit.' "[6] While the authors articulate this "inner affinity" in terms of mythology, scholasticism, and even autobiography, it is part of the project of this essay to rethink the questions they raise in light of linguistic and dramatic (and hence temporal) models of quantitatively inflected melancholy.

The "inner affinity" between mathematics and melancholy might, on the one hand, be situated in terms of classical formulations of woe: the numerical constitution of the soul in Pythagorean thought (where music could heal by realigning the arithmetic coordinates of the self); Platonic traditions of representing emotional disequilibrium as a departure from formal and metaphysical integrity (we might remember the lonely fraction at the center of Aristophanes' myth in *The Symposium*);[7] Galenic economies of humoral and cosmic imbalance; the Vitruvian ideal of the healthy human body as a paradigm of geometric perfection. In Dürer, as in the metaphysics of Plato and Pythagoras, the disjunction between the idealization of mathematic forms and a departure from that ideal create a productive tension for the articulation of hurt, loss, and introspection. Clearly, models of proportion were integral to much Renaissance aesthetic and medical theory: Timothy Bright's *Treatise of Melancholy* (1586), for example, models the "just temper" of the sanguine disposition on "humours in quantity & quality rated in geometricall, and just proportion." Melancholy, in contrast, is aligned with disproportionate and inconsistent geometry: "fullest of varietie of passion [and]...diversitie of place where it setleth," marked by imaginative flight, "straunge symptoms of fancie and affection."[8] So the Greek traditions of mathematic self-idealization adapt perfectly to Galenic theory. But crucially, this very tension becomes entwined with the cultural history of mathematics in the Renaissance, when a new idealization of mathematics began to emerge that was deeply at odds with the complicated structures of Euclidean geometry (which we explore in the next section) and with practical problems of numeracy and mensuration at work in the world.[9]

This compounded tension is exemplified in Robert Burton's *Anatomy of Melancholy* (1621), in which mathematics is positioned as both idealized cure and frustrating cause of melancholic disorientation. In order to cure themselves, he suggests, those melancholics who are "more mathematically given" should "demonstrate a proposition in *Euclide* in his 5 last bookes,...calculate spherical triangles, cast a Nativity," turn to mathematics to "diuert...idle thoughts, and alienate their imaginations."[10] But if mathematics is an idealized cure in this period, that which in Francis Bacon's words could "fixe" the "wandring" mind, it is also strangely complicit with the disease of melancholy, capable itself of "wandering" and "alienating the imagination."[11] In example after example of mathematic "cures" (which expanded with consecutive printings and developments in mathematics), Burton offers such a dizzying array of contradictory texts, theories, and exercises, that what emerges is a "cure" for disorientation that is itself deeply disoriented. After thinking about "*Rotman, Kepler, Gilbert, Diggeus, Galely*" and "our latter Mathematitians," who "haue invented new hypotheses, and fabricated new systems of the World, out of their own *Dedalian* heads," Burton, hurtling toward infinity, quickly breaks off from "such absurd and brainsick questions," noting how it imbalances his own mind, "almost giddy with roving about."[12] "I am an infant, and not able to diue into these profundities, not able to vnderstand, much less to discusse" (330). Elsewhere, Burton's phrase for those "troubled in the mind," "*fracti animis*" (349), becomes an ontological aggregate: a condition of all men. Burton, who feels he is "inconsiderable, nothing at all," quantifies this feeling: "We are by no means men,—rather fractions of men; through the agency of all it is possible to accomplish something though nothing very great: from a single person—absolutely nothing."[13] What emerges here is a condition of "Renaissance self-fractioning" produced by the simultaneous idealization and conspicuous insufficiency of numerical forms of accounting for the world. Agency within this quantitative framework becomes aligned with necessary collaboration, accomplishment contingent upon an assemblage of persons rather than an isolated effort, and persons mere "fractions" in the face of a mathematically imagined universe.

Mathematics as a Renaissance *pharmakon* becomes all the more conspicuous when we turn to discourses of geometry, as distinct from arithmetic. And with good cosmological reasons, but perhaps more interesting structural ones. In John Dee's "Mathematicall Preface" to the first English translation of Euclid's *Elements* (1570), although "mathematics" is idealized as *the* vehicle for cognitive orientation and cultural organization, basic geometric form poses problems of being

and knowing for even this unabashed Neoplatonist:

> O comfortable allurement, O rauishing perswasion, to deale with a Science, whose Subject, is so Auncient, so pure, so excellent, so surmounting all creatures, so vsed of the Almighty and incomprehensible wisdome of the Creator, in the distinct creation of all creatures: in all their distinct parts, properties, natures, and virtues, by order, and most absolute number, brought, from *Nothing*, to the *Formalitie* of their being and state.[14]

The operative term here is "number," which as a fundamental unit of arithmetic had a very different status in relation to "mathematical idealism" than the geometric "point." The distinction is crucial insofar as the former was aligned with rational abstraction and the latter with sensory and affective subjection.[15] "What excellency and worthiness Arithmeticke is aboue Geometrie," writes Henry Billingsley, the translator of the 1570 *Elements*, "in that, Geometry borroweth of it principles, ayde, and succour, and is as it were maimed without it. Whereas Arithmetic is... perfit in it self (fol. 183^r). God of course created the world in number, weight, and measure, but when we separate these categories, we will see that geometric "formalities," while potentially "rauishing," prove uncomfortable allurements at best. This essay aims to unsettle equations between the "quantification of thought" and the rise of rationalism by distinguishing between (the often conflated) arithmetic and geometric models of quantity, and more importantly, by examining interrelated genealogies of geometry and the "passions" (and particularly melancholy) in Renaissance texts.

THE RUINS OF MATHEMATICS

Philosophy is written in this grand book, the universe, which stands continually open to our gaze, but the book cannot be understood unless one first learns to comprehend the language and read the letters in which it is composed. It is written in the language of mathematics, and its characters are triangles, circles, and other geometric figures without which it is humanly impossible to understand a single word of it; without these, one wanders about in a dark labyrinth.

—*Galileo Galilei*, Il Saggiatore *(1623)*

[L]ines, figures, and bodies in Geometry, are oftymes incommensurable and irrationall.

—*Henry Billingsley, in Euclid's* Elements *(1570)*

Practically speaking, one might imagine that a drama based on Euclid's *Elements*, would have little to offer an audience eager for complexity and the internal difference which at least since Aristotle has been the hallmark of good drama. But in the Renaissance, geometry as well as arithmetic was a fertile ground for new articulations of affect and the complexity of social interaction. In *Blame Not Our Author*, all the dramatic "characters," to borrow Galileo's words, "are triangles, circles, and other geometric figures." But as Line, Rhombus, Quadro, and other inhabitants of this geometric microcosm enter into a "dark labyrinth" of play, they dramatize the very antithesis of Galileo's idealized "language of mathematics." In this self-proclaimed "carneual" (297) of spatial dimensions, shapes get out of hand, get into the wrong hands, and don't know their own place. Here, spatial coordinates are uncoordinated, instruments of measure vulnerable, and shapes themselves marked by conditions of irrationality and self-difference. Characters in this play are not just "ill at numbers"; they *are* ill numbers, threatening to "make a faction in ye vniu'sll [universal] order of things" (453). Quadro and Regulus are both melancholics lost in a universe where they cannot find their place. They are literally dis-oriented and, as a consequence, sad. The geometric figures inhabit an ideal realm, but come to life only when that realm fractures and turns against itself. Affect is produced within an increasingly disoriented geometric realm, where the forms not only vie for "position," but come to articulate fractured worlds of form as aspects of bodily and psychological pain. The idea that geometry might be melancholic, and melancholy geometric, is one of the central issues of this drama, where the disorientation of multiple and autonomous spatial logics translates into what is imagined as emotional "depth" (730, 748). In contrast to the isolated figure of Dürer's *Melencolia I* quantitative disequilibrium becomes a principle of dramatic and necessarily communal interaction in the field of calculated space.

The central plot is sparked by the emotional drama of "Quadro," a self-loathing quadrilateral who longs to change his shape and be "all orbicular," the shape of shapes, the sphere. The squaring of the circle, that allegory of incommensurability between physical and metaphysical, mortal and immortal, only sets the stage for this comic drama. For Quadro, who offers a lengthy panegyric to all things round, begins as a naïve Platonist in a world of scheming, political plotting, and dangerously applied mathematics. In a geometric analogue to the generic types of idealist and malcontent that we see so often in Shakespearean drama, Quadro's own servant, Rectangulum, embodies

all negative associations of the pragmatist with a "calculating mind." He not only envies Line's power of infinite extension, the sovereignty of Regulus and Compass, and the privileged position of all things round, but plots the destruction of all. His agency is linked with the assertion of alternative systems of measure in the microcosm (for in imagining a rectilinear coup, with himself as "Ring leader to the Planetts" [257], he challenges nothing less than the geometric structure of the cosmos). Not unlike Shakespeare's Claudius in *Hamlet*, Rectangulum works to "bring the figures out of joint" (240), but with an explicit understanding that social disarticulation is a precondition and consequence of agency. As such, with dramatic attention to the mathematical tropes of "joining" and "articulation," the play works as a consistent meditation on the quantitative contours of political rule, social interaction, "individual" agency, and as we will see, dramatic form itself.[16]

The drama opens with the imagined transformation of Quadro, that quintessentially flat or two-dimensional character who wants to expand his horizons, as it were, to become round. In a broad sense, this imagined release from the world of two dimensions is mirrored by the play itself, where the flat world of textbook geometry (that is, of print and page) is transformed into the three-dimensional space of the stage. From the first, two becomes three, "volumes" take up space. The depth added to two dimensions is achieved not simply through the space of the theater, or through the performative application of mathematics, but importantly, through tropes of melancholy enabled by mathematical crisis—through the capacity of shapes to feel. What is striking is the extent to which flat shapes are full in this play, full of emotion, claiming again and again to have "depths" of passion and melancholy (748), "that within that passes show (*Hamlet*, I.ii.85)."[17] In *Blame Not*, striking aspects of *Hamlet* are recast in spatial terms: Quadro, a self-loathing melancholic, echoes Hamlet in wishing the "darksome Canopy" would "close...vp in euer lasting night / ... that soe my passion may / Mourne in the weedes of sable melancholy" (20–24). Like Hamlet (who feels alone in "setting right" a world "disjoint and out of frame" [I. v. 196–97, I.ii. 120]), Quadro internalizes and embodies the quantitative world around him, which in the words of this play as well, is "out of joint," out of frame, leading him to contemplate spatial suicide. That Quadro is, from the opening lines of the play, spatially suicidal, emphasizes the extent to which an *emotional disposition* articulates, first and foremost, a *spatial dis-position*. Indeed, for Quadro, to become a sphere means to become "out of joint," un-hinged, dis-articulated, a condition he begins to look forward to with a rather antic disposition. No sooner

does Quadro wax eloquent in praise of circles and spheres than he finds a material object of veneration in Compass, a tool he seeks out, "swift as thought" (84), for metaphysical comfort and literal transformation. With the imagined help of Compass, he drinks medicine he is duped into believing will "extenuate [his] junctures" until he is "formed to a p[er]fect rotundity" (152–55): Compass literalizes his task, "bind[s] hi[m] in 2 hoopes," and prepares Quadro to "Apply your necke to subjugation your knees to mortification" (171). "My joints grow feeble & my vitall parts / Benummed are" (214–15), says Quadro, quite sure that he is becoming "all orbicular" (185). Quadro remains, however, a "corner creeper" (475), hinged in body but unhinged in mind.

Quadro's geometric two-dimensionality makes his pretensions to depth comically delusional, but in a way that throws the fiction of a spatialized interiority (being and emotion as spatial depth) into high relief. Here the fantasy of interior space offers an imaginative alternative to restricted social mobility (squares, after all, can't move with the freedom of circles and sphere). Interestingly, the failure of Quadro's "applied mathematics" leads him, with the advice of Rectangulum, into another kind of equation, a revenge plot against Compass: "if I die my gost shall force reuenge / my palefast goast shall trace him vp and down / And brandish forth infernall fierbrands" (303–5). "I cannot compasse the drift of Quadro," Compass suggests, highlighting the conceptual vocabulary of measurement, "why hee should be turnd into a periphera. [Rectangulum] informed mee t'was a plot against my life" (131–33). We see Rectangulum at work not only as a usurper but a dramatist, working to "plot a Tragedie" (340) by undermining the unity and rationality of geometric space. As such this drama might be counterposed to a number of theories on the relationship between geometry and models of spatial and cultural orientation in the Renaissance.

A range of critics have argued that, with the development of print and scientific knowledge in sixteenth-century Europe, came an episteme that entailed (and privileged) a "rationalization" of space and sight. Considering how print coincided with the development not only of imagined communities but of what might be called "imagined coordinates," Tom Conley historicizes the "cartographic impulse" of early modern France in terms of the spatial and volumetric dimensions of both letter and line. He argues that cartographic and geometric forms of self-extension become integral to ways of imagining, understanding, and articulating the self.[18] Similarly, Bruno Latour, bringing together theories of literacy with those of science and art

history, draws on the work of Samuel Edgerton to argue for a geometrically enabled form of "*ocular consistency*" within and between various fields of knowledge.[19] He understands geometry as paradigmatic of emergent models of self and world where meaning hinges, as it were, on the quantification of space. Recent work on cartography and social norms has followed suit, with Valerie Traub, for example, aligning the rise of cartographic "rationalization" with the representation of normative hetero-sexualities in Renaissance Europe. Examining illustrations of couples in the margins of maps, she writes: "Enhancing the map's geometric rationalization of space, these images of embodiment evoke and reveal the power of submitting social relations to a spatializing grid."[20] But in contrast to such models, and to what McLuhan, Panofsky, and others have posited as a uniformity and homogeneity of spatial models in the Renaissance, what is dramatized in *Blame Not* (and in a range of early English dramas) is a fundamental disunity and irrationality of measured space: a chaotic interaction of multiple and potentially autonomous spatial logics.

The complexity of geometric form in the play in fact enables a diversity of behaviors, perspectives, and "orientations." In what at once complicates and complements Traub's argument, this Jesuit drama links wayward and autonomous spatial orientations with movements away from moral and ethical norms, but also toward a range of dramatically entertaining possibilities. Indeed, anything but isomorphic models for normative social forms, these shapes are capable of infinite polymorphous perversity: while Compass is called "naturs aberratio" (804), Rectangulum, the shiftiest shape, at one point mounts the "backe" of unsuspecting Line. Once out of Line's angle of vision, he calls out with a sodomitically evocative: "[I am] Just perpendicular ouer your backe" (350), to which Line, recoiling in horror, calls him "insolent" (353). After Rectangulum gets Line to move from a vertical to a horizontal position ("He lies downe and Rectangulū getes on his backe" [345]), he announces that he is performing a mathematical exercise: "Now a I perfect true rectangulū and why not perfect / figure Pish tis but question de nomine, ist not Line? / ...[I am] just perpendicular ouer your backe. Cū vero recta linea supra recta consistens linea" (347–51). Here aberrant behavior is imagined as a kind of queer mathematics, a same-shape bonding that puns on "rectangle" (an early suggestion of "rect" being not just "straight" but "erect" [*OED*], and the word from the Latin *rectus, rectum*). These puns emerge throughout the play: Quadro asks Compass, "Pray take the measure of euery little creuise & hole / that yow may make all orbicular" (184–85), and Rectangulum says that he

is not just an "vpright man" (61), but "vpright as a boult" (60, 61), and later, "stiff as a stake" (227–28), and at the same time, "not as / straight as I was wont to bee" (248–50). Though Rectangulum claims to be an "vpright man" (102) he may be so only in the most bawdy of senses. (This may give new meaning to the notion of an "out"-line.) What is curious here is the extent to which the straight is bent, the normal aberrant. Interestingly, the word "normal" entered English, not in the context of theology or law as one might expect, but rather of grammar and geometry, pertaining, as the *Oxford English Dictionary* notes, to the "Right (angle), rectangular." But given the perverse potential of geometry in this play, it becomes clear early on that the "right" angled is anything but normal. Or rather, the contours of normativity are themselves "aberratio." Reason itself wanders, lines go outside the lines, and the self-difference and *ocular inconsistency* of geometry is here on full display.

Clear associations between geometry and the rationalization of space and sight may be further complicated by touching on the commentaries of Billingsley and Dee. For Billingsley, geometry is inferior to arithmetic precisely because it depends on the sense of sight, rendering "ocular consistency" epistemologically suspect: "[T]riangles, squares, circles, cubes, and other are sene & judged to be such as they are, by the sight: but number, which is the subject and matter of Arithmeticke, falleth vnder no sence ... number, as being only intellectuall, is more pure, more immateriall, and more subtile, farre then is magnitude: and extedeth itself farther" (fol 183^r). For Dee, geometry poses a larger problem of cognition. The geometric line, he suggests, in fact confounds the concept of unity integral to "the workmanship of our mind": "a Line of an inch long, ... may be diuided into as many partes, as may the diameter of the whole world, from East to West: or any way extended" (sig. aii^r). Further, unlike abstract arithmetic "numbers," geometric "points" are grounded in material space, necessitating for Dee "a certaine determined Situation ... to be here, there, yonder, &c. Herein, (behold) our Vnit [number] is free, and can abyde no bondage, or to be tyed to any place" (sigs. ai^r-aii^v). Here the relative situatedness of geometry, even in the most abstract terms, renders it subject to a logic of earthly "bondage." These comments provide a striking gloss to the words of "Line" in *Blame Not*, who laments the fact that he is infinitely divisible, cursing Compass who "hath so tortured me with punctures and iuncturas that he hath mad me diuisible in infinitū" (314–16). The "point" here marks a condition of subjection (from the the Latin *pungere*, to pierce, hence "punctures"), and recalls Billingsley's perspective on the compromised and often

"irrational" structure of geometry: "For there are not in any [arith-
metic] number infinite vnities: by a point taken certayne times, yea as
often as ye list, neuer maketh any line, for that in euery line there are
infinite pointes. Wherefore lines, figures, and bodies in Geometry, are
oftymes incommensurable and irrational" (fol. 228^r).

This alignment of geometry with the irrational is important to
consider in terms of the affective potential of geometric representa-
tion. But to further complicate analogies between geometric thinking
and rational modeling, it is important to note the centrality of the
imaginative faculty in early geometry textbooks for grasping even the
most basic relationships between dimensions (that is, between points,
lines, circles and squares, and cubes and spheres). As Nicole Oresme's
fourteenth-century *Tractatus de configurationibus qualitatum et
motuum* puts it, it is always up to the imagination to "feign" other-
wise nonexistent geometric ratios: "Although indivisible points, or
lines, are non existent, still it is necessary to feign them mathemati-
cally for the measures of things and for the understanding of their
ratios."[21] Even the most commonplace definitions such as, "a flowing
point imaginatively produces a line" (531) consistently emphasize the
temporal as well as the imaginative structure of magnitude when
moving from one dimension to the next. When Line, realizing his
thoughts, actions, and passions have been manipulated by
Rectangulum, says to him, "of faulshood didst not thow animate
me[?]" (1031–32), the textbook logic of geometric dimensionality
becomes isomorphic with lying, imaginative movement, and in this
case, dramatic animation. The explicitly fictional and temporal com-
ponents of geometric logic in the play, in other words, foreground the
detachment of mathematic form from any single and rationally calcu-
lable space.

The play's disorienting, multidimensional and deeply imaginative
maneuvers encompass extended parallels between Euclid's *Elements*
and Ovid's *Metamorphoses*, resulting in further challenges to geomet-
rical rectitude. Given that these two texts are foundational for
Renaissance concepts of sublunary shape-shifting, it is perhaps no
surprise to see them meet, for example, in Quadro's extended allusion
to Ovid the instant before he believes he has moved from the second
to the third dimension: "I perish in my metamorphisis" (194–218).
Clearly, squaring the circle would *have* to take place in the domain
of fiction, hence the Ovidian model of Euclidean transformation.
But the conflation between Euclid and Ovid extends throughout the
play, where Compass, ever "pestured [by] ... Euclid" (512) is equally
informed by Ovid, constantly accused of spinning malevolent,

metamorphic plots. The opening of the *Metamorphoses*, "Of shapes transformed to bodies straunge, I purpose to entreate" and the opening of the *Elements*, where it "is taught how a figure of any form may be changed into a Figure of an other forme" (sig. Bi^r), suggest a structural similarity too tantalizing for the playwright to resist.[22] But others, such as Arthur Golding, would anticipate such a conflation, noting in his 1567 preface to the *Metamorphoses* that not only does Ovid mirror God's divine "plat" or geometric plot for "framing out the world," but "[W]hatsoever hath bene writ of auncient tyme in greeke / By sundry men dispersedly, and in the latin eeke, / Of this same dark Philosophie of turned shapes, the same / Hath Ovid into one whole masse in this book" (sig. B1^r). William Cunningham's *The Cosmographicall Glass* (1559), opens not with Euclid, but "Daedalvs that excellent Geometrician" (sig. Aii^r), and cites Ovid for "proof" of the "true order of the spheres" (fol. 11).[23] George Sandys, in his 1632 commentary on the *Metamorphoses*, goes so far as to look to Ovid to establish the grounds of geometry and its applications in astronomy. He notes that Book I (which addresses God's work as a geometer of cosmic proportion) affirms models of geocentrism and perfect "orbicular" sphericity, newly challenged through Copernican theory and Galileo's telescope: "For the former is denied by *Copernicus* and his followers, who would rather place the Sunne in the Center: & alleadging the Moone to be a heavy body, with risings and depressions, as like our vallies and mountains as since discovered by Galileos Glasses."[24] Ovid here becomes the privileged guide to geometric structure, keeping the earth "at rest in her proper center" (51).

Indeed, while Ovid expands early modern vocabularies of "Passions and Affections," Euclid might well be said to do the same.[25] *Blame Not* in fact draws on the semantic complexity of "passion", in this period, a term used in mathematics and alchemy as well as psychology and literature. Billingsley's Euclid, for example, regularly alludes to the "passions" of parallelograms, or the "proprieties and passions of these irrationall lines" (fol. 321^r), and Thomas Bedwell's translation of Ramus's *Via Regia Ad Geometriam* consistently refers to the "affections" of magnitudes.[26] "Passion," "the fact or condition of being acted upon or affected by external agency; subjection to external force,"[27] is precisely what animates Quadro's opening question, "why range my passions so at large" (29) and similar statements that flood the play such as "my passio draues me fr[om] my selfe" (308), "my passion hath transported me" (488), or the three-dimensional variant: "his passion deep" (748). Quadro's "restlesse braine" (17) informs his "restless rage" (546), suggesting a link

between "passions" of geometric intellection and emotional expression. Historically speaking, the "restlessness" of geometry in part dramatizes a geocentrically challenged world, in which the sun, in contrast to the earth, is now imagined to be "at rest," while the earth is veritably "restless," whirling on its own axis and endlessly circling the sun. This geometric restlessness brings the "elements" and "passions" of Euclid and Ovid together, with the threat of heliocentrism, for example, underscored in Quadro's image of Phaeton coming to dash "this globe that mortals trample on" to bits (34–37). More generally, however, the meeting of Ovid and Euclid links the work of the geometer with that of the poet and dramatist.

Staging a contest between the Greek Euclid and the Roman Ovid in the domain of the imagination is fitting enough for an academic drama at an English college in Rome. But Euclid and Ovid meet again in the perhaps more surprising context of geometric learning. In Ramus's textbook, *Via Regia ad Geometriam*, Ovid's *Metamorphoses* is cited in the process of both praising the compass and asserting the following rule: "The raies of the same, or of an equall periphery, are equal": "*Talus*, the nephew of *Daedalus* by his sister, is said in the viij. Book of *Ovids Metamorphosis*, to have beene the inventour of this instrument [the compass]: For there he thus writeth of him and this matter:—*Et ex uno duo ferrea brachia nodo: Junxit, ut equali spatio distantibus ipsis: Altera pars staret, pars altera duceret orbem.*"[28] Ramus of course treated mathematics as a subset of logic, and this brief commingling of Ovid and Euclid would fit well within his project of integrating mathematics into a humanist paradigm.

But finding Ovid at work on mathematical definitions in the midst of a geometric textbook is important in reconsidering the relationship between geometric shapes and the words (and narrative traditions) that served to "rationalize" them. On the one hand, as Kenneth J. Knoespel puts it,

> The linkage of geometric shapes and language, formally memorialized in Euclid, marks more than the creation of order. It celebrates the moment when drawn shapes provoke a systematic rational response in written language. The rational written response of Euclidean geometry also marks the moment when shapes are given a narrative, or even more precisely, the moment these shapes are plotted and brought under linguistic control.[29]

But on the other hand, we might note a striking complication of "rational response" that comes directly from Billingsley, where

translations call the very words "rational" and "irrational" into question:

> [As] we before noted in the definitions, that *Campane* and others which followed him, brought in these phrases of speeches, to call some lynes rationall in power onely, and other some rational in length and in power, which we cannot find that Euclide euer vsed. For these wordes in length and in power are neuer referred to rationalitie or irrationalitie, but always to the commensurabilitie or incommensurabilie of lines. Which peruerting of wordes...has much increased the difficulty and obscureness of this book. (fol. 246ᵛ)

"[M]isliking the word irrational," Billingsley offers "incommensurable" with the hope of lifting some of the "confusion and darkenes of this booke, which so hath tossed, and tormoyled the wittes of all both writers and readers, masters and scholars, and so ouerwhelmed them, that they could not with out infinite trauell and sweat, attayne to the truth and perfect vnderstanding thereof" (fol. 231ᵛ). But in doing so, he further enacts the difficulty of bringing geometric shapes under narrative control. For his own prose in the section on "*Lines which are incommensurable to the rationall line, are called irrationall*" becomes so convoluted that legibility is challenged along with "rationality" (see fol. 231ʳ).[30] "For the truth is," John Wallis would write in 1662, "Euclide...is not constant to himself" (25). Billingsley adds, "In Greeke such [irrational] lines are called... *alogoi*, which signifieth nameless, vnspeakable, vncertayne, indeterminate, and with out proportion" (fol. 231ʳ), which further highlights the problem of representation posed by this "figure," or "irrational line," and sheds further light on the acting out of "vnspeakable" acts in *Blame Not*.

Line's comment that "schollars wrangle about my definitio" (299–300) is but one statement in *Blame Not* that underscores the complexity of "linguistic control" in the "language of mathematics" (something the use of Ovid only complements and highlights). Indeed, to hold up Euclid's *Elements* as a model of "systematic rational response" or narrative rationality (as Joseph Addison would do, for example, in the early eighteenth century), is to understand Euclid from a largely post-Renaissance perspective.[31] Problems of translation aside, Ramus's *Scholae mathematicae* (1559) famously blasted the *Elements* for problems of logical coherence (in definitions, propositions, axiomatic structure, etc.). And importantly, in order for his own "Euclidean" logic to function as a basis of rational articulation, he had to dismiss whole chunks of the *Elements*, including the

incommensurables and irrationals integral to the three-dimensional complexity of the later books. Johannes Kepler consequently blasted Ramus, that "advocate of ignorance," in whose hands geometry was "left in ruins." Because Ramus could not deal with the complexity of Euclid's final books (including the five Platonic solids, which he summarily dismissed along with any hint of mystical or "irrational" thinking), Kepler suggests, he devastated the foundations of "Euclid's house," "jutting arches left in ruins" and left only "a formless heap of propositions, against which, as if against some ghost, Ramo's inveighs in all the 28 books of his 'Study of Mathematics.'"[32]

Kepler's image of Ramus inhabiting the ruins of mathematic space and hurling language at the ghost of Euclid might serve as a visual analogue to the world of *Blame Not*. While our poor Platonist Quadro inhabits a world in spatial ruins (imagining his own "gost shall force reuenge" [303]), geometric forms are "subdeuided into so many seuerall varios" (721), and "Logitians...propositions" (276) and Euclidean definitions are constantly quoted and performed, rendering them less "definite" through their relationship to rhetoric.[33] Space becomes a clear function of language, and is accordingly heterogeneous, disrupting any concept of a rationalization or unity of geometric space. The fact that a "line" is a spatial and linguistic concept (as the play notes in both Latin and English, the shortest distance between two points [673–74]), renders it in the play subject to dangerous forms of manipulation. A logical extension of this concept is that Line not only "draue[s] the diameter betweene the Articke and Antartike poole," but he "translate[s] the psalms into better lines" (342–43, 652). Here the complex relationships between spatial forms and language (the latter further unsettled by the translations of line, configured here as an unruly Protestant) threaten to leave not only Euclid's house in ruins, but God's. The topicality of the threat posed by a rectilinear takeover of cosmic and religious authority is vividly concretized in Line's image of himself mutating into a "cord" for the hanging of "Papists" (654–67). This brings together the dangers of biblical translation with novel geometric interpretation, both forms of "disseminating" authority that would set many a Jesuit hair on end. As Rectangulum puts it in only the most suspicious of terms, "I see allreadie I beegin to haue the comaundinge / Spirit of autority" (1000–1).

"From this line to this," there is no end to the use and abuse of lineation in *Blame Not*, particularly with Rectangulum, who ultimately proves most capable of undermining the order of social space and place. With multiple orders of "rule" in the play, the threat to

linear consistency translates in social and temporal terms as a threat to
lineage: Rectangulum is not just a shifty bastard, but truly a "bastard
sonne" (797) who wants to take control of a "whole line." The
illegitimacy of Rectangle can be seen as a variation of early geometric
symbolism, where the rectangle, next to his kin Square, looks
comparatively two-faced, uneven, a hybrid of two different "lines." The
drama of illegitimate quantification that Rectangulum plays out is not
dissimilar to that of Edmund in Shakespeare's *King Lear*, another
"bastard son" who wants to take control of a whole line. When
Rectangulum "tops" Line, he does so, in part, to prove that he is just
as "perfect [a] figure" (347). Indeed, in both plays, "the base ... top[s]
th'legitimate," claiming his "dimensions are as well compact," his
"shape as true."[34] Rectangulum, an "upright man," literally "stand[s]
up for bastards" (*Lear*, I.ii.22), attempting to take control of the ulti-
mate design, or the temporally and spatially imaged *plot* of *lineage
and linearity* in the play.

The contested issue of "lineage" (or ordered temporal succession)
so integral to tragic, historical, and revenge drama of the Renaissance,
is played out spatially in this play, and linked specifically with the
structure of revenge. Throughout the play, space is anthropomor-
phized, and even Compass, called the "longelegged slaue" who
"trase[s all] ... about" (810) is imagistically divided and dismembered
by the envious Rectangulum (276), who marshals noncircular forms
to plot his demise: "Reuengd reuengd yes hundrethfold reuengd,"
agrees the still-square Quadro (292). The genre of revenge drama,
while typically inaugurated by a fantasy of commensurability (an "eye
for an eye" or "measure for measure") inevitably results in imbal-
anced equations, with action exceeding the bounds of commensura-
bility (a "hundrethfold reuengd"). And in *Blame Not*, the revenge, as
a theatrical model of at least temporary dis-equivalence, becomes
explicitly figured along quantitative coordinates, where geometry
"Yeald[s] a Theater for a Tragedy" (747), and even Regulus laments
that "equity shall yeald reuenge" (935). The contingent structures of
geometric form stand in for the contingent structures of justice
("equity shall yeald reuenge"), and the play stages the perils of formal
and epistemological contingency in social and legal terms. Geometry
is dangerously "projective" in this play, with multiple puns on pro-
jective geometry (used in Renaissance perspective painting to create
illusions of depth) subtending the "projects" of Rectangulum
(287–88, 354, 536). Rectangulum is consistently taking "the law"
into his own hands, not only by plotting revenge, or by signing
warrants and arresting characters under false pretenses, but by

attempting to secure a "patent" on himself, granting him authority in the microcosm as the model of perfection and "rule."[35]

Given the classical equation between arithmetical proportion and justice, it makes sense that geometry may serve as a poor substitute as a foundation for the law. Indeed, it is worth noting the extent to which legal and mathematical thinking coincide in Dee's "Preface," aligning the arithmetic with legal justice and the geometric with potential crimes in "injuries" against the state.[36] In contrast to the necessity of arithmetic for "equitie" in Civil and Canon law (sig. ai^v), geometry (through both ignorance and willful manipulation) proves capable of confounding the jurisdictional foundations of law and land: "God knoweth," writes Dee, "in these Realms of England and Ireland (whether through ignorance or fraude, I cannot tell, in euery particular) how great wrong and iniurie hath (in my time) been committed by vntrue measuring and surueying of Land or Woods" (sig. aiii^v–sig. aiiii^r). In *Blame Not*, the specter of alternative geometric application further detaches geometry from absolute coordinates of space, informing the fundamental structure of the revenge, that alternative but deeply contingent and slippery model of measurement.

It is no coincidence, in this respect, that Compass is loathed in *Blame Not* because he is accessible to everyone, "pedlar" and scholar alike, and revenge, or the very idea of uncontrolled *repetition* becomes entwined in the play with the dissemination of knowledge and the properties of the printing press. For Rectangle exacts his revenge by putting everyone into his "secret presse for the sequele" (586), a device that evokes another specter of illegitimate "pressing," drawing the printing press itself into the equation of spatial disarray. Print and science converge, again, in the cultivation of ocular inconsistency in a world that is conspicuously pressed, de-pressed, and not at all itself. Again, whereas revenge drama consistently stages problems of commensurability, this drama figures questions of justice, of conceptual and metaphysical decorum, as rooted in one's fundamental relationship to numbers in space and time. Whereas Walter Ong has famously emphasized the power of print to spatialize words, language, and thought itself, putting math into the press here is staged as a crisis of order and space.[37] The "secret press," in multiple senses, combines the dissemination of print with the deformation of geometry.

The unprecedented circulation of math treatises and translations in early modern England may well have led to a chaotic sense of number and spatiality. As Elizabeth Eisenstein has noted, the movement of mathematical and scientific treatises into print in this period may have first exposed the instability of scientific knowledge by drawing together

heterogeneous theories of homogenous forms.[38] Henry Cornelius Agrippa in fact attributes the chaotic state of geometric knowledge to the proliferation of heterogenous theories about form. The 1569 English translation of his *Of the Vanitie and vncertaintie of Arts and Sciences* reads:

> The measure of the worlde do promisse vs all these thinges, and them which we haue spoken of before. But the Authours, that will teache it vs, are with many discords at contention emonge themselues of the Limites, Lonitudes, Latitudes, Magnitudes, measures, distaunces, climate: muche disagreeing one from an other in that habitude or state wherein they be. The whiche Eratosthenes, Strabo, Marinus, Ptolomeus, Dionysis, and the fresher writers *have diuers waies deuided.*[39]

If as "Plinie also saithe," Agrippa notes, "that it is a madnesse to measure the earthe, whiche while we measure, wee very often goo out of measure" (39), this sentiment is compounded by the contemporary state of geometric exposition, where the very *idea* of measure is out of measure. This also exacerbates the relation between geometric "mastery" and incurable melancholy: "[Geometricians] will neuer reste vpon the precepts of theire predecessours, but beleuinge in suche thinges to finde out some thinge more then their Masters, doo bring them selues into so great madness, that all the *Helleborus* in the world sufficeth not to purge it" (Agrippa, 33–34) (Hellebore is specifically defined as "An hearbe that purgeth Melanchlie" [34]). For without clear or consistent "precepts," melancholy is not only a product of idealistic aspiration but a condition of geometrical knowledge.

This is similar to *Blame Not*, in which the quantitative dimensions of classical melancholy are exacerbated by the disarray inherent in early modern quantifying and spatializing discourses. But further, and perhaps more importantly, the conceptual apparatus through which melancholy is defined represents an active and cathartic response to the disequilibrium of quantity. Indeed, in a somewhat circular logic, melancholy in *Blame Not* is at once a symptom of the excesses of quantification and the imagined *cure* for the disharmonies of the world. Regulus mourns the loss of measure in his world and yet defends melancholy as a mode of restoration: "Sorrow," he says, "doth please when passions are at odds" (945) and "Sadness makes music in her deepest groans" (947). Pythagoras of course thought music a cure for sorrow, for the numerical imbalance of souls, and here the lyric dimensions of melancholy promise to balance out the equation—to transform the interior world of grief by a harmonic articulation of it. Here even

the ever-equilateral triangle is brought to tears by Regulus's melancholic lament, which "breeds some melancholie humours in me" (969). So too, Circle, with "inward gaul" (787), grows melancholic, lamenting, "care lay groning at my heart" (789), and Rectangle drinks spirits along with Line to "chase away sadnesse" (608) and "cure melancholy" (622). Melancholy increases exponentially as the play nears a close, itself a way to "sound the depth of so [com]plex a Chaos" (730), in some sense uniting this otherwise embattled spatial domain.

The very idea of melancholy as a cure for mathematical mayhem, as that which might not only express but actively counter the geometric instability of the world, implicates the mathematics of emotion with a logic of theatrical catharsis, a purging of quantitative irrationality through the articulation of affective imbalance. For in this play, melancholy, as a felt and palpable form of imbalance, turns a two-dimensional world into a three-dimensional world. The flat world of form not only becomes a "thick rotundity" that takes up space, but the complexity and self-difference of geometry translates into shapes that are sad, hurt, capable of pain: shapes are punctured, wounded, scheming, and in the case of Rectangle, nasty, brutish, and (relatively) short. In this world, melancholy becomes the dominant language through which a sense of *depth* can be articulated in a world of flatness, spatial disorientation, and numerical excess.

The articulation of quantitative disorientation as melancholy, as I have begun to suggest, is by no means particular to this play. It is significant that Robert Burton, for example, writes *The Anatomy of Melancholy* under the name of "Democritus Junior." Democritus Senior was not only the laughing philosopher, but perhaps more importantly, the well known founder of atomic theory, which posited an "*infinite* number of *indivisible* corpuscles moving randomly in infinite and empty space." This could not more perfectly describe the structure and content of Burton's text. Burton, who opens his preface with an allusion to Democritus's atomic theory "lately revived by Copernicus, Brunus, and some other," in effect replaces a theory of spatial disorientation with a theory of psychic disorientation. Paradoxically, for Burton, the concept of melancholy becomes that which draws together an otherwise random, hetergeneous and discontinuous universe: it becomes a kind of cure for the ruins of quantitative order.

The intersecting structures of geometry and psychology I have been mapping out might be further illuminated by James Elkins's reformulation of notions of spatial unitarity in the visual arts of the period. In *The Poetics of Perspective*, he writes that there was in fact no

uniform system of geometrical perspective: "Renaissance perspectivists cared relatively little for compatibility or for the kind of rigor they knew in Euclid and other ancient geometers. Instead their concern was to elaborate and *improvise*. Renaissance authors wanted to *maximize disequivalence*." "Perspective," he continues, "is rarely good mathematics; more often than not it is something else, a kind of experimentation in the ruins of mathematics."[40] Over the course of the sixteenth century, Elkins argues, these ruins, and the emphasis in geometrical perspective on the logic of the fragment, the partial, and the divisible, in addition to the movement of geometrical perspective away from painting and into math and science books, created a powerful sense of melancholy among painters and their works and writings. In *Blame Not*, it is precisely the "improvisation" and elaboration of mathematical form that enables experiments in theatrical as well as scientific application, a phenomenon that fits well with Elkin's speculations on the melancholic dimensions of aesthetic and quantitative practice. In somewhat simplistic terms, it might be said that bad math makes for good drama. Or rather, "experimentation in the ruins of mathematics" may have enabled the production of new representational models for depth as well as its dimensional underling, "superficiality" (from the mathematic term for two dimensional).[41]

Interestingly, the "superficialities" of a much later period in English culture are fully thematized in Edwin Abott's nineteenth-century novel, *Flatland: A Romance in Many Dimensions* (1884), through a cast of two dimensional geometric characters, who are shocked and awed by an encounter with the third dimension.[42] The central character "A. Square" provides a later historical formulation of our early modern Quadro, feeling disoriented in the face of another quantitative sphere. Upon experiencing the third dimension, he says: "An unspeakable horror seized me. There was a darkness; then a dizzy, sickening sensation of sight that was not like seeing; I saw a Line that was no Line; Space that was not Space: I was myself and not myself" (155). The self-difference of space here opens up for the transferal of geometric thinking into "sickening sensation," ocular inconsistency, and emotional intensity drawing on tropes of irrational dimensionality we have seen at work some three centuries earlier. While *Blame Not* offers a striking early modern precursor to this revolutionary novel, what the play does is ground the irrational potential of spatial measurement, not only in Euclidean geometry and seventeenth-century scientific thought, but in the structure of drama itself. The play as a form, in other words, is complicit in resisting the rise of flatlandish regimes of quantification.

FULL CIRCLE

*The more clearly mathematics demonstrate that the total elimina-
tion of the problem of representation...is the sign of genuine
knowledge, the more conclusively does it reveal its renunciation of
that area of truth to which knowledge is directed.*

—*Walter Benjamin,* The Origin of German Tragic Drama
(1928)

At the end of *Blame Not*, the power of the playwright as an inexact
measurer is said to be incommensurate with the power of exact rule.
Once Regulus regains command, and Rectangulum is put in his proper
place, having no empirical "proof" to back his propositions (705),
melancholy is banished from the space of the play. "Hence care the mis-
tres of sad funeralls," says Regulus, "come Joy and with thy peacefull
oliue wreath / Circle our heads and croune our cloudie fronts" (1067).
With the affective metaphorization of the circle (triply emphasized with
wreath, circle, and crown), the vulnerability of mathematic practice is
controlled; the world is now "all orbicular" and under clearly delin-
eated spatial control. The sad, funereal melancholy has been expelled
from space, but where did it come from in the first place? In the final
lines, Regulus refers to the "aughtor of our greef" as a human play-
wright, not a divine author. This author is imagined in the play's pref-
ace as an author with a "mathematique brain" who "Breeds no
Minervas" and "cares not to set your harts at ease" (4, 5, 12). The
playwright is here imagined as a bad mathematician responsible for pro-
ducing, not simply a world of passion, revenge, and melancholy, but a
world of distinctly mathematical "greef." Regulus closes the play: "as
for thee thow aughtor of our greef / I censure thee from henceforth
to remain / A bondslaue to all figurs in this train /...Let him that
squars from rule and compasse be / Vasail to fear and base seruility"
(1073–77). This autocratic ruler urges the playwright to be a sub-
servient quantifier, to represent the happiness of all things flat: find joy
in spatial orientation, justice in two dimensions, power in numbers. But
we know in fact that the opposite is true: that this play, like so much
early modern drama, thrives on the instabilities of measurement, thrives
as a narrative form where plots are shifty, multiple, and difficult to
detect; where contradictory conceptions of number, weight, and meas-
ure come into play. That *Blame Not* comes to an abrupt halt at the
moment, to quote Benjamin, that mathematics demonstrates a "total
elimination of the problem of representation," suggests the cost of such
"elimination" for emotional and dramatic complexity, and agency
within a newly assertive regime of standard measurement.

"Regulus," as a name, not only registers measurement and kingship, but his restoration of order also signifies a restoration of classical models of rhetoric and astronomy. While "Regulus" would have echoed that famed Roman patriot, Marcus Atilius Regulus, who was unusually true to his word (throwing himself into the hands of his enemies because he said he would), "Regulus" was also the name of that bright "king" of stars in the heavens. No "stella nuova" this, the restoration of Regulus as *the* ruler in the play, in astronomical terms, "fixes" the problems posed by those new stars discovered in 1572 and 1604, which contradicted Aristotle's theory of an immovable, "fixed" heavenly sphere. So interestingly enough, the rise of Regulus brings politics, rhetoric, and measurement into strict alignment, the only costs of which are, of course, the complexities that give rise to the play itself.

The historian William Bouwsma has suggested that in the Renaissance, "mathematical relationships" that were applied to space and "to cartography by locating points on a grid of latitudinal and longitudinal parallels," were "meanwhile becoming a general principle of cultural articulation."[43] In the shifting mentality of cultural articulation, "quantity now tended to be substituted for quality as the essential principle of orientation," and "equilibrium became a primary category for analyzing the relations both of states and of the social forces within them; the maintenance of political stability was seen to depend on quasi-mathematical calculation and adaptation rather than on the preservation of a pattern of qualitative relationships" (234). If this is so, then what is dramatized in *Blame Not* is not only the social and psychological cost of such a shift, leading to a fragmentation of psyche and state, but also the dramatic potential of such a shift for the articulation of affect. The shift Bouwsma describes from quality to quantity is, as I have argued, counterbalanced by new models of "depth" in both emotional and quantitative terms. Indeed, the dominance of "melancholy" as a trope of self-articulation in *Blame Not* and other Renaissance texts is deeply entwined, not simply with classical tropes of musical imbalance, but with quantitative crises at a time when print and science expanded the fields and availability of mathematical knowledge, and where print "made visible" competing theories of, and contradictions within, mathematics itself. But perhaps more than being integral to the mathematization of the world, melancholy was itself a necessary act of translation: volumes became volumetric, infinity a crisis of measuring up, the ideals and possibilities of spatial orientation expressed as psychic "disorientation." Melancholy was a vehicle for translating that

without to "that within," depth to depth, infinite space to bad dreams, infinite divisibility to a sense of the vulnerable. If the early modern theater has been linked with the emergence of modern subjectivity, *Blame Not* offers an alternative model of self-fashioning, a disoriented mode of personhood we might call "Renaissance self-fractioning," within which identity is negotiated in a world of unclear frames and temporal disjunctions, where (to allude to Benjamin) quantification poses problems of representation that open up space for affective intensities and the experience of another kind of truth.

NOTES

1. Ernst Robert Curtius, *European Literature and the Latin Middle Ages*, trans. William R. Trask (New Jersey: Princeton University Press, 1973), 510.

2. For example Timothy J. Reiss, *Knowledge, Discovery and Imagination in Early Modern Europe: The Rise of Aesthetic Rationalism* (Cambridge: Cambridge University Press, 1997), along with his essay "From Trivium to Quadrivium: Ramus, Method and Mathematical Technology," in *The Renaissance Computer: Knowledge Technology in the First Age of Print*, ed. Neil Rhodes and Jonathan Sawday (London: Routledge, 2000), 45–58; S.K. Heninger, *The Subtext of Form in the English Renaissance: Proportion Poetical* (University Park: Pennsylvania State University Press, 1994); Kristen Poole and Martin Bruckner, "The Plot Thickens: Surveying Manuals, Drama, and the Materiality of Narrative Form in Early Modern England," *ELH* 69 (2002): 617–48, at 630; Alfred W. Crosby, *The Measure of Reality: Quantification and Western Society* (Cambridge: Cambridge University Press, 1997), 130. On quantitative forms of verification and self-authorization integral to larger transformations in models of evidence in philosophy and political theory, see Mary Poovey, *The History of the Modern Fact: Problems of Knowledge in the Sciences of Wealth and Society* (Chicago: University of Chicago Press, 1998), 30.

3. Anon., *Blame Not Our Author* (ca. 1613), ed. Suzanne Gossett (New York: Malone Society, 1983). Other than this edition, this play has no critical history.

4. On the history of the Venerable English College, see Suzanne Gossett, "Drama in the English College, Rome, 1591–1660," *English Literary Renaissance* 3 (1973): 60–93; Cardinal Gasquet, *A History of the Venerable English College* (New York: Longman, 1920), 94–95.

5. Compare the frontispiece of Oronce Fine, *In sex priores libros geometricorum elementorum* (Paris, 1544), which features Geometria atop the page, compass pointed outward as if slaying a dragon, with the frontispiece of Henry Billingsley's translation of Euclid's *Elements* (London, 1570), with Geometria toward the bottom of the page, compass pointed inward.

6. Raymond Klibansky, Erwin Panofsky, and Fritz Saxl, *Saturn and Melancholy: Studies in the History of Natural Philosophy, Religion and Art* (London: Thomas Nelson and Sons, 1964), 331–34, 345.

7. Plato, *The Symposium*, ed. Walter Hamilton (Baltimore: Penguin, 1966), 23.

8. Timothy Bright, "Of Humours and the Mind," *A Treatise of Melancholy* (London, 1586).

9. On the development of mathematics in Renaissance England, see especially, Mordechai Feingold, *The Mathematicians' Apprenticeship: Science, Universities and Society in England, 1560–1640* (Cambridge: Harvard University Press, 1984) and E.G.R. Taylor, *The Mathematical Practitioners of Tudor & Stuart England* (Cambridge: Cambridge University Press, 1954).

10. Robert Burton, *The Anatomy of Melancholy, What it is, with all the kinds, cavses, symptoms, prognostickes, and seuerall cvres of it* (London, 1621), 355.

11. Francis Bacon, *The Two Bookes of Sʳ Francis Bacon of the Proficience and Advancement of Learning, Divine and Hvmane* (Oxford, 1633), 152.

12. Burton, *The Anatomy of Melancholy*, 328–30. The phrase "such absurd and brainsick questions" was added to later editions of *The Anatomy* (Part 2, Sec. 2, Memb. 3).

13. Burton, *The Anatomy of Melancholy*, II.ii.3.

14. John Dee, "Mathematicall Preface," *The elements of geometrie of the most auncient philosopher Evclide of Megara. Faithfully (now first) translated into the Englishe toung by H. Billingsley*... (London, 1570), sig. 1ʳ.

15. See Euclid's *Elements* (Book I), upon which distinctions between arithmetic and geometry were generally based.

16. The mathematic lexicon of "dividuals" and "individuals" offers a counterpart to complications of Burckhardt's legendary "rise of the individual" in the Renaissance. As Peter Stallybrass notes, in English, "the uses of 'individual' suggesting indivisibility and those suggesting divisibility emerge *together*." Further, the word, "whatever its range of possible meanings, suggests a *relation* (of part to whole, of part to part, of member to body, of body to body) not a separate entity." "Shakespeare, the Individual, and the Text," in *Cultural Studies*, ed. Lawrence Greenberg, Cary Nelson, and Paula Treichler (New York: Routledge, 1992), 593–612, at 606.

17. Citations of *Hamlet* will be from the Arden Edition, ed. Harold Jenkins (London: Routledge, 1993). I address the arithmetical melancholy of Hamlet in the sequel to this essay.

18. Tom Conley, *The Self-Made Map: Cartographic Writing in Early Modern France* (Minneapolis: University of Minnesota Press, 1997).

19. Bruno Latour, "Drawing things Together," in *Representation in Scientific Practice*, ed. Michael Lynch and Steve Woolgar (Cambridge: MIT Press, 1990), 19–68.

20. Valerie Traub, "Mapping the Global Body," in *Early Modern Visual Culture: Representation, Race and Empire in Renaissance England*, eds. Peter Erickson and Clark Hulse (Philadelphia: University of Pennsylvania Press, 2000), 44–97, at 77. See also David Woodward, "Maps and the Rationalization of Geographic Space," in *Circa 1492: Art in the age of Exploration*, ed. Jay. A. Levenson (New Haven: Yale University Press, 1991), 83–87.

21. Nicole Oresme, *Tractatus de configurationibus qualitatum et motum*, in *Nicole Oresme and the Medieval Geometry of Qualities and Motions*, ed. and trans. Marshall Clagett (Madison: University of Wisconsin Press, 1968), 165.

22. Arthur Golding, trans., *The. Xv. Bookes of P. Ouidius Naso, entytuled Metamorphosis, translated oute of Latin into English meter, by Arthur Golding Gentleman* (London, 1567), sig. Cvi^r.

23. William Cunningham, *The Cosmographicall Glasse, conteinyng the pleasant Principles of Cosmographie, Geographie, Hydrographie, or Nauigation* (London, 1559), sig. Aii^r, Fol. 11.

24. George Sandys, *Ovid's Metamorphosis, Englished, Mythologized, and Represented in Figures* (Oxford, 1632), ed. Karl K. Hulley and Stanley T. Vandersall (Lincoln: University of Nebraska Press), 50.

25. Sandys, "To the Reader," *Ovid's Metamorphosis*, 9.

26. Peter Ramus, *Via Regia Ad Geometriam, The Way to Geometry Being necessary and usefull, for Astronomers. Geographers. Land-meaters. Sea-men. Engineres. Architecks. Carpenters. Paynters. Carvers, &c. Written in Latine by Peter Ramvs, and now Translated and much enlarged by the Learned Mr. William Bedwell* (London, 1636), sig. Bi^r, 7, 9, 13, 28, passim.

27. *Oxford English Dictionary*, s.v., "Passion" (5a). This term was used interchangeably with "Affection."

28. Ramus, *Via Regia Ad Geometriam* (London, 1636), 57.

29. Kenneth J. Knoespel, "The Narrative Matter of Mathematics: John Dee's Preface to the *Elements* of Euclid of Megara (1570)," *Philological Quarterly* 66 (1987): 27–46, at 41.

30. For a later example of debates over "rational" definitions in Euclid, see John Wallis, *Hobbius Heauton-timorumenos* (Oxford, 1662), esp. 55–59. Gordon Hull addresses Wallis's polemic with Hobbes in his essay, chapter 6 in this volume.

31. Addison, *The Spectator* (May 11, 1711), 62.

32. Johannes Kepler, *Harmonices Mundi* (1619), preface to Book I.

33. It is notable that shapes continually practice oratory by performing speeches, or what Line calles "linea imaginaria" (601) based on the virtues of geometric configurations.

34. Citations of *King Lear* will be from the Arden edition, ed. R.A. Foakes (London: Thomson Learning, 1999), I.ii.21,7,8.

35. Part of the joke here is about the formation of "patents" in fifteenth-century Florence, with Brunelleschi one of the first to be granted a patent (for architectural design).

36. John Dee, "Mathematicall Preface" (sig. aiv): "Wonderfull many places, in the Ciuile law, require an expert Arithmeticien, to vnnder-stand the deep Judgemet, & Just determinatio of the Auncient Romaine Lawmakers. But much more expert ought he to be, who should be hable, to decide with equitie, the infinite varietie of cases, which do, or may happen, vnder euery one of those lawes and ordi-nances Ciuile...[and] in the Canon law: and in the lawes of the Realme...Justice and equity might be greately preferred, and skill-fully executed, through due skill of Arithmetike, and proportions appertaining" (sig. ai^v).

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

38. Elizabeth L. Eisenstein, *The Printing Press as an Agent of Change* (Cambridge: Cambridge University Press, 1982).

39. Henry Cornelius Agrippa, *Of the Vanitie and vncertaintie of Artes and Sciences, Englished by Ja. San. Gent.* [James Sanford] (London, 1569), 38 (my emphasis).

40. James Elkins, *The Poetics of Perspective* (Ithaca: Cornell University Press, 1994), 114–16 (my emphasis).

41. *Oxford English Dictionary* (s.v. "superficial"). Without arguing for emergent concepts of "depth" as emotional interiority in the Renaissance (see *OED*, s.v. "depth"), I am suggesting that geometric logic and language, as it entered into broader circulation and vernac-ular expression, expanded the lexicon and structural possibilities of imagining personhood and emotional constitution. It is striking, for example, that the adverb "superficial," which entered the English ver-nacular as the mathematic term for two dimensional (1398), came to signify a form of feeling and thought lacking depth in the early sixteenth century.

42. Edwin Abbott, *Flatland: A Romance in Many Dimensions* (1884), ed. Ian Stewart (Cambridge, MA: Perseus Publishing, 2002).

43. William J. Bouwsma, "Anxiety and the Formation of Early Modern Culture," in *After the Reformation: Essays in Honor of J.H. Hexter*, ed. Barbara C. Malament (Philadelphia: University of Pennsylvania Press, 1980), 215–246, at 236.