

Social Network Theory and the Claim that Shakespeare of Stratford Was the Famous Dramatist

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Orthodox biographies of the man baptized ‘Gulielmus Shakspere’ in Stratford-on-Avon on 26 April, 1564, have generally downplayed and sometimes even ignored a long-known fact which came at the end of his life. Downplaying this fact is understandable since it undermines the first premise on which Stratfordianism is based: Gulielmus Shakspere grew up to become the master dramatist-poet William Shakespeare. The troublesome fact? *When Shakspere died in Stratford in 1616, none of his London dramatist or theatrical peers wrote a tribute for him, nor did any of them do so during the ensuing seven years*¹.

Undermining this Stratfordian first premise is this anomaly: if Shakespeare’s dramatist peers commonly wrote tributes to their former colleagues on their death, and if Shakspere became Shakespeare, then his peers should have written tributes for Shakspere — especially since he was so prominent. No such tributes exist. What makes their omission significant is that three months after Shakspere’s death, another London poet/dramatist — Francis Beaumont — died. Far from ignoring him, other dramatists celebrated Beaumont with numerous tributes (some have survived) and they were active in his interment in the Poets’ Corner of Westminster Abbey. The Stratfordian’s problem is straightforward: if Shakspere was Shakespeare, why were there no tributes? The absence of tributes implies that they were two persons, not one. In this report, network theory and analysis is used to predict the likelihood that Shakespeare’s dramatist peers would: (a) know Shakespeare’s identity; and (b) write tributes to him on learning of the Stratford man’s death.

Predicting how London’s dramatists would respond to Shakspere’s death. Are there theoretical grounds for predicting how Shakespeare’s peers would have reacted on learning that William Shakspere of Stratford had died in 1616? Modern network theory provides some basis

¹ Stratfordians generally substitute ‘Shakespeare’ wherever ‘Shakspere,’ ‘Shaxpere,’ ‘Shakspere,’ ‘Shakspeare’ or another variant appears on a document. In this paper the versions as they appear on the documents will be used.

for making such predictions. A substantial research literature on social networks has developed since the 1930's — beginning with Moreno & Jennings (1938), Bavelas (1951), and Newcomb (1961). Modern mathematical forms of network analysis have become pervasive throughout the natural and social sciences as well as in engineering. In their book, Wasserman and Faust (1994) described some generalizations about the differential resources available to the *most central* vs. *peripheral* members of social networks. Central members, for example, are more likely to be ritually celebrated than peripheral members. By implication, the expense of honoring prominent and respected members on their retirement is expected to be greater than for lesser members, and the obligation to attend a funeral is stronger for a former prominent member than for a peripheral one. For central, prominent figures in London's network of dramatists, social network theory predicts that his surviving peers would have felt a strong obligation to write tributes — *if he was William Shakespeare*. If he was not the dramatist, this theory predicts there would have been no sense of obligation — rather, to write a tribute for Shakespeare would have been considered absurd.

Empirically, the network prediction is borne out: Marlowe, Jonson and even Beaumont were widely celebrated by tributes from their peers. The 'silence' of those peers on Shakespeare's death puts the evidence at odds with the Stratfordian's first premise. The missing tributes may yet turn up, but until then, the implication is: (a) there must have been a good reason why the surviving eleven of his peers ignored the most prominent member of their dramatist community on his death; or (b) the man who died in Stratford in 1616 was not the dramatist Shakespeare. Explanations for his peers' 'silence' are taken up in the Discussion.

Two conditions shaping relationships within London's dramatist community. The social structure of Elizabethan and Jacobian dramatists was shaped by a variety of conditions including two considered here: (a) the new large theaters produced a heavy demand for new or revised play scripts; and (b) relationships between those twenty major playwrights were being shaped by both internal and external forces, including their alignments with one another, the theater companies, producers and patrons.

The demand for play scripts. The large new public theaters (e.g., Theatre, Curtain, Rose and Globe) attracted large audiences by their relatively low prices. The audience for a play was soon exhausted, which necessitated putting on several different plays a week. The demand for scripts compelled producers to look for and acquire old and new plays, to commission plays or use a play-writing corps to work on plays. The demand for scripts even attracted recent university graduates. New structural forms developed among these dramatists, including a writing corps of several dramatists working on different scenes or characters in the same play —

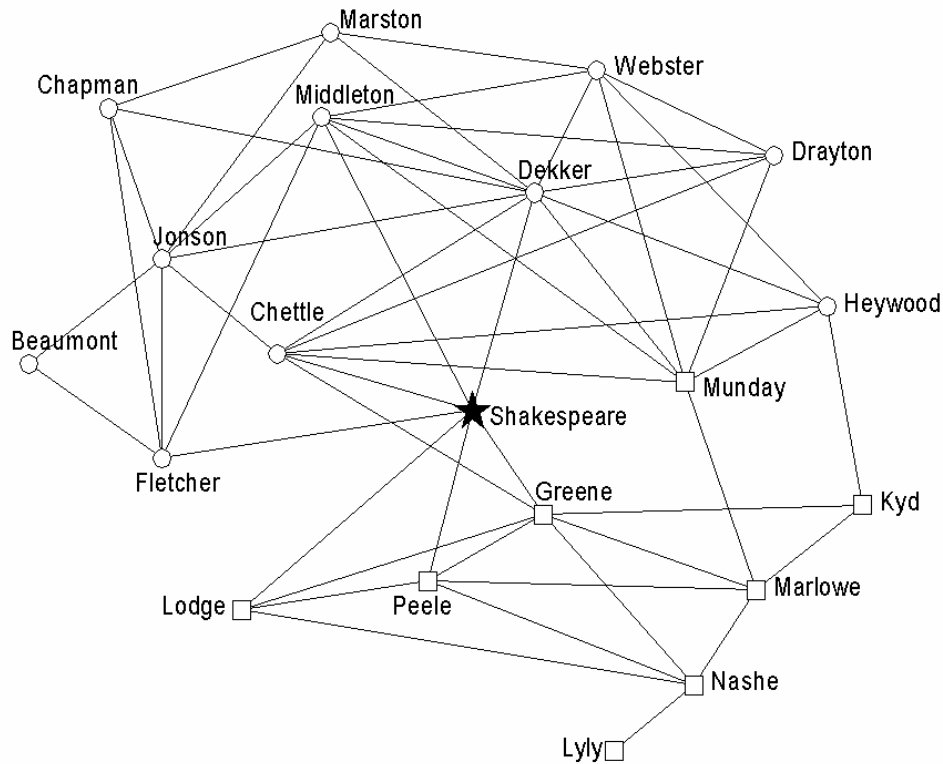
much as contemporary teams of writers do for movies and television. The dynamic character of that structure makes it difficult to assign credit for authorship, since credit became entangled with matters of seniority or authority over the production of a script or a play's revision. Co-authoring took several forms, including work on another's unfinished work (e.g., Chapman on Marlowe's *Hero and Leander* — not a play). Not only did dramatists tinker with and revise their own scripts, so did the players and publishers. Playwrights would be curious as to what their friends and competitors were writing, what kinds of works were being commissioned, which plays were chosen, and audience reactions to plays, themes, plots and characters (e.g. a rise in the popularity of comedies; a decline in interest in revenge or history plays).

Shakespeare and nineteen of his peers considered as a social network. To estimate Shakespeare's place within London's community of playwrights, a matrix was developed to estimate how twenty Elizabethan and Jacobean playwrights were linked to one another during the period of Shakespeare's prominence. Evidence for those links comes mainly from research by Elizabethan scholars on co-authorship and from evidence of literary and social relationships. These reputed relationships are subjected to quantitative network analysis, and the mathematical centrality of each dramatist in that network is estimated (cf. the accompanying matrix and graph).

Matrix: Literary and Social Relationships Between English Dramatists: ~1590 – 1610

	Beaumont	Chapman	Chettle	Dekker	Drayton	Fletcher	Greene	Heywood	Jonson	Kyd	Lodge	Lyly	Marlowe	Marston	Middleton	Munday	Nashe	Peele	Webster	Shakespeare	
Beaumont						X			X												
Chapman				X		X			X				X	X							
Chettle				X	X		X	X	X							X					X
Dekker		X	X		X			X	X					X	X	X			X	X	
Drayton			X	X											X	X			X		
Fletcher	X	X							X						X						X
Greene			X							X	X		X				X	X			X
Heywood			X	X						X						X			X	X	
Jonson	X	X	X	X		X								X	X						
Kyd							X	X					X								
Lodge							X										X	X			X
Lyly																	X				
Marlowe		X								X							X	X			
Marston		X		X					X												
Middleton				X	X	X			X							X				X	X
Munday			X	X	X			X							X				X		X
Nashe							X					X	X								
Peele							X				X		X				X				X
Webster				X	X			X						X	X						
Shakespeare			X	X		X	X	X			X				X	X		X			

Graph 1: Shakespeare Network



The matrix and graph must be *estimates* because they are based on evidence which has survived four centuries of fires, negligence in the care of documents, and a lack of appreciation for documents' significance. Alone, those conditions produced significant losses. For example, while there is surviving documentary evidence for the educational backgrounds for nearly all the others, Shakespeare's education cannot be documented – there are no records of the King's New School before the year 1700. Furthermore, nineteenth century discoveries of forgeries in Shakespeare-related documents and evidence of deliberate destruction of important records have introduced additional biases and uncertainties into his historical record. Finally, beyond the distortions attributable to deliberate and inadvertent loss are the numerous and unresolved disputes among Elizabethan scholars over some elementary facts about both William Shakespeare and William Shakspeare. Continuing research may turn up evidence of relationships omitted

from this matrix, and some scholarly claims of a relationship may have to be deleted when confronted by stronger evidence. So long as those modifications are minor, additions to or deletions from this matrix are not likely to change its broad representation showing that *Shakespeare occupied a place close to the center of a dense network of peer relationships.*

Which Elizabethan dramatists are included in this analysis? To minimize bias in selection, all the major and several lesser dramatists from that era are included — nineteen of Shakespeare's peers in all. Fifteen are known to have written or to have received tributes (Price, 2001). Several lesser dramatists are included because they had written a popular play, despite contemporary scholarly judgment that they were not important writers. Drayton is recognized mainly as a poet, but is included because he was a paid member of Henslowe's play-writing corps. While none of his plays have survived, Nashe is included because he is known to have been linked to several early Elizabethan dramatists and poets (not always positively). Daniel is excluded because all but one of his plays fell outside the specified period. Similarly, Massinger, Shirley and Ford were omitted because they came to this theatrical scene later. Spenser, Harvey and Watson were excluded because they did not write plays. Antony Munday, a lesser playwright, is included because he is a principal in a disputed Shakespeare play.

What constitutes a literary or social relationship? The primary sources for these links are reports of co-authoring based principally on the introductions to Shakespeare's and his peers' plays in the LION database; entries in the Dictionary of Literary Biography; scholarly introductions to Shakespeare's plays (e.g., Riverside, 2nd edition, 1997); membership in a play-writing corps (e.g., as reported in Henslowe's 'Diary'); recent text analyses (e.g. Vickers, 2002); sharing a writing room supplied by a common patron; being jailed together for writing a controversial play, on suspicion of advocating atheism, or some officially unacceptable religious or political view; and on credible reports of links in biographies, surviving private letters and manuscripts. Relationships could be brief or lengthy; positive, neutral/ambivalent or negative (e.g., Middleton vs Munday), and could change over time (e.g., Marlowe and Kyd). Eleven of these nineteen dramatist peers were alive on the day Shakespeare died — Beaumont, Chapman, Drayton, Fletcher, Heywood, Jonson, Lodge, Marston, Middleton, Munday, and Webster. Of those, Munday and Lodge came from the first half of the Shakespeare era, the others from the latter half. Aside from much missing information, the major obstacle in constructing a valid network is disagreement among Elizabethan scholars over important facts about these linkages. For whose claims for a relationship are included in this matrix, see Appendix A.

Calculating each dramatist's 'centrality' within this network. The graph estimates the

structure of London's dramatist network, each playwright placed in accordance with his mathematical *centrality* within that community; i.e., the graph establishes the direct and intermediary links through which news might pass about Shakspeare's death. 'Centrality' describes each dramatist relative to his peers. The equation is: $C(i) = n / (\sum(d(i,j), j \neq i))$, where n is the graph size, d is the graph-distance between two persons, and the summation of distances is over all pairs of dramatists (Wasserman & Faust, 1994, cf. esp. Chapters 5, 12). This measure of a person's centrality, the C statistic, varies between 0 and 1. A person's C measure represents not only his direct but all his indirect connections to the others. A C value of .50 represent someone twice as central in the network as one with a score of .25. Table 1 supplies three sets of C estimates for these twenty dramatists: one for the first half of the Shakespeare era; one for the last half; and one for the data treated as a single network.

Table 1: Closeness Centrality

<i>Dramatist</i>	<i>'Generation'</i>		
	<i>First</i>	<i>Second</i>	<i>Combined</i>
Shakespeare	0.643	0.667	0.633
Beaumont		0.462	0.365
Chapman		0.501	0.381
Chettle		0.667	0.594
Dekker		0.800	0.594
Drayton		0.571	0.463
Fletcher		0.632	0.501
Greene	0.751		0.543
Heywood	0.501	0.571	0.514
Jonson		0.706	0.501
Kyd	0.563		0.422
Lodge	0.643		0.475
Lyly	0.409		0.297
Marlowe	0.692		0.475
Marston		0.599	0.432
Middleton		0.706	0.543
Munday	0.563	0.632	0.576
Nashe	0.643		0.413
Peele	0.692		0.487
Webster		0.632	0.487

Two overlapping ‘generations’ of dramatists are evident. The first (names represented by squares on the Graph) consists of the six Oxford and Cambridge graduates: the ‘University Wits’ — Marlowe, Greene, Nashe, Peele, Lodge and Lyly, plus Shakespeare, Kyd, and Munday. Four of the ‘Wits’ and Kyd were dead by 1596, and except for Munday and Lodge, the others by 1606. These early deaths largely account for the scarcity of cross-generation ties. The centralmost of the first generation were Greene ($C = .75$) and Peele ($C = .69$) — both dead by 1596. The second ‘generation’ (represented by circles on the Graph) had as its centralmost

figures Dekker ($C = .80$), Jonson ($C = .71$) and Middleton ($C = .71$). These exceptionally high C values reflect the *dense network of social relationships among those dramatists*. Shakespeare was the most well-connected in the combined generations ($C = .67$), but not the centralmost dramatist in either period. John Lyly ($C = .30$) was the least integrated member, in part because he had retired from writing plays early. Heywood and Chapman, while first generation in age, are included with the second generation because they began writing in the latter period.

High as these centrality values are, they *underestimate* the true level of relationships between these dramatists since much of the evidence, especially as it bears on their informal relationships, is missing. The high density of these relationships in both ‘generations’ of dramatists ensures that each knew the other, not just by reputation, but directly — personally. That means that *William Shakespeare’s identity was known by all of them*. If Shakspere had become William Shakespeare, all of his dramatist peers would know who died in Stratford.

This network and the Jonson/Shakespeare link. There is a significant omission in the graph in what is otherwise a densely-interconnected network. There is no link connecting the two most prominent members of London’s dramatist community — Jonson and Shakespeare. Jonson worked with many of his colleagues, but there is no evidence that he and Shakespeare had ever worked together. Nor had Jonson mentioned Shakespeare by name in his extensive and surviving records of works or private commentaries between 1598 and 1616.

After Marlowe’s reputed death in 1593, Shakespeare became the most prominent dramatist in London and remained so until the late 1590s when challenged by Jonson after his successful *Every Man In His Humour*, produced by Burbage brothers’ company in 1598. Jonson had already begun working for Henslowe (receiving a £4 advance). Ever feisty, Jonson made public appraisals of his peers (e.g. he satirized Dekker and Marston’s works, leading to an exchange, in kind), but as far as is known, Jonson never took on Shakespeare — in print. In both the earlier and later years, they remained distant and cool — prominent colleagues and rivals, but without documented evidence of animus. Their relationship, in turn, probably affected their alignments with other dramatists and theirs with one another — forming small sub-groups.

The relationships between those twenty dramatists were also being affected by their alignments with the rival theater companies and by their patrons. If a patron was a noble, his standing at Court (favored or not) would affect a dramatist’s alignment with others. An important example is Jonson, favored by his noble friends, including the third Earl of Pembroke and his brother, wife, and mother. The Pembrokes had strong negative feelings toward the Earl of

Oxford. In deference to his noble friends, Jonson would have avoided working with any London dramatist peer closely aligned with the Earl of Oxford, such as John Lyly and Antony Munday. In short, Jonson's external relationships affected his links within London's dramatist community, which, in turned, affected others with whom he was aligned.

While Shakespeare's extended association with the Lord Chamberlain/King's Men companies is uncontested, the identity of his patron(s) is not. Unsupported speculation has Shakespeare closely linked to the Earl of Southampton, but Southampton was out of favor with the Queen and Court and later barely survived with his life after his conviction for treason.

Those dramatists' alignments with theater companies, impresarios, and their patrons all produced fault lines within that playwright community. The presence and absence of linkages between the members suggests some probable alignments: Beaumont, Chapman, Drayton, Marston, and Middleton appear to have been aligned with Jonson; Lodge, Munday and Heywood with Shakespeare, leaving Chettle, Fletcher, and Dekker in the delicate position of maintaining relations with both camps. Lyly simply withdrew from the community.

Linking this network to Jonson's eulogy for Shakespeare in 1623. The relationships in the matrix and graph supply essential context for understanding Jonson's role in the 1623 *First Folio*, for which he wrote a lavish tribute to Shakespeare. So far as is known, Jonson never collaborated with Shakespeare, nor had he written a tribute for Shakspere on his death. In his private writings, he ignored Shakespeare. Given their long-term relationship, there are some puzzling aspects to Jonson's being chosen to write the principal eulogy for his long-term rival.

Can Jonson's eulogy be taken at face-value? Price (2001) has developed this question, noting that there has always been and continues to be debate over his eulogy. Jonsonian scholars generally agree that it is an ambiguous document. John Dryden (1631-1700) asserted that Jonson's eulogy was 'an insolent, sparing and invidious panegyric.' Dryden's interpretation coincides with what is known of the Jonson-Shakespeare relationship – if not hostile, it was cool and distant.

Jonson was the most prominent dramatist of his time – he became Court Poet around 1605 and England's Poet Laureate in 1616. What could have motivated him to produce the eulogy for his rival Shakespeare in the *Folio*? There are many speculations. Jonson may have been hired to write the eulogy as a 'puff' – a public endorsement on a script designed by the promoters. A second explanation for Jonson's role in the *Folio* is that he did it as a personal

favor for his long-time friends and patrons – the Earl of Pembroke and his brother to whom the *Folio* was dedicated. That too does not assure that his eulogy can be taken at face value. A third explanation is that despite their cool relationship, Jonson admired Shakespeare and welcomed the opportunity to write an effusive tribute, although his appraisals of Shakespeare in his private papers were reserved, critical and ambivalent. Jonson's eulogy is an ambiguous document, particularly when read against the background of his private commentaries, others' reports of his appraisals of Shakespeare, his extended cool and distant relationship with Shakespeare, and the practice of commissioning puffs.

If Shakspeare became Shakespeare, there has to have been a good reason for his peers' 'silence,' or they were two men: one from Stratford, born and died as Shakspeare, and a second, the historical poet/playwright Shakespeare, whose identity has been in dispute for 400 years.

Discussion

If the 'silence' of his peers (especially his closest co-author, Fletcher) is not to undermine the main Stratfordian premise, there must be a plausible explanation. Several are proposed. One is that news of Shakspeare's death in Stratford was long-delayed in getting back to London — it came too late for tributes. That is implausible given the level of Shakspeare's engagement with London. Though it took days, there was regular traffic between Stratford and London. In London, there were creditors and agents involved in Shakspeare's documented real estate and theatrical holdings and his money lending. There were debtors to whom Shakspeare had loaned money and he held their bond. A solicitor would have been required in the course of some of his business transactions. The identity of one partner is known from his signature as a co-buyer on the legal papers for the purchase of a gate-house near the Blackfriars theater. Shakspeare's London agent(s) would need to learn of his death promptly in order to negotiate the settlement on his extensive business affairs. Finally, there were his fellow shareholders in the King's Men company of players, and in the Globe and Blackfriars theaters. If not already sold, his shares and the income from them would have to be negotiated by someone acting in the interests of his family and estate.

News of Shakspeare's death might also have gotten back to London through members of a traveling company of players. If they believed Stratford's William Shakspeare was the famous playwright, it would have been natural for them to look for him in the audience when they played there or for them to inquire after the famous dramatist's health. If no actor had the opportunity to do so, Michael Drayton, a fellow Warwickshire native, and a member of that

London playwright community should have (if he believed the Stratford man was the dramatist). Drayton often summered with the Rainsford family, two miles from Stratford (Jimenez, 2002). Though there is no direct link between Drayton and Shakespeare in the graph, they could easily have visited one another and shared the latest literary and theatrical news. When Drayton became ill, he was ‘treated’ by Shakspeare’s own next-door neighbor, his physician son-in-law, John Hall. Later, Hall made notations in his notebook about Drayton, noting his stature as a poet and dramatist. His published notebook contains no mention of a remarkable coincidence: both his father-in-law and Michael Drayton shared an uncommon London occupation.

Jimenez has found another Shakspeare link to London. The Stratford Corporation’s solicitor and Town Clerk of Stratford for ten years was Londoner Thomas Greene. For many months, he, his wife and children actually lived in Shakspeare’s New Place home. Greene’s diary mentions Shakspeare once — in connection with the Welcombe land enclosure matter. He referred to Shakspeare as ‘my cosen Shakspeare.’ Greene was a friend of John Marston, still another of Shakespeare’s London dramatist peers. They had gone school together in the mid-1590s, making it curious that Greene never made mention of his host’s place among London’s playwrights. Finally, there were people in London who had once known Shakspeare as a child and adolescent in Stratford. One was Richard Field, who became an apprentice to the London publisher Harrison. Eventually he took over the business and published both Shakespeare’s *Venus and Adonis* and *Rape of Lucrece*. Another former Stratfordian emigrant was Shakspeare’s own brother, Gilbert, who became a London haberdasher. This explanation for the silence of his peers — that news of Shakspeare’s death was long delayed in getting back to London’s dramatist community — is implausible for these many reasons. Once his death became known to any one of his kin, literary, theatrical, business or legal associates, the high density of their network provided multiple channels through which that news could pass to the others, enabling them to organize some form of tribute. Their seven year silence after learning of his death violated their own established practice, especially on the death of so prominent a member.

A second proposed explanation for this silence is that the Stratford Shakspeare was not eminent enough to warrant tributes, i.e., he was a marginal figure in their dramatist community. That might have been true in the early 1590s but not after the two major poems were published or his works produced in his middle or latter years. He maintained a central place among his peers through twenty years. Furthermore, his plays were often performed at Court, at Greenwich, at both the Globe and Rose theaters in London, at regional theaters, at both universities, at Grays and Lincoln Inns, at the great noble houses, and possibly in northern Europe. Meres’ ranking of

Shakespeare's works in *Palladis Tamia* (1598), and a quarter-century later, Jonson's lavish appraisal in the *First Folio* also make this explanation implausible.

In a third explanation for the silence, Kathman (2002) proposes that his peers *did write tributes to Shakspere* (Shakespeare) after his death but those were circulated privately and all have been lost. It is unlikely that this hypothesis can ever be disproved (e.g. by some 21st century manuscript discovery). What makes the hypothesis implausible is that tributes for several of his dramatist peers, especially for the more prominent members of that community, have survived. The tributes for Jonson were so numerous that they were organized into a book. Why should tributes for the equally-prominent Shakspere not have survived? Kathman's explanation (they did write tributes for Shakspere but all were lost) — remains possible, but is not plausible.

What would be a plausible explanation for his peers' silence? An obvious explanation for his peers' silence on Shakspere's death is the one based on network theory — if his dramatist peers did not write tributes for him, then they must have known that he was not a dramatist — *William Shakspere was not William Shakespeare*. They knew him as a part-time actor, a prosperous businessman, a major shareholder in a theatrical company and theaters. Not being a dramatist, it would have been absurd for them to write tributes for him. This authorship dispute could be resolved for all time if so much as a single tribute by one of his dramatist peers had survived which honored Shakspere *as a dramatist*. It would be the first and *only contemporaneous document* showing that one of his peers believed Shakspere was Shakespeare. This anomaly, the 'silence of his peers,' is the single most serious threat to Stratfordianism and to its first premise. There would be no Stratfordian anomaly, no threat to the orthodox position — if even one such document were found. No such document exists.

This network analysis has established Shakespeare's central place in that small 16th and 17th century community of London dramatists. For nearly twenty years, he was near or at the center of a dense network of interpersonal relations, ensuring that all nineteen of his peers would have known Shakespeare's identity. According to network theory, if it was Shakespeare who died in Stratford in 1616, his high level of centrality would have assured many tributes from his peers. The absence of tributes undermines what is already a modest and heavily-disputed evidentiary case for Shakspere being Shakespeare. The absence of their tributes encourages non-Stratfordians to seek Shakespeare's identity elsewhere. Unless a new, well-documented and far more plausible explanation can be developed for this silence of his peers, the odds that the man from Stratford grew up to become the master poet-dramatist William Shakespeare have fallen to the level of the improbable.

Appendix A

Beyond who was included in the matrix of Shakespeare literary and other social relationships, and what constituted a ‘link or relationship’ is this question: which contested scholarly claim for a relationship should appear in this matrix and graph? Strikingly different matrices result from those contradictory claims. An *inclusive* principle would accept every Elizabethan scholar’s claim to having found a link between any two of these 20 playwrights. Such claims could be based on many grounds: stylistic and metric considerations, allusions or other forms of internal or external evidence. In Shakespeare’s case, Chapman has been reported to have written part of *Cymbeline*; Middleton, one third of *Timon of Athens*; Kyd to have co-authored part of *Titus Andronicus* and an early version of *Hamlet*; Peele is reported to have written part of *Titus*; while still others have proposed that Nashe wrote parts of *Henry VI, Part I*; Fletcher is reported to have collaborated with Shakespeare on *Two Noble Kinsmen*, *Pericles*, (the latter with Wilkins) and *Henry VIII*; and finally, Greene, Peele, Marlowe, Nashe, Chapman, Drayton, Kyd and Lodge have all been reported to have had a hand in the *Henry VI* plays (Baker, Riverside Shakespeare, 1997, pp. 623). A matrix/graph based on this *inclusive* principle would be challenged on the grounds that some claims have not held up on further or close examination. Were such a matrix produced (not shown) Shakespeare would be directly linked with at least 14 of his 19 peers – through claims of co-authorship alone. That would put Shakespeare at the very center of a dense network of social/literary relationships, but would make the ‘silence’ of his peers on his death even more anomalous.

An alternative matrix could be constructed by following an *exclusive* principle – one which omits any claim of a relationship with Shakespeare (or any other writer) if Elizabethan scholars disagree among themselves. The *First Folio* is a good example of a document most take as supporting such a matrix. By this principle, the Fletcher-Shakespeare link for *Pericles*, *Two Noble Kinsmen* and *Henry VIII* would have to be omitted as there is scholarly dispute over each. More controversial would be the links connecting Chettle, Dekker, Heywood and Munday to Shakespeare for *Sir Thomas More*. (One incongruity about that set of linkages is that all those four dramatists worked for Henslowe, owner-producer of a competing theater company; never, so far as is known, did they work for the Lord Chamberlain’s or King’s Men companies). Since the joint authoring of *Sir Thomas More* remains controversial, the exclusive principle would remove all such links from the matrix. The most controversial relationships may be those

associated with *Groats-worth of Wyt*. Some scholars contend that the references to an ‘Upstart Crow’ and other objectionable descriptions refer to Shakspere, others believe they refer to Shakespeare, still others deny that either Shakspere or Shakespeare was Green/Chettle’s target. Given the controversy on those points, those links between dramatists too would be omitted. A matrix based on the *exclusive* principle would show Shakespeare as having *no* links to his peers – he solo-authored every play. Given Shakespeare’s stature among playwrights, at court, and with the public, the absence of any links whatsoever in what is otherwise a dense network of dramatists, is implausible, though not impossible. Most contemporary Shakespearean scholars would consider such a matrix to be an invalid depiction of London’s playwright community at the beginning of the 17th century.

As in the sciences, there are no courts for adjudicating scholarly disputes; consequently the matrix/graph depicted here is a compromise – lying somewhere between one based on the *exclusive* and the *inclusive* principles. Three controversial works were retained in this analysis: (1) *Two Noble Kinsmen* – most scholars believe it to be a Shakespeare/Fletcher collaboration; (2) the *Groats-worth* pamphlet – linking Greene to three of his playwright friends; and (3) *Sir Thomas More*, linking four Elizabethan playwrights – Chettle, Dekker, Heywood and Munday with William Shakespeare.

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