Upstart Crows and Red Herrings: Thomas Nashe and *Greene's Groatsworth of Wit*

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Greenes, groats-vvorth of witte, bought with a million of Repentance (1592) has long been a notorious work, as controversial as it is well known.[1] Its reputation is based primarily on being the source of a scathing attack on the contemporary London stage and especially the plays of an "vpstart Crow," generally identified as William Shakespeare, "beautified with our feathers, that with his *Tygers hart wrapt in a Players hyde*, supposes he is as well able to bombast out a blanke verse as the best of you: and beeing an absolute *Iohannes fac totum*, is in his owne conceit the onely Shake-scene in a country."[2] Appearing shortly after its purported author's death, the authenticity of the pamphlet remains disputed, and the answer to the question who really wrote the famous epistle in which the attack on Shakespeare appears, "To those Gentlemen his Quondam acquaintance," remains equally uncertain.[3]

In this essay we argue, following Katherine Duncan-Jones's suspicion, that Thomas Nashe wrote the epistle in the *Groatsworth*, and we show that Robert Greene was perhaps only partly responsible for the remaining pamphlet content, which was likely augmented by Henry Chettle.[4] This argument is supported by rigorous stylometric testing of the *Groatsworth* and other texts, the results of which are included here in a substantial appendix. In the essay itself, we explore the relationship between anonymity, attribution, and early modern professional writing in order to explain why it is likely that the first reference to Shakespeare's writing for the stage is not quite what it seems to be and not what

[1] *Greenes, groats-vvorth of witte, bought with a million of Repentance* (London: [J. Wolfe and J. Danter] for William Wright, 1592; STC 12245), hereafter cited as "*Groatsworth*."

[2] *Groatsworth*, sig. F1v.

[3] *Groatsworth*, sigs. E4v–F2v. See Steve Mentz, "Forming Greene: Theorizing the Early Modern Author in the *Groatsworth of Wit*," in *Writing Robert Greene: Essays on England's First Notorious Professional Writer*, ed. Kirk Melnikoff and Edward Gieskes (Aldershot, Hampshire: Ashgate, 2008), 115–31. Nandini Das's recent podcast, "Shakespeare's Rival" (BBC Radio 3, broadcast September 23, 2023), assumed that Greene was the author.

[4] Katherine Duncan-Jones, *Ungentle Shakespeare: Scenes from His Life* (London: Thomson Learning, 2001), 44.

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readers have assumed it was. Nashe may indeed have been—as generations of critics have said Greene was—criticizing Shakespeare for attempting to write above his station, but the larger significance of the epistle lies in the view it provides of a professional writer navigating the rapidly expanding worlds of print publication and the commercial theater in the 1590s. Our revised attribution of the epistle in the *Groatsworth* allows us to explore not only Nashe's relationship with Shakespeare, but also his use of literary personae—including, if we are right in our attribution, the earliest appropriation of Greene's persona for literary and financial gain; his comfort with anonymity; and his use of invective as a tool of recognition and even, perhaps, grudging respect. The reference to the "vpstart Crow" is much more than one author slighting another for his unmerited rise in status and reputation. In this essay, we try to unravel the complex significance and multiple contexts of an apparently straightforward insult, and in doing so uncover significant clues to the author's identity.

I. Rereading the "vpstart Crow" Passage with Nashe

If Thomas Nashe is the author of the "vpstart Crow" passage, how does our understanding of literary history change as a result? Is attributing the attack on Shakespeare to Nashe rather than Greene significant? After all, both Nashe and Greene are often characterized as "university wits," educated authors who looked down on more popularly oriented playwrights; changing Nashe for Greene might not seem to alter all that much in our understanding of the passage and its representation of Shakespeare.[5]

Attributing the "vpstart Crow" passage to Nashe has consequences for both Shakespeare and Nashe scholarship. As Andy Kesson observes, "Greene's supposed hatred for Shakespeare has become so important for Shakespeare scholarship" despite evidence that Greene was not the author of the *Groatsworth* epistle, and this has "produced misunderstandings of Shakespeare's early and subsequent career."[6] Scholars have worked both to defend Shakespeare and to perceive a rivalry between him and Greene that forms the basis of comparisons of their works.[7] What has tended to be overlooked in these discussions is the

[5] In the context of early modern drama, the term "university wits" seems to have been popularized by, if it did not originate with, George Saintsbury and his *History of Elizabethan Literature* (London: Macmillan, 1887), 64ff.

[6] Andy Kesson, "His Fellow Dramatists and Early Collaborators," in *The Shakespeare Circle: An Alternative Biography*, ed. Paul Edmondson and Stanley Wells (Cambridge: Cambridge UP, 2015), 236.

[7] John Semple Smart felt that the passage was a stumbling block for Shakespeare scholarship and wished that "it had never been written or never discovered" in *Shakespeare: Truth and Tradition*, 2nd ed. (Oxford: Clarendon, 1966), 167. Assumptions that Greene was the author of the words has led to some elaborate conjectures about an ongoing rivalry/feud between the two

fact that, amid the rapid growth of print culture and the rapid rise of the commercial theater in the 1590s, many authors, Nashe being a prominent example, enjoyed exploiting the resources at their disposal to challenge and unsettle readers, forcing them to think carefully about what they knew and did not know.[8] That is to say, anonymity and attribution were as serious topics in Nashe and Greene's moment as they are in ours. Furthermore, as his long-standing dispute with Gabriel Harvey demonstrates, Nashe was a dogged, even obsessive, author who was prepared to start and continue quarrels, and to use a variety of sophisticated literary strategies and devices to attack his opponents.[9]

Nashe explicitly denied writing the "vpstart Crow" passage in a prefatory letter to the printer in *Pierce Penniless, His Supplication to the Devil* (1592), where he writes:

> Other news I am aduertised of, that a scald triuial lying pamphlet, cald *Greens groats-worth of wit* is giuen out to be of my doing. God neuer haue care of my soule, but vtterly renoūce me, if the least word or sillable in it proceeded from my pen, or if I were any way priuie to the writing or printing of it. I am growne at length to see into the vanity of the world more than euer I did, and now I condemne my selfe for nothing so much, as playing the dolt in Print. Out vpon it, it is odious, specially, in this moralizing age, wherein euery one seeks to shew himselfe a Polititian by mis-interpreting.[10]

This denial would appear to be clear enough: the author wishes to distance himself from a damaging false claim or is simply acknowledging that be does not want to be associated with a scurrilous work. But why draw attention to such an issue in the preface of a work that has little to do with Robert Greene? Surely, he protests too much: Nashe had written the preface to Greene's prose romance, *Menaphon* (1589); imagines (in the same letter to the printer quoted above) Greene's ghost needing to be told how much of a stir he created after his death; and was prepared to spend considerable energy defending his reputation after Gabriel Harvey asserted that he had died after a fatal banquet of Rhenish wine

writers that had wider resonances among London writers: see, for recent examples, Joseph Loewenstein (interviewed by Rebecca King Pierce), "The Upstart Crow: Shakespeare's Feud with Robert Greene," *Hold That Thought* (Washington University at St. Louis, podcast, June 23, 2015); Robert Sawyer, *Marlowe and Shakespeare: The Critical Rivalry* (Basingstoke, Hampshire: Palgrave Macmillan, 2017), 36; and Will Sharpe, *Shakespeare and Collaborative Writing* (Oxford: Oxford UP, 2023), 133.

[8] Andrew Hadfield, *Thomas Nashe and Late Elizabethan Writing* (London: Reaktion, 2023), ch. 6.

[9] Hadfield, *Thomas Nashe*, ch. 4.

[10] Thomas Nashe, *Pierce Penilesse his svpplication to the Diuell* (London: A. Jeffes for J. B[usby], 1592; STC 18373), sig. ¶1v.

and pickled herring in *Four Letters* (1592).[11] In *Strange News* (1592), he claims that Greene was the chief author employed by the Bishops to write against the Marprelate pamphlets; therefore, Greene would have worked alongside Nashe, who first came to prominence as an anti-Martinist author, excoriating these anti-episcopal works.[12] For these and other reasons outlined later, it is hard to see why being associated with *Greene's Groatsworth of Wit* would actually arouse Nashe's anger.

But Nashe's disavowal has been taken at face value, as has been another passage for which he has become famous—his description of *1 Henry VI*:

> How would it haue ioyed braue *Talbot* (the terror of the French) to thinke that after he had lyne two hundred yeares in his Tombe, hee should triumphe againe on the Stage, and haue his bones newe embalmed with the teares of ten thousand spectators at least, (at seuerall times) who in the Tragedian that represents his person, imagine they behold him fresh bleeding.[13]

This passage has been reproduced in several editions of and commentaries on the play. In his Arden edition, Edward Burns acknowledges its vagueness, but then states that "for all its limitations as documentary evidence, Nashe's description does give us an account of the dynamics of an audience's response to a star actor in a role designed to exploit and articulate his drama."[14] Nashe is represented as if he were a disinterested spectator recording his observations of a successful play. But a scholarly consensus has emerged in recent years that Nashe was in fact the author of the first act of *1 Henry VI*—possibly other passages, too—and to accept this attribution is to change the way we should read his comments here.[15] They now need to be read less as a testimony to the play's success—although they may well be that—and more as a sly piece of self-promotion, with a few knowing readers getting the joke.

[11] See Thomas Nashe, "To the Gentlemen Students *of both Uniuersities*," in Robert Greene, *Menaphon* (London: T[homas] O[rwin] for Sampson Clarke, 1589; STC 12272), sigs. **1r–A3r; Thomas Nashe, "A priuate Epistle of the Author to the Printer," in *Pierce Penilesse*, sig. ¶1r–v; and Gabriel Harvey, *Foure letters, and certaine Sonnets* (London: J. Wolfe [and R. Robinson]), 1592; STC 12900.5), sig. A4r.

[12] Joseph L. Black, introduction to *The Martin Marprelate Tracts: A Modernized and Annotated Edition*, ed. Black (Cambridge: Cambridge UP, 2008), lxii–lxiv, passim.

[13] Nashe, *Pierce Penilesse*, sig. F3r.

[14] Edward Burns, introduction to *King Henry VI, Part 1*, ed. Burns (London: Thomson Learning, 2000), 3. Burns does, however, express some doubts about the nature and context of the description.

[15] See Gary Taylor, "Shakespeare and Others: The Authorship of *Henry the Sixth, Part One*," *Medieval and Renaissance Drama in England* 7 (1995): 145–205, and Brian Vickers, "Incomplete Shakespeare: Or, Denying Coauthorship in *1 Henry VI*," *Shakespeare Quarterly* 58.3 (2007): 311–52.

Pierce Penniless, written in the voice of the impecunious writer, Pierce Penniless—at once honest and devious, a poor victim of an indifferent society and a trickster rogue—established Nashe as a shape-shifting writer skilled at adopting different personae.[16] Read in the light of the narrative that follows from it—and of Nashe's use of paratextual material in later works such as *Have With You to Saffron Walden* (1596) and *Lenten Stuff* (1599)—the preface blurs the boundaries between author and character. Pierce's story is that of a young writer so disillusioned by the follies of the world and its inability to reward him properly that he abandons all hope of his future and sells his soul to the devil. Nashe's protestations that God should not take care of his soul if he wrote anything in *Groatsworth* seem very much in line with the character of Pierce, who asserts that he does not care about the false world and so will do anything as he is now bound to the devil. We should, therefore, be wary of what is stated in the preface to *Pierce Penniless*. Surely the assertion that he has played the dolt in print implies that he has written part of *Groatsworth*, not that he had nothing to do with it; that is, it makes little sense to deny something then to change track by lamenting one's foolish publications unless there is more at stake than a simple denial of authorship. A further clue appears in the last sentence of the passage with its faux naïve lament that he is living in a moralizing age in which "euery one seeks to shew himselfe a Polititian by mis-interpreting." On the one hand this is a challenge to the reader to condemn both Nashe and Pierce for their actions: the work aims to expose hypocrisy in the course of its narrative. On the other hand, it is a warning to the wise that to be honest and truthful is a difficult matter and requires careful reading and the suspension of immediate judgment when one is confronted by a complicated, challenging text. The distinction between truth and lies, like the distinction between Nashe and the devil's disciple Pierce, is not one to be arrived at easily. In lambasting the *Groatsworth*, then, Nashe is both announcing that he is an author who understands the contemporary literary scene and so demands to be read, and signaling that his prefaces are important sites of information—and disinformation. He is not just advertising his works; he is displaying his skill in using print as an interactive medium in which an author can manipulate a reader's responses.[17]

The attack on Shakespeare in the epistle to the *Groatsworth* shares with the attack on *Groatsworth* in *Pierce Penniless* both Nashe's interest in literary gamesmanship and his desire to demonstrate familiarity with the contemporary literary (or, here, theatrical) scene. As we have already noted, it is now generally

[16] See Samuel Fallon, *Paper Monsters: Persona and Literary Culture in Elizabethan England* (Philadelphia: U of Pennsylvania P, 2019), 119–50.

[17] See Rachel Stenner, *The Typographic Imaginary in Early Modern English Literature* (Abingdon, Oxfordshire: Routledge, 2019), 171–77.

accepted that *1 Henry VI* was written by Shakespeare, Nashe, and either Christopher Marlowe, Thomas Kyd, or some other unidentified dramatist(s).[18] If Nashe was the author of the attack on the "vpstart Crow," he was—as in the preface to *Pierce*—vehemently distancing himself from a text in which he had a hand. The composition of *1 Henry VI* and the nature of the collaboration between authors is difficult to determine, but it is likely that Nashe was one of the authors of the original work for performance. Shakespeare may have been employed to revise the text, perhaps for the performance at the Rose Theatre in 1592 to which Nashe refers in *Pierce Penniless*, based on the earlier work by Nashe and his collaborators. If so, then Nashe's disparaging comments on Shakespeare in *Groatsworth* might be the result of a disgruntled author resenting a writer he saw as inferior having the gall to revise his work, and so mangling words that he thought would have been better left as they were.[19] As Brian Vickers points out in a recent article, the purpose of the attack on the "vpstart Crow" was not to accuse Shakespeare of plagiarism, but to berate him for thinking that he could rise above his station and produce eloquent writing and dramatic exchanges that could rival those of the established experts.[20] A later assessment of Shakespeare's achievements in the *Parnassus* plays acknowledges that Shakespeare is indeed a fine poet and stylist, but finds that he is addicted to what was regarded as the facile Ovidian style, which enabled writers to produce sweet and enjoyably melodic verse, but which—as might be expected if the writer is too devoted to an author introduced to schoolboys relatively early in the curriculum—can be repetitive and lacks the sophistication of poetry based on more intricate, difficult, and advanced authors studied later, such as Lucan, Juvenal, and Petronius.[21] The judgment of the anonymous author of *The Returne from Pernassus: or The Scourge of Simony* (circa 1601, published 1606) is similar to that of the author of the "vpstart Crow" passage and so might be congruent with what Shakespeare's contemporaries generally thought about him in the 1590s: that he was a significant but rather limited writer. That such a writer dared to revise Nashe's work may be the source of Nashe's contempt in the "vpstart Crow" passage.[22]

[18] See Taylor, "Shakespeare and Others," and Vickers, "Incomplete Shakespeare."

[19] Further gamesmanship is also possible here, with Nashe, an adroit adopter of literary personae, calling out Shakespeare for trying to adopt a literary persona out of his reach.

[20] Brian Vickers, "'Upstart Crow'? The Myth of Shakespeare's Plagiarism," *The Review of English Studies* 68.284 (2017): 244–67, 249.

[21] J. B. Leishman, "Introduction" to *The Three Parnassus Plays (1598–1601)*, ed. Leishman (London: Ivor Nicholson & Watson, 1949), 55–60.

[22] Leishman, "Introduction," 55–60.

II. Nashe's Literary Personae

Nashe may have been seriously irritated by what he saw as Shakespeare's undeserved literary reputation, or only mildly annoyed: either way, the elaborate joke played across texts enabled him to show his mastery of print culture. Whatever the force or extent of his reaction, the question of why Nashe would not admit to having a part in the *Groatsworth* even many years later remains a stumbling block in attributing his hand. To understand Nashe's comfort with —perhaps even his enjoyment of—anonymity, it is worth examining an integral feature of his writing career: his frequent adoption of other personae.

Nashe's early career was founded on pseudonymous writing. Hired by the Archbishop of Canterbury, John Whitgift, Nashe was part of a group including John Lyly—and, according to Nashe, Robert Greene—who wrote an aggressive and scurrilous set of pseudonymous pamphlets to counter the polemical onslaught of the anonymous puritanical, anti-episcopal Marprelate tracts.[23] This was a chance for the young Nashe, at the beginning of his career, to show his skill in rhetoric and wit. In one of his early contributions, *Martin's Month's Minde* (1589), Nashe self-consciously parodies "the clownish prose style of Martin Marprelate and his heirs."[24] Anonymity gave him the opportunity to experiment with genre and style. Gary Schmidt has identified the "hybridity" that existed in late sixteenth-century culture and literary genre, and this generic flux allowed Nashe to move between and to manipulate genres.[25] Neil Rhodes notes that it is difficult to find consistency in Nashe and locates his interest in language as "a living source of energy, something inexhaustibly potent and infinitely malleable."[26] This fascination with language and disregard for generic homogeneity, coupled with his comfort with both anonymity and pseudonymity, allowed Nashe to evade identification while deliberately leaving tantalizing clues in his writing.

[23] On the Martinist controversy and Nashe, see Joseph L. Black, "The Marprelate Controversy," in *The Oxford Handbook of English Prose, 1500–1640*, ed. Andrew Hadfield (Oxford: Oxford UP, 2013), 544–59, and Travis L. Summersgill, "The Influence of the Marprelate Controversy upon the Style of Thomas Nashe," *Studies in Philology* 48.2 (1951): 145–60.

[24] Kirk Melnikoff, "The Limits of Clowning in the Age of Marprelate: The Anti-Martinist Tracts and *2 Henry VI*," in *Renaissance Papers 2010*, ed. Andrew Shifflett and Edward Gieskes (Woodbridge: Boydell & Brewer, 2011), 35–64, 45.

[25] See Gary A. Schmidt, *Renaissance Hybrids: Culture and Genre in Early Modern England* (Farnham, Surrey: Ashgate, 2013).

[26] Neil Rhodes, "Nashe, Rhetoric and Satire," in *Jacobean Poetry and Prose: Rhetoric, Representation and the Popular Imagination*, ed. Clive Bloom (Basingstoke, Hampshire: Macmillan, 1988), 25.

Anonymity leads, of course, to questions of attribution, and Nashe was keen to exploit the uncertainty about what he actually wrote—acknowledging some of his works, disowning others, and seeming not to comment on still others.[27] Two pseudonymous mock-prognostications from 1591, *A Wonderful, Strange and Miraculous Astrological Prognostication* by Adam Foulweather and *Fearful and Lamentable Effects of Two Dangerous Comets* by Simon Smellknave, have caught the attention of critics as being possible additions to the Nashe canon. R. B. McKerrow included the former in *The Works of Thomas Nashe* but was doubtful of the attribution, noting that "I have been unable to discover any reason whatever for so considering it, nor have I been able to learn by whom and on what grounds it was first attributed to him."[28] With the discovery of *Two Dangerous Comets*, which McKerrow knew of but did not have access to, the critical consensus shifted to suggest that this mock-prognostication was more likely to be Nashe writing in response to Foulweather, who was sometimes identified as Robert Greene.[29] While in most cases critics have suggested that one or the other pamphlet belongs to Nashe, with the most recent consensus being that he is responsible for Smellknave's *Two Dangerous Comets*, two of the present authors have recently shown that *both* mock-prognostications are probably his work.[30] This new attribution must change our view of the manner in which these pamphlets were believed to have been written—not as a response to and even mock-praise of his "familiar friende," but rather in response to himself.[31] In assigning both mock-prognostications to Nashe, White and Greatley-Hirsch conclude that "rather than a satirical partnership, collaboration, or rivalry using a popular form, we are left with Nashe writing on his own, playing

[27] On the contemporary practice of anonymous authorship more generally, see Marcy L. North, *The Anonymous Renaissance: Cultures of Discretion in Tudor–Stuart England* (Chicago, IL: U of Chicago P, 2003).

[28] Ronald B. McKerrow, ed., *The Works of Thomas Nashe*, 5 vols. (London: Sidgwick & Jackson, 1904–10), 5:138. F. P. Wilson was also uncertain of the attribution; see "Some English Mock Prognostications," *The Library*, 4th series, 19.1 (1938): 6–43, 23. Critics who accept that Foulweather is likely to be Nashe include Charles Nicholl, *A Cup of News: The Life of Thomas Nashe* (London: Routledge, 1984), 81–82, and Anne Lake Prescott, *Imagining Rabelais in Renaissance England* (New Haven, CT: Yale UP, 1998), 246n2. For a more detailed account of the Foulweather attribution, see Rachel White and Brett Greatley-Hirsch, "Ass-troll-ogical Nashe: Revisiting *Two Dangerous Comets* and *A Wonderful Prognostication*," *Renaissance Studies* 38.3 (2024): 335–62.

[29] See Swapan Chakravorty, "'Upon a Sudden Wit': On the Sources of an Unnoticed Pun in *The Revenger's Tragedy*," *Notes and Queries* 42.3 (1995): 344–45, and Matthew Steggle, *Digital Humanities and the Lost Drama of Early Modern England: Ten Case Studies* (Farnham, Surrey: Ashgate, 2015), 36.

[30] White and Greatley-Hirsch, "Ass-troll-ogical Nashe."

[31] Simon Smellknave, *Fearfull and lamentable effects of two dangerous Comets* (London: I. C[harlewood] for Iohn Busbie, 1591; STC 22645), sig. A2r.

with form and his own authorial identity" as well as "extending and 'riffing' on the same ideas and tropes."[32]

This highly self-conscious playfulness sets Nashe apart from other contemporary professional writers in that he seems to have been deliberately limiting the use and recognition of his name through the continued use of pseudonyms. Perhaps Simon Smellknave was meant to recall Cuthbert Curry-knave of *An Almond for a Parrot* (1590) and so serve as a mark of identity to those in the know, but publishing two mock-prognostications early into his career as a professional writer under pseudonyms seems like an odd choice. Though Adam Smyth notes that "almanacs constituted a lucrative and vigorously defended monopoly for the Stationers' Company," each of Nashe's mock-prognostications had only one print run, indicating that neither sold particularly well, and it is doubtful that Nashe expected to make much money from them.[33] Neither was entered into the Stationers' Register, though a pamphlet by one Francis Fairweather was entered on February 25, 1591, for the publisher William Wright, making it the first of the three. There are no extant copies of this third pamphlet, so it is hard to say whether this is a third mock-prognostication by Nashe or whether the other two are responses to this one. What is clear is that Nashe was not bothered about following processes or with using these early works to make a name for himself. He seems to have enjoyed the freedom that pseudonymous writing gave him for experimentation with biting social commentary.

Having established that Nashe enjoyed taking on different literary personae, it is worth examining an instance in which he styles himself upon a dead writer. In the preface to the pirated version of Philip Sidney's *Astrophel and Stella* (1591), Nashe ends by saying that he has "beene too bold, to stand talking all this while in an other mans doore."[34] This gesture of humility is surely disingenuous, given that Nashe "appropriates Sidney's poetic lexicon" throughout the preface, suggesting that he was eager to imitate and even match the writing style of the dead literary giant.[35] Georgia Brown notes that Nashe uses the "perverse tactic of self-undermining in order to achieve self-promotion," while Kristen Abbott Bennett suggests that Nashe's prefaces capitalize "on his predecessors'

[32] White and Greatley-Hirsch, "Ass-troll-ogical Nashe," 361–62.

[33] Adam Smyth, "Almanacs and Ideas of Popularity," in *The Elizabethan Top Ten: Defining Print Popularity in Early Modern England*, ed. Andy Kesson and Emma Smith (Abingdon, Oxfordshire: Routledge, 2013), 125–34, 125.

[34] Thomas Nashe, "Somewhat to reade for them *that list*," in Philip Sidney, *His Astrophel and Stella* (London: [John Charlewood] for Thomas Newman, 1591; STC 22536), sig. A3r–A4v, quotation at A4v.

[35] Joshua Phillips, *English Fictions of Communal Identity, 1485–1603* (Abingdon, Oxfordshire: Routledge, 2016), 193.

reputations to legitimize his own artistic value."[36] If he is being "too bold," we might say, as Steve Mentz has argued, that in memorializing Sidney for his own advantage "Nashe manipulated his own and the public's fascination with Sidney in an attempt to promote himself as a brand name author."[37] Whether Nashe was setting himself up as a "brand name author" is perhaps debatable, given his predilection for anonymity, his habit of taking on different literary personae, and his desire to invest so heavily in a protracted and destructive quarrel with Harvey in his later works (one that surely had the effect of increasing Nashe's fame), but there is certainly a strong aspect of authorial manipulation here.[38] In fact, and again contrary to the thrust of his apparent assertion, Nashe would seem to be quite comfortable standing in another man's door and ventriloquizing him.

Nashe's comfort with donning different literary personae—both of his own invention and the posthumous linguistic relics of his contemporaries in Greene and Sidney—suggests that he was more interested in forging a character rather than a professional writing identity for himself. Even his fictional characters of Jack Wilton and Pierce Penniless merge with his own character and are extensions of his parodic and motley approach to his own authorial identity. Samuel Fallon notes that to try to resolve *The Unfortunate Traveller* (1594) into a certain kind of story "would be to resolve Wilton into a certain kind of character," which his very formulation in the text resists.[39] Likewise, to try to resolve Nashe into a certain kind of writer defies the purpose of Nashe's writing character: his fluidity and ability to don different styles and personae are part of his authorial identity, the truth of which flutters beneath the surface of his texts. "Parody's objects may tend toward mechanical rigidity," Fallon argues, "but parodic subjects move in the opposite direction: they treat forms merely as forms, alienable and manipulable, holding them at a distance so as never to be under their sway. The parodist is thus a distinctly elusive figure."[40] Nashe had become adept at practicing parody from his early days writing for Whitgift and he continued to weave parody into his writing. Combining parody with pseudonymity

[36] Georgia Brown, *Redefining Elizabethan Literature* (Cambridge: Cambridge UP, 2004), 55. Kristen Abbot Bennett, *Conversational Exchanges in Early Modern England (1549–1640)* (Newcastle: Cambridge Scholars, 2015), 103.

[37] Steve Mentz, "Selling Sidney: William Ponsonby, Thomas Nashe, and the Boundaries of Elizabethan Print and Manuscript Cultures," *Text* 13 (2000): 151–74, 153.

[38] One of the structuring principles of Gabriel Harvey's *Pierces Supererogation, or, A new praise of the Old Asse* (London: Iohn VVolfe, 1593; STC 12903), his principal contribution to his quarrel with Nashe, is Nashe's desire for fame in continuing the quarrel, as he outlines in the preface (sigs. *2r, **v–**1r).

[39] Samuel Fallon, "Formal Men: On Parody and Character," *Journal for Early Modern Cultural Studies* 21.2 (2021): 26–53, 43.

[40] Fallon, "Formal Men," 39–40.

gave Nashe a slipperiness that he exploited to great effect; it gave him a freedom that his contemporaries did not enjoy to the same extent, though arguably it cost him his authorial legacy.

In his early career, Nashe relished being able to experiment with different literary personae, from the pseudonymous to the deceased. It is not a great stretch to imagine that he did the same with Greene and the *Groatsworth*: that he stood in Greene's door, but instead of just appropriating Greene's language, he colluded in the fiction that the epistle was among the deceased Greene's papers found by Chettle.

III. Greene and Nashe: Overlapping Styles

Another reason that contemporary readers may have thought that Nashe was the author of the *Groatsworth* is that Nashe and Greene employed very similar styles in the early 1590s and both had attacked the theater in print from 1588 onwards.[41] Greene's cony-catching pamphlets in particular have a Nashean quality, and John Jowett notes that the *Groatsworth* sounds like Greene "in his Nashean manner."[42]

Greene blurred the line between the authorial persona and the character of "Robert Greene," making it difficult to distinguish the real Greene from the fictional one. Fallon notes that Greene tested "the boundary between fiction and reality, weaving strange claims of historical veracity into outlandish romances and then, more aggressively, turning himself into a peripheral character in the cony-catching pamphlets that he wrote between 1590 and 1592."[43] Arul Kumaran argues that this change took place around 1590 and was a direct reaction to Martin Marprelate as Greene (like Nashe) recognized the potential of developing a print persona.[44] This deliberately crafted intersection between author, persona, and character created the perfect opportunity for writers to *become* Greene and for his name to remain profitable in the wake of his death, the notorious circumstances of which were well known. Kumaran describes the death of Greene, which took place a month after an excessive night involving Rhenish wine and pickled herring, as a "pamphlet moment": it created a proliferation of pamphlets claiming to be written by Greene in his final days.[45] The

[41] Mentz, "Forming Greene," 116n4.

[42] John Jowett, "Johannes Factotum: Henry Chettle and *Greene's Groatsworth of Wit*," *The Papers of the Bibliographical Society of America* 87.4 (1993): 453–86, 476.

[43] Fallon, *Paper Monsters*, 35.

[44] See Arul Kumaran, "Robert Greene's Martinist Transformation in 1590," *Studies in Philology* 103.3 (2006): 243–63.

[45] Arul Kumaran, "Patronage, Print, and an Early Modern 'Pamphlet Moment,'" *Explorations in Renaissance Culture* 31.1 (2005): 59–88, 59.

Groatsworth was the first, entered into the Stationers' Register on September 20, 1592; John Danter then registered *The Repentance of Robert Greene* on October 6, 1592; Thomas Newman did not register *Greene's Vision* but the prefatory epistle suggests that it was also published shortly after Greene's death. All three pamphlets claim emphatically in their titles to be by Greene, written as he suffered the drawn-out effects of excess and debauchery: the *Groatsworth* claims to have been "Written before his death and published at his dyeing request"; the *Repentance* points to Greene revealing the details of his life, "Wherein by himselfe is laid open his loose life, with the manner of his death"; and *Greene's Vision* claims to have been "Written at the instant of his *death*."[46] With their competing claims to authenticity, however, the pamphlets "place each other under suspicion."[47] Greene's own blurring of the lines between himself as author, persona, and character made it easy for other authors to use his name to cash in on his success and reputation in the immediate aftermath of his death. Though Fallon assumes Greene was the writer of the *Groatsworth*, he notes the exciting possibility that this pamphlet could be "the first appropriation of Greene's persona."[48]

If Greene adopted a persona that could be copied and imitated, Nashe, in turn, seems to have enjoyed the game of imitating others and assuming different styles. Although his name appeared alongside Marlowe's on the title-page of *Dido, Queen of Carthage* when the play was published in 1594, most critics agree that the work does not read or sound much like Nashe. The nature and date of the first performance of the play are unclear, and stylometric analyses of *Dido* either have not revealed any clear evidence that aids attribution or have suggested Nashe was probably not responsible for much, if any, of it.[49] Those who maintain the validity of the title-page attribution have either relied on arguments positing an auxiliary role for Nashe—as plotter, editor, or literary executor—or been based on verbal echoes from Nashe's writing, a method that has largely been abandoned in authorship studies.[50] No matter how we read the evidence,

[46] *Groats-vvorth*, title-page; *The Repentance of Robert Greene Maister of Artes* (London: [J. Danter] for Cutbert Burbie, 1592; STC 12306), title-page; *Greenes vision* (London: [E. Allde] for Thomas Newman, 1592; STC 12261), title-page.

[47] Alexandra Halasz, *The Marketplace of Print: Pamphlets and the Public Sphere in Early Modern England* (Cambridge: Cambridge UP, 1997), 38.

[48] Fallon, *Paper Monsters*, 39.

[49] Ruth Lunney and Hugh Craig, "Who Wrote *Dido, Queen of Carthage*?," *Journal of Marlowe Studies* 1 (2020): 1–31.

[50] See discussion of the play in Brett Greatley-Hirsch and Rachel White, "Doubting Thomas: Attributing the Nashe Dubia" in *The Complete Works of Thomas Nashe*, ed. Joseph L. Black, Andrew Hadfield, Jennifer Richards, and Cathy Shrank, 6 vols. (Oxford: Oxford UP, forthcoming).

Nashe appears, as usual, to be adopting a persona. Either he did write the play with Marlowe, and they contrived to produce a work in a different voice that does not really read like the work of either of them, or he did not write any of *Dido*—but was happy to pass it off as partly his own.

Nashe's interest in personae and his persistent joking about his own writing might encourage us to extend our search for his authorial activity to other texts. Scholars of Ben Jonson who have worked on what may well be his first play, *The Case is Altered* (circa 1597), tend to agree that it does not read like anything else Jonson wrote.[51] The earliest reference to the play appears in what is almost certainly Nashe's last written work, *Lenten Stuff* (1599): there, he refers to "that witty Play of, *the Case is altered*," when discussing a riddle about herrings.[52] Stylometric tests have so far revealed little about the play—certainly nothing like evidence for Nashe's sole or partial authorship—but since we know that Nashe collaborated with Jonson on the now-lost *Isle of Dogs*, it might be worth placing the reference to *Case* alongside Nashe's product placement of *1 Henry VI* in *Pierce Penniless*, his assertion that Greene played a major role in writing the anti-Marprelate tracts, and, most significantly, his disavowal of his authorship of the *Groatsworth* and its attack on Shakespeare.[53]

IV. The *Groatsworth* and the Question of Authorship

The *Groatsworth* attracted doubts about its authorship from its first print run in 1592 and continues to stir debate. It was first entered into the Stationers' Register on September 20, 1592, to the publisher William Wright, though the entry was accompanied by the curious addition "vppon the perill of Henrye Chettle."[54] In *Kind-Heart's Dream* (1593), Chettle explains his intervention in the *Groatsworth* as that of a friendly editor:

> For the first, whose learning I reuerenee, and at the perusing of *Greenes* Booke, stroke out what then in conscience I thought he in some displeasure writ: or had it beene true, yet to publish it, was intollerable: him I would wish to vse me no worse than I deserue. I had onely in the copy this share, it was il written, as sometime *Greenes* hand was none of the best, licensd it must be, ere it could bee printed which could neuer be if it might not be read. To be

[51] See discussion of the play in Greatley-Hirsch and White, "Doubting Thomas."

[52] Thomas Nashe, *Nashes Lenten Stuffe* (London: [Thomas Judson and Valentine Simmes] for N[icholas] L[ing] and C[uthbert] B[urby], 1599; STC 18370), sig. K2v.

[53] Mark Eisen, Alejandro Ribeiro, Santiago Segarra, and Gabriel Egan, "Stylometric Analysis of Early Modern Period English Plays," *Digital Scholarship in the Humanities* 33.3 (2018): 500–528.

[54] Edward Arber, ed., A Transcript of the Registers of the Company of Stationers of London, 1554–1640, 5 vols. (London and Birmingham: privately printed, 1875–94), 2:292b.

> breife I writ it ouer, and as neare as I could, followed the copy, onely in that letter I put something out, but in the whole booke not a worde in, for I protest it was all *Greenes*, not mine nor Maister *Nashes*, as some vniustly haue affirmed.[55]

Chettle's insistence that he did not interfere with the text naturally raises the question how much he did remove and change, and thus the extent to which the text can be said to be Greene's at all. Even if Greene was not the sole author, Chettle would have had a vested interest in maintaining the pretence that he was, since Greene's name would surely have helped sell copies. The question of the text's authorship has therefore remained open, with some scholars believing the text to be wholly Greene's, some claiming that it is mostly Chettle's (or a mixture of Greene's and Chettle's writing), and some finding a third hand in the text, that of Nashe.

Chauncey Sanders voiced suspicion about the authorship of the *Groatsworth*, citing among other things Chettle's strained financial situation and the strange phrasing in the entry for the pamphlet in the Stationer's Register: "vppon the perill of Henrye Chettle." Sanders suggests that the publisher William Wright "anticipated trouble" about the pamphlet's publication and thus placed responsibility upon Chettle.[56] Sanders concludes that the authenticity of the *Groatsworth*, as well as the *Repentance* and *Greene's Vision*, are suspect and that "these death-bed pamphlets are not what Greene intended them to be when he wrote them, or such parts as proceeded from his pen."[57] Writing in response to Sanders's article, Harold Jenkins acknowledges that evidence such as Wright's and Chettle's claim of Greene's authorship "positive as it is, is not of such integrity that we can accept it as infallible proof of Greene's authorship," but he concludes that there is insufficient evidence to remove either the *Groatsworth* or the *Repentance* from Greene's canon.[58]

Warren B. Austin's 1969 computer-aided analysis aimed to prove that Chettle was the author of *Groatsworth*, including the letter to playwrights and the attack on Shakespeare. Austin used five of Greene's prose works written within three years of the *Groatsworth* and three of Chettle's, though these ranged in date up to 1603 and differed considerably in genre. Quantitative analysis was conducted on these texts to produce high-frequency function words

[55] Henry Chettle, *Kind-harts dreame* (London: [J. Wolfe and J. Danter] for William Wright, 1593; STC 5123), sig. A4r.

[56] Chauncey Sanders, "Robert Greene and His 'Editors'," *PMLA* 48.2 (1933): 392–417, 396.

[57] Sanders, "Robert Greene," 417.

[58] Harold Jenkins, "On the Authenticity of Greene's *Groatsworth of Wit* and *The Repentance of Robert Greene*," *The Review of English Studies* 11.41 (1935): 28–41, 31 and 41.

for each writer, and these were compared with occurrences in the *Groatsworth*. Austin concluded that "the 21 Chettle-favored words occur in the *Groatsworth* at almost precisely the rate to be expected if the book was another example of Chettle's prose."[59] Austin's study met with criticism, however, for his use of modern editions of texts and his limited selection of Greene's works. T. R. Waldo, for example, noted that he found "numerous examples of traits which Austin alleges to be Chettle characteristics" in other texts by Greene not included in Austin's corpus.[60] R. L. Widmann similarly criticized both Austin's use of edited texts over transcriptions of originals and the size of Austin's database, which was "just too small to support the general conclusions that he draws, which show that Chettle is undisputedly the author."[61] Despite weaknesses in Austin's study, later critics began to favor Chettle as the *Groatsworth*'s author and used Austin's study to support this attribution. D. Allen Carroll's 1994 edition of the *Groatsworth* attributes it to both Greene and Chettle, with Carroll claiming that it is "one of the most successful creative hoaxes in our culture."[62] John Jowett argues that "if the *Groatsworth* is . . . a forgery, it must have been perpetrated by Chettle."[63] More recently, Richard Westley has reassessed this critical tradition—which saw Austin as "a pioneer in work that is now the critical mainstream"—in light of various problems with the original study.[64] Westley examined evidence excluded by Austin and ultimately concluded that the *Groatsworth* and Chettle's *Kind-Heart's Dream* are by different authors. Brian Vickers follows Westley's analysis of Austin and supports his findings, in an unpublished study, by using "anti-plagiarism software to identify many collocations (extended word-strings) that it shares with Greene's Repentance pamphlets, but also his plays and romances." This method leads him to conclude that Greene was the author of the *Groatsworth*.[65]

While not favoring Chettle as the author, Katherine Duncan-Jones has argued that "Greene himself had little or nothing to do with it [the *Groatsworth*]" and put forward Nashe as a candidate for at least the epistle "To those

[59] Warren B. Austin, *A Computer-Aided Technique for Stylistic Discrimination: The Authorship of* Greene's Groatsworth of Wit (Washington, DC: US Department of Health, Education, and Welfare, 1969), ix.

[60] T. R. Waldo, review of Austin in *Computers and the Humanities* 7.2 (1972): 109–10, 110.

[61] R. L. Widmann, review of Austin in *Shakespeare Quarterly* 23.2 (1972): 214–15, 214.

[62] D. Allen Carroll, ed., *Greene's Groatsworth of Wit* (Binghamton, NY: Medieval and Renaissance Texts & Studies, 1994), x.

[63] Jowett, "Johannes Factotum," 453.

[64] Richard Westley, "Computing Error: Reassessing Austin's Study of *Groatsworth of Wit*," *Literary and Linguistic Computing* 21.3 (2006): 363–78, 364.

[65] Brian Vickers, "Giving Greene His *Groatsworth*" (unpublished paper). We are grateful to Professor Vickers for sharing his unpublished essay with us.

Gentlemen his Quondam acquaintance."[66] Though not supported by stylistic analysis, Duncan-Jones's reasons for attributing the epistle to Nashe are compelling. It is, she argues, Nashean in style: "A memorably brilliant piece of writing —glancing, allusive, learned, and double-edged in a manner beyond the reach of the journeyman Chettle."[67] Duncan-Jones supports this claim with examples from Nashe's later prose works, including Cutwolfe's final speech in *The Unfortunate Traveller*: "The device of having a dying man utter sentiments that in the mouth of the living would be held seditious, blasphemous or slanderous is common to *The Unfortunate Traveller* and the epistle in *Groatsworth*."[68] She also notes that "Johannes factotum" is a "giveaway term" used by learned university men and that Nashe used it "conspicuously" in both *Lenten Stuff* and *The Unfortunate Traveller*, which were both published under his own name.[69]

V. Conclusion

In an astute analysis of the pamphleteering style of both Greene and Nashe, Lawrence Manley argues that the prose style of both authors was intimately connected in the minds of their supporters and detractors. All readers, according to Manley, saw that the two writers "placed a premium on their literary–social marginality and their exploitation of it."[70] That marginality, we might add, involved a keen sense of mischief and the ability to snipe from the margins and to play literary games, especially those involving attribution and authorship. It should, therefore, be no surprise that Nashe combined with the ghost of his dead ally to attack Gabriel Harvey, a writer who sought to assume a central position in the intellectual culture of early modern England by appointing himself the heir of Cicero and the chief master of Ciceronian style.[71] The attack on Harvey was in keeping with Nashe's authorial project, initiated in his writing for Whitgift during the Marprelate controversy, of attacking and irritating rivals, enemies, and even writers he surely otherwise admired, making use of anonymity, personae, irreverence, and allusive games designed to unsettle, provoke, and challenge readers.

It is in this context that we can best understand the possibility that Nashe was responsible for the attack on Shakespeare in the epistle in the *Groatsworth*.

[66] Duncan-Jones, *Ungentle Shakespeare*, 43.
[67] Duncan-Jones, *Ungentle Shakespeare*, 44.
[68] Duncan-Jones, *Ungentle Shakespeare*, 46.
[69] Duncan-Jones, *Ungentle Shakespeare*, 45–46.
[70] Lawrence Manley, *Literature and Culture in Early Modern London* (Cambridge: Cambridge UP, 1995), 322.
[71] P. Albert Duhamel, "The Ciceronianism of Gabriel Harvey," *Studies in Philology* 49.2 (1952): 155–70.

Greene was not only an ally and literary comrade—Duncan-Jones argues that they co-wrote *Summer's Last Will and Testament*—but a writer who adopted a literary persona that could be imitated and appropriated.[72] If Shakespeare's role was to rewrite and add material to an existing version of *1 Henry VI*—to imitate and appropriate material that Nashe had written—Nashe might well attempt to expose the "vpstart Crow," lest he beat him at his own game.

Appendix 1: Stylometric Tests

Authors have unique writing styles. Given adequate samples, linguistic features can be quantified and analyzed (i.e., stylometry) to distinguish the works of one author from another (i.e., authorship attribution). Variations in authorial style are observable in writing across different genres, registers, and periods, as well as, in the case of literary works, different characters' idiolects, but these variations operate at different economies of scale: that we may differentiate Shakespeare's tragedies from his comedies or discern Brutus's speech from Shylock's does not preclude us from recognizing them all as flowing from Shakespeare's pen. Parody, pastiche, homage, and other forms of imitation require only the most obvious, surface-level features to affect the desired appropriation of style, typically ignoring more latent—but no less distinctive—markers of authorship.[73] It is often these absences, easily overlooked by human readers but readily visible to the computer, that are the most telling. Thus, with suitable features and methods for their analysis, stylometric investigators should be able to distinguish imitation from genuine article since, as Gary Taylor and John V. Nance remark: "Identity is cellular and systemic. Imitation is selective and semiotic."[74]

To test the authorship of *Groatsworth*, we analyzed three different sets of linguistic features—the most frequent function words (excluding personal pronouns), "middling" words (present in 25–75 percent of samples), and part-of-speech trigrams—in an effort to target plausible areas of conscious and unconscious language usage that might reveal even an author actively

[72] Katherine Duncan-Jones, *Shakespeare: Upstart Crow to Sweet Swan: 1592–1623* (London: Methuen, 2011), 45–52.

[73] On stylometry and imitation, see Harold Somers and Fiona Tweedie, "Authorship Attribution and Pastiche," *Computers and the Humanities* 37.4 (2003): 407–29; John Burrows, "Who Wrote *Shamela?* Verifying the Authorship of a Parodic Text," *Literary and Linguistic Computing* 20.4 (2005): 437–50; and David L. Hoover, *Modes of Composition and the Durability of Style in Literature* (New York: Routledge, 2021), 27–34.

[74] Gary Taylor and John V. Nance, "Imitation or Collaboration? Marlowe and the Early Shakespeare Canon," *Shakespeare Survey* 68 (2015): 32–47, 33; see also Taylor's discussion in "Fake Shakespeare," *Journal of Early Modern Studies* 5 (2016): 353–79.

seeking to conceal their identity.[75] We constructed a corpus of texts containing *Groatsworth* (separated into the epistle and the remaining text) and representative sole-authored, well-attributed prose by Chettle, Greene, and Nashe. No other authorial candidates have been proposed. Appendix 2 details our corpus, derived from the *EarlyPrint* repository of EEBO-TCP corpora enriched with standardized spelling and linguistic annotation (marking lemma and part-of-speech).

For our first test, we employed Delta, a standard method in authorship attribution "proven to be a very robust measure in different genres and languages," which analyzes features to determine stylistic "distances" between a target sample (i.e., a whole text or a segment of uncertain or unknown authorship) and comparison samples of texts or segments by candidate authors.[76] After features are selected and their instances in the samples are counted, Delta proceeds by transforming these counts into *z*-scores (i.e., by subtracting the mean average and then dividing by the standard deviation for each feature) and then calculating absolute differences (i.e., ignoring whether the values are positive or negative) between an author's mean average *z*-score for each feature and the corresponding *z*-score of the target sample. These absolute differences are then combined to produce a composite measure of difference—a Delta distance—for each author. The candidate with the lowest Delta distance from the target sample is deemed the least unlikely author out of those considered.[77]

The linguistic features selected for this test were function words—that is, words whose primary function is to express grammatical relationships among other words in a sentence—which are not only among the most commonly used in a language but also one of the most popular features selected for authorship attribution study.[78] Since the *Groatsworth* epistle is 1,098 words in

[75] Function words, for example, may be less constrained by context and perhaps even "lie outside the conscious control of authors": see David L. Hoover, "Statistical Stylistics and Authorship Attribution: An Empirical Investigation," *Literary and Linguistic Computing* 16.4 (2001): 421–44, 422.

[76] Stefan Evert, Thomas Proisl, Thorsten Vitt, Christof Schöch, Fotis Jannidis, and Steffen Pielström, "Towards a Better Understanding of Burrows's Delta in Literary Authorship Attribution," *Proceedings of NAACL-HLT Fourth Workshop on Computational Linguistics for Literature* (Denver, CO: Association for Computational Linguistics, 2015), 79–88, 79.

[77] John Burrows, "'Delta': A Measure of Stylistic Difference and a Guide to Likely Authorship," *Literary and Linguistic Computing* 17.3 (2002): 267–87; see also David L. Hoover, "Testing Burrows's Delta," *Literary and Linguistic Computing* 19.4 (2004): 453–75.

[78] Patrick Juola, "Authorship Attribution," *Foundations and Trends in Information Retrieval* 1.3 (2006): 233–334, 244; see also Antonio Miranda García and Javier Calle Martín, "Function Words in Authorship Attribution Studies," *Literary and Linguistic Computing* 22.1 (2007): 49–66.

length, we segmented the corpus into non-overlapping 1,098-word chunks and discarded any smaller remainders.[79] This produced 439 segments for the comparison corpus, one segment for the *Groatsworth* epistle, and eight segments for the *Groatsworth* remainder. We then counted occurrences of the top fifty most frequent function words (excluding personal pronouns) across the corpus for each segment, using part-of-speech annotations to distinguish between homographs (e.g., between *be* and *have* used as either infinite or present-tense verbs, counted separately as *be*[vvi] and *be*[vvb], *have*[vvi], and *have*[vvb]).[80]

To test the method and assess its predictive power, we excluded the *Groatsworth* segments and performed a "leave-one-out" cross-validation: that is, we ran a series of 439 tests, each time excluding a different segment from the comparison corpus to be treated as if it were of unknown authorship and calculating Delta distances from it for Chettle, Greene, and Nashe, thereby predicting its least unlikely author. Table 1 gives the resulting confusion matrix (a tally of all the predictions). The validation tests correctly predicted the least unlikely authors for 359 of the total 439 segments—an overall accuracy of 81.78 percent. The confusion matrix also allows us to evaluate the model's performance for each class in terms of *recall* (e.g., the proportion of Chettle segments correctly identified) and *precision* (e.g., the proportion of Chettle predictions that were correct). When a segment of uncertain authorship is introduced, for example, we should expect the test to correctly predict a segment belonging to Chettle 31.25 percent of the time (precision), and for 74.07 percent of the actual Chettle segments to be among those correctly predicted (recall). Taken together, these scores mean that the test will correctly predict a substantial proportion of segments belonging to each class (recall) and that these predictions are markedly more accurate when it comes to Greene and Nashe segments (precision).

With the method validated and an estimate of the test's performance in terms of precision and recall, we repeated the procedure to predict the least unlikely author of the *Groatsworth* segments. Table 2 lists the Delta distances from each segment for each candidate, with the lowest distance (i.e., the least unlikely author) shaded. Nashe emerges as the least unlikely author of the

[79] The data for this test is available from https://github.com/JackWilton1594/SQ-Groatsworth/.

[80] Empirical studies have shown the use of personal pronouns to be linked to genre; see, e.g., Barron Brainerd, "Pronouns and Genre in Shakespeare's Drama," *Computers and the Humanities* 13.1 (1979): 3–16. *EarlyPrint* adopts the NUPOS v2 part-of-speech tags, which are given in square brackets when counted. For further information, see the MorphAdorner documentation: https://morphadorner.northwestern.edu/.

Table 1. Confusion matrix for a leave-one-out-cross-validation test of 439 comparison corpus segments.

		Predicted				
		Chettle	Greene	Nashe	Recall	Precision
Actual	Chettle (27)	20	2	5	74.07%	31.25%
	Greene (196)	25	160	11	81.63%	88.89%
	Nashe (216)	19	18	179	82.87%	91.80%

Table 2. Delta distances from *Groatsworth* segments for Chettle, Greene, and Nashe.

	Delta distance		
Groatsworth segment	Chettle	Greene	Nashe
Epistle (1)	38.87	38.52	36.18
Remainder (1)	36.59	40.93	37.38
Remainder (2)	40.75	35.63	38.31
Remainder (3)	27.76	27.88	32.76
Remainder (4)	28.82	32.95	38.86
Remainder (5)	36.39	37.15	46.97
Remainder (6)	33.06	30.28	37.03
Remainder (7)	29.29	33.28	37.71
Remainder (8)	32.40	33.39	37.54

Groatsworth epistle, while the remaining segments are shared between Chettle (6 segments) and Greene (2 segments).

To test these findings independently, we selected an entirely different linguistic feature for our second test. In contrast to high-frequency and very common function words, we selected "middling" words—namely, relatively infrequent words present in no fewer than 25 percent and no more than 75 percent of total segments.[81] As a further point of independence, we also analyzed these "middling" words using a different method: support vector machines (SVMs), a standard technique in machine learning and among "the most accurate" methods currently applied to classification problems (including authorship attribution).[82] The mathematics underlying SVMs are

[81] 206 words satisfied this distribution criteria. The data for this test is available from https://github.com/JackWilton1594/SQ-Groatsworth/.

[82] Juola, "Authorship Attribution," 287; see also Thorsten Joachims, "Text Categorization with Support Vector Machines: Learning with Many Relevant Features," *ECML '98: Proceedings of the 10th European Conference on Machine Learning* (Berlin: Springer, 1998), 137–42.

Table 3. Confusion matrix for a five-fold cross-validation of 439 comparison corpus segments.

		Predicted				
		Chettle	Greene	Nashe	Recall	Precision
Actual	Chettle (27)	15	7	5	55.56%	78.95%
	Greene (196)	3	190	3	96.94%	95.48%
	Nashe (216)	1	2	213	98.61%	96.38%

complex, and a fuller treatment is beyond the scope of the present article.[83] In reductively simple terms, however, SVMs work by determining a hyperplane that separates data projected into *n*-dimensional space into predefined classes (e.g., 1,098-word segments into their respective authors). This process requires "training" the SVMs on data of known classes. To validate the method, guard against "overfitting" the model, and test its predictive power, we use five-fold cross-validation: that is, the corpus (excluding the *Groatsworth* segments) is divided into five "folds" or exclusive subsets and the SVMs are "trained" five times, each time withholding a different fold to be tested as if those segments were of unknown authorship. The results are then averaged to give an estimate of the model's general performance. Table 3 gives the resulting confusion matrix. With 418 of the total 439 segments correctly classified, the model has an overall accuracy of 95.22 percent. The SVMs also perform with greater precision and recall when it comes to Greene and Nashe than we saw with Delta; while the model predicts Chettle segments with greater precision, the recall is lower.

After validating the method and estimating the model's precision and recall, we introduced the *Groatsworth* segments to the model for classification. Table 4 lists the classifications predicted by the SVMs. Nashe is predicted as the author of the *Groatsworth* epistle, and the remaining *Groatsworth* segments are assigned to Chettle (3 segments) and Greene (5 segments).

Using different linguistic features and methods for their analyses, both tests independently agree that the *Groatsworth* epistle is more likely to be by Nashe than Greene or Chettle. Though there is variation in the attribution

[83] For a fuller treatment of SVMs, see Nello Cristianini and John Shawe-Taylor, *An Introduction to Support Vector Machines and Other Kernal-Based Learning Methods* (Cambridge: Cambridge UP, 2000). For our tests, we used the popular LIBSVM package to generate SVMs with linear kernels; see Chih-Chung Chang and Chih-Jen Lin, "LIBSVM: A Library for Support Vector Machines," *ACM Transactions on Intelligent Systems and Technology* 2.3 (2011): 27.1–27.

Table 4. Predicted classifications for *Groatsworth* segments using SVMs.

Groatsworth segment	SVMs prediction
Epistle (1)	Nashe
Remainder (1)	Greene
Remainder (2)	Chettle
Remainder (3)	Chettle
Remainder (4)	Greene
Remainder (5)	Greene
Remainder (6)	Chettle
Remainder (7)	Greene
Remainder (8)	Greene

of the remaining *Groatsworth* segments between Greene and Chettle, neither test suggests Nashe's involvement beyond the epistle.

As a third and final independent test, we selected another entirely different linguistic feature: part-of-speech trigrams—that is, sequences of three adjacent grammatical classes, such as adjective–adjective–noun (e.g., "*hot*[j] *costly* [j] *spice*[n1]" in *The Unfortunate Traveller*), verb (infinite)–coordinating conjunction–verb (infinite) (e.g., "*arise*[vvi] *and*[cc] *call*[vvi]" in *Kind-Heart's Dream*), or noun–verb (past tense)–adverb / conjunction / particle / preposition (e.g., "*boy*[n1] *began*[vvd] *to*[acp]" in *Menaphon*). To ensure that trigrams capture meaningful conceptual units in whole or part, any sequences interrupted by periods, cola, semicola, exclamation points, question marks, or em-dashes were excluded.[84] For our test, we employed a method called Zeta to compare the distribution of part-of-speech trigrams in two "training" sets of text segments of known classification—in our case, a set comprising all Nashe 1,098-word segments and another set combining all Chettle and Greene 1,098-word segments—to identify those that are typical in one and correspondingly atypical in the other. In other words, the algorithm generates a list of "markers" (in this case, part-of-speech trigrams) that most distinguish Nashe segments from Chettle–Greene segments and vice versa.[85]

[84] These precautions avoid some of the pitfalls of working with n-grams more generally, where investigators have unwittingly treated sequences "split across different speakers or sentences" as if they were meaningful or conceptually equivalent to phrases; see Duncan Salkeld, "Shakespeare in *Arden*: Pragmatic Markers and Parallels," *Shakespeare Survey* 76 (2023): 163–79, 167.

[85] John Burrows, "All the Way Through: Testing for Authorship in Different Frequency Strata," *Literary and Linguistic Computing* 22.1 (2007): 27–47; see also Hugh Craig and Arthur F. Kinney, "Methods," in *Shakespeare, Computers, and the Mystery of Authorship* (Cambridge: Cambridge UP, 2009), 15–26, and David L. Hoover, "Zeta Revisited," *Digital Scholarship in the Humanities* 37.4 (2022): 1002–1021.

This is accomplished by calculating index-scores for each part-of-speech trigram expressed as the proportion of the segments in one set containing the part-of-speech trigram added to the proportion of segments in the other set where it is absent. Thus, a part-of-speech trigram in all Nashe segments and correspondingly absent from all Chettle and Greene segments will have a Nashe index-score of 2; a part-of-speech trigram absent from all segments in both sets will score 1, and so on. All part-of-speech trigrams in the Nashe set are then ranked by their index-scores and a given number are selected as markers; the process is then repeated for the Chettle–Greene set. Zeta scores are calculated for each segment as a proportion of markers from each set present out of the total number of part-of-speech trigram types in that segment. Each segment, including any withheld for testing or validation, is scored in this manner and is then projected as a data-point in two-dimensional space, treating the Zeta scores as *x*- and *y*-coordinates respectively.

After excluding a random 10 percent of segments from the training sets for validation purposes, we ran the algorithm to determine 100 part-of-speech trigram markers for Nashe and Chettle–Greene respectively. Zeta scores were calculated for all segments using these markers, including the previously withheld test segments. Treating the Zeta scores as *x*- and *y*-coordinates respectively, the segments were projected into a two-dimensional scatterplot (see figure 1). We then added a perpendicular bisector—a line between the two "centroids" of the training sets—to mark a decision boundary between Nashe and Chettle–Greene classifications. Segments that fall on the Nashe side of the line are classified as Nashe, and segments on the Chettle–Greene side as Chettle–Greene.

We then generated a confusion matrix to tally the combined Zeta classifications and to estimate the model's performance when new data is introduced (see table 5). Out of the total 439 segments, 388 are correctly classified, giving the model an overall accuracy of 88.38 percent. Both classes score highly on precision and recall, though the model performs with greater precision when predicting Chettle–Greene segments (91.35 percent versus 85.71 percent) and with greater recall when predicting Nashe segments (91.67 percent versus 85.20 percent).

To classify the *Groatsworth* segments, we introduced them to the model and calculated Zeta scores using the Nashe and Chettle–Greene markers. The *Groatsworth* segments were then projected into the same two-dimensional space as before, with the previous projections faded to increase legibility (see figure 2).[86] The *Groatsworth* epistle is plotted with the Nashe

[86] The data for this test is available from https://github.com/JackWilton1594/SQ-Groatsworth/.

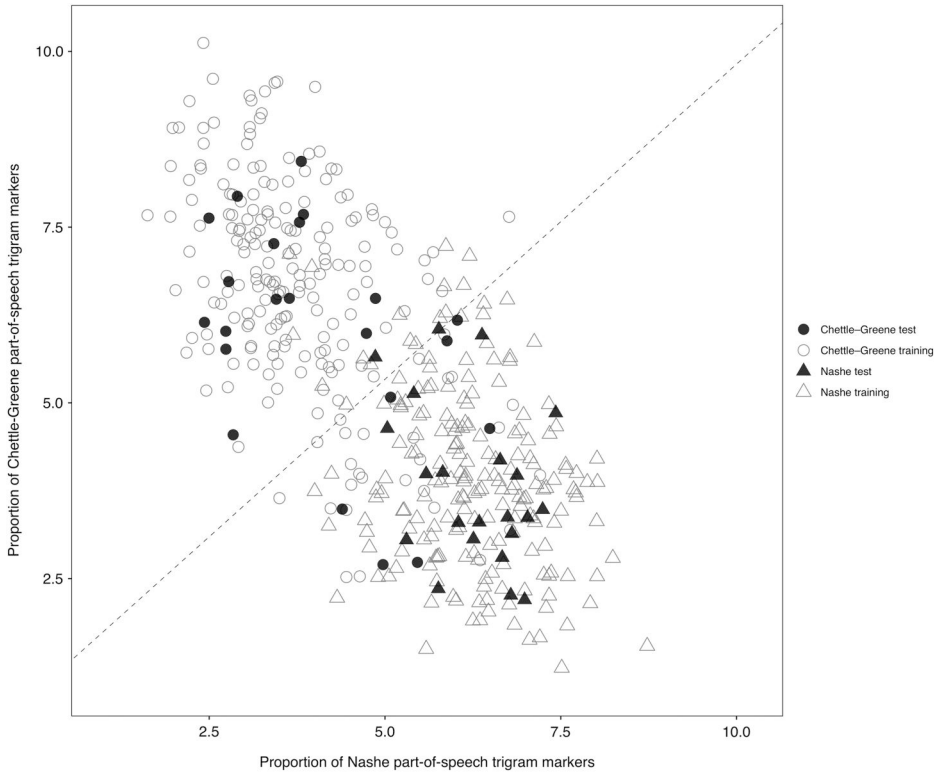


Figure 1. Zeta scatterplot of Nashe and Chettle–Greene segments using 100 part-of-speech trigram markers.

Table 5. Confusion matrix for Zeta classification of 439 comparison corpus segments.

		Predicted			
		Chettle–Greene	Nashe	Recall	Precision
Actual	**Chettle–Greene (223)**	190	33	85.20%	91.35%
	Nashe (216)	18	198	91.67%	85.71%

cluster and is classified as Nashe, as is a single remainder (segment 1) plotted just at the border of the decision boundary. Segments 2–8 of the *Groatsworth* remainder are plotted with the Chettle–Greene cluster and classified accordingly.

While the Zeta test cannot help us to differentiate *Groatsworth* remainder segments 2–8 between Chettle and Greene, it offers additional independent confirmation that the epistle is more likely to be by Nashe than any other candidate considered. The possibility remains, of course, that the "true"

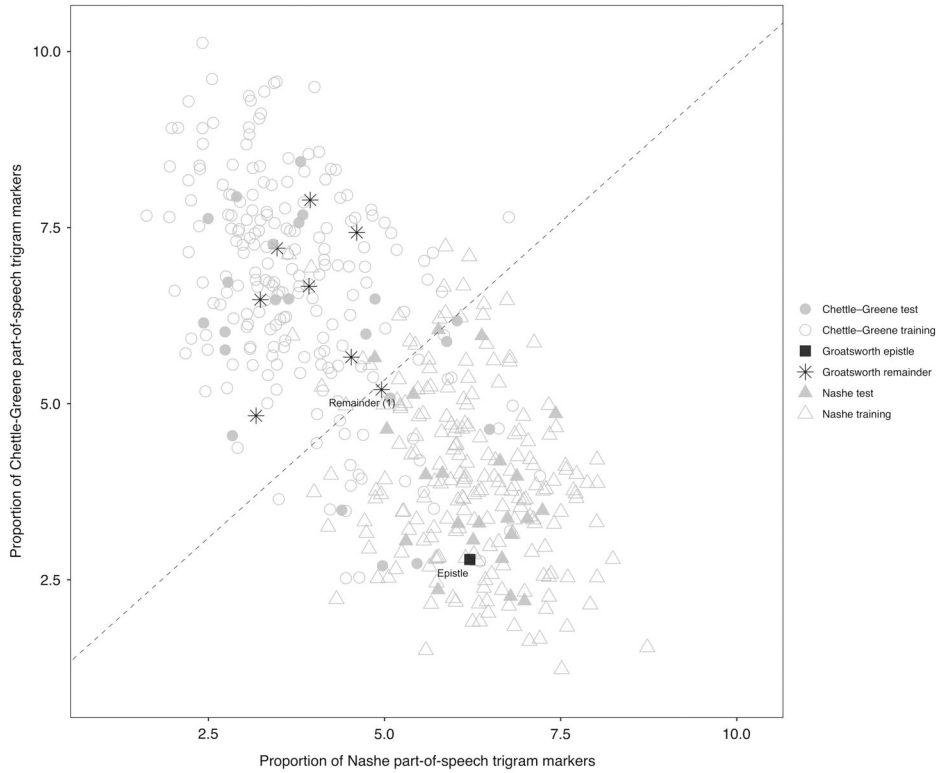


Figure 2. Zeta scatterplot of *Groatsworth*, Nashe, and Chettle–Greene segments using 100 part-of-speech trigram markers.

author of the segments may not be represented in our corpus—and that is true of all but the most closed-set authorship attribution problems—which is why we must couch our stylometric findings in terms of probabilities, not certainties. Independent confirmation from three different methods analyzing three different linguistic features is about as robust a case as can be made for Nashe's likely authorship of the *Groatsworth* epistle.

Appendix 2: Texts in the Corpus

Author	Title	Pub Date	Source	Words
Chettle, Henry	*Kind-Heart's Dream*	1593?	STC 5123	12,683
Chettle, Henry	*Piers Plainness*	1595	STC 5124	18,315
Greene, Robert	*1 Cony-catching*	1592	STC 12280	11,183
Greene, Robert	*2 Cony-catching*	1591	STC 12281	13,270
Greene, Robert	*3 Cony-catching*	1592	STC 12283.5	11,571
Greene, Robert	*Arbasto*	1589	STC 12219	17,847
Greene, Robert	*Black Book's Messenger*	1592	STC 12223	6,768
Greene, Robert	*Ciceronis Amor*	1589	STC 12224	25,899
Greene, Robert	*Farewell to Folly*	1591	STC 12241	26,751
Greene, Robert	*Menaphon* (excl. preface)	1589	STC 12272	24,392
Greene, Robert	*Mourning Garment*	1590	STC 12251	19,613
Greene, Robert	*Never Too Late*	1590	STC 12253	42,028
Greene, Robert	*A Quip for an Upstart Courtier*	1592	STC 12301A.3	20,247
Nashe, Thomas	*The Anatomy of Absurdity*	1589	STC 18364	14,202
Nashe, Thomas	*Christ's Tears*	1613	STC 18368	55,647
Nashe, Thomas	*Have With You*	1596	STC 18369	39,379
Nashe, Thomas	*Lenten Stuff*	1599	STC 18370	25,600
Nashe, Thomas	*Pierce Penniless*	1592	STC 18373	29,260
Nashe, Thomas	Preface to *Menaphon*	1589	STC 12272	4,319
Nashe, Thomas	*Strange News*	1592	STC 18377A	21,942
Nashe, Thomas	*The Terrors of the Night*	1594	STC 18379	13,745
Nashe, Thomas	*The Unfortunate Traveller*	1594	STC 18380	40,176
Uncertain	*Groatsworth* epistle	1592	STC 12245	1,098
Uncertain	*Groatsworth* remainder	1592	STC 12245	9,518