The Strange Case of "Mr. W. H.":

How we know the dedication to Shakespeare's Sonnets is a cryptogram, and what it reveals

by John M. Shahan

n May 20, 1609, publisher Thomas Thorpe registered for publication a book titled *Shake-speares Sonnets*. The quarto printed with that title contains 154 sonnets, followed by the long poem "A Lover's Complaint." Despite the quality of the poems and the fame of Shakespeare, there was no second printing, and no commentary on it has been found in any document from the period, suggesting that it may have been suppressed. Thirteen copies of the volume survive.

The Sonnets are the only works in which the author speaks in the first person, seemingly revealing his innermost thoughts and feelings about his closest relationships. Most of Sonnets 1–126 are addressed to an attractive young man, commonly referred to as the "Fair Youth"; the rest deal mostly with his tortured relations with a "Dark Lady." Neither is named, and their identities have been the subject of endless speculation. The leading Fair Youth candidate is Henry Wriothesley, 3rd Earl of Southampton, because Shakespeare's first two published poems, *Venus and Adonis* (1593) and *Lucrece* (1594), were both dedicated to him around the time the early sonnets are thought to have been written, and because what is known about Wriothesley seems to match the Fair Youth.

A possible clue to the Fair Youth's identity is in the dedication to the Sonnets, after the title page, which refers to "the onlie begetter" of the Sonnets as "Mr. W. H." Could this be a reference to Wriothesley, the initials reversed to avoid being transparent? Other candidates have been proposed,¹ but in this paper we focus on the case for Wriothesley. What about the rest of the dedication, which is strikingly odd in both appearance and wording, with no other dedication remotely like it in the Elizabethan-Jacobean period?

In 1997, Dr John M. Rollett, a British physicist who became a notable Shakespeare researcher, published an article entitled "The Dedication to Shakespeare's Sonnets" in *The Elizabethan Review* (1997, 93–122). Rollett proposed that the strange dedication is in fact a double cryptogram, including (1) a transposi-



Figure 1: The dedication page of Shakespeares Sonnets, published in 1609.

tion cipher² revealing the identity of "Mr. W. H.," and (2) an innocent letter cipher³ revealing the identity of the author of the Sonnets—that is, someone other than the traditional author, William Shakspere,⁴ as his family name was usually spelled in his hometown of Stratford-upon-Avon (Pointon 2011, 11–24).

Knowing that supporters of Sir Francis Bacon as the true author of the plays and poems ascribed to William Shakespeare had long sought to find ciphers in the works without success, I was skeptical of Rollett's claim. Upon reading his article, however, despite each of the proposed solutions having an apparent imperfection, there was something clearly non-random with each that suggested intentionality. Rollett's article listed several oddities about the dedication that could have been due to it being a cryptogram, and it cited

John M. Shahan has an M.S. in Public Health from UCLA School of Public Health and is ABD in Public Health. He worked as an analyst in the California Governor's Office on health issues, and as a senior analyst for Kaiser Permanente of Southern California. He has previously appeared in The Oxfordian. He founded and is CEO of the Shakespeare Authorship Coalition, devoted to increasing awareness of reasonable doubt about the identity of William Shakespeare. Its Declaration of Reasonable Doubt About the Identity of William Shakespeare has over 4,700 signatories, including Sir Derek Jacobi, Sir Mark Rylance and Michael York, and Supreme Court Justices John Paul Stevens and Sandra Day O'Connor. leading scholars who had previously suggested that it might be one. Rollett also checked his solutions against the validation criteria in William F. and Elizebeth S. Friedman's book *The Shakespearean Ciphers Examined* (Rollett 1997, 99–110, 109).

Finding Rollett's article intriguing, I contacted the former head of my doctoral program at UCLA—a mathematician who also consulted for the Rand Corporation. She introduced me to a colleague then on the board of the journal *Cryptologia*. An initial contact elicited a skeptical response to the idea of a valid Shakespearean cipher. I sent him a copy of Rollett's paper. While he gave no opinion about the validity of either solution, neither did he reject them. I proposed to write an article supporting the validity of Rollett's solutions, and he emphasized the importance, if I did, of addressing the imperfections. I began a dialogue with Rollett, focusing on the imperfections, and started work on an article.

Perhaps our most helpful communications involved advocates for Shakspere of Stratford, testing our views against those of scholars who disagreed with us. One called our attention to an invalid assumption and a common error in estimating the odds of the transposition cipher occurring by chance. Another noted errors in the application of the Friedmans' criteria for validating proposed cipher solutions. We appreciated their help, and the errors are corrected in this paper.

The most important contribution, however, was to clarify that, despite the strengths of Rollett's proposed solutions, we could not fully explain the meaning of the message produced by the concealment system, which pointed to another authorship candidate. Given the contentiousness of the authorship controversy, nothing less than a complete explanation would suffice. I therefore decided to wait until a full explanation of the message became available, which has now come to light. Also, I recently noticed a feature of the dedication not previously commented on that virtually proves the dedication was designed as a cryptogram and was not a chance occurrence. These developments warranted writing this long-delayed paper.

Rollett's article focuses first on the transposition cipher identifying "Mr. W. H.," and then on the concealment system identifying someone else as author of the Sonnets. He did so because he regarded the former as the more clearly valid of the two, based on his estimates of the odds of each occurring by chance, and because his original aim was to identify "Mr. W. H." In this article the order is reversed because (1) in fact, the concealment system is less likely to have occurred by chance, and (2) its message identifying another author was discovered first, as the designer of the dedication may have intended. It may be easier to follow in the order in which they were discovered.

This article quotes extensively from Rollett's article⁵ to give readers sufficient background to fully understand both of his proposed solutions. Part One deals with the "hidden message" that identifies another author of the Sonnets. After recapping Rollett's account of its discovery, it addresses (1) the meaning of the two words "THE FORTH," (2) whether the key "6-2-4" is due to chance, (3) whether the proposed solution meets the Friedmans' validation criteria, and (4) whether it is consistent with other aspects of the Sonnets publication.

Part Two deals with the question of the identity of "Mr. W.H.," again beginning with Rollett's description of his discovery. This is followed by (1) whether it meets the Friedmans' validation criteria, (2) additional considerations in evaluating the proposed solutions, (3) Rollett's subsequent decision to reject the validity of the hidden message, and (4) a discussion of the question of who most likely created the dedication. The Appendix estimates the odds that the proposed name of "Mr. W.H." is due to chance.

Part One: The Hidden Message

Rollett first calls attention to the mysteries presented by the dedication, citing leading scholars, including some who speculate that it was a cryptogram (Rollett 1997, 93–4):

One of the most enduring of literary mysteries is the identity of "Mr. W. H.", the man to whom *Shake-speares Sonnets* were dedicated in 1609.... Commentators for over two hundred years have admitted to being puzzled by its unusual appearance, peculiar syntax, and obscure meaning (Rollins 1944, 166–176).

The Dedication to the Sonnets is unlike any other literary dedication of the period (Gebert 1933), quite apart from the mystery of "Mr. W. H.", and some scholars have speculated that it may be a cipher. As Richard Dutton says, "The grammar of the piece is almost sufficient to quell interpretation in itself. How many sentences are hidden within the unusual punctuation (which... [may be] essential to some cryptogram...) (Dutton 1989, 41)?" Who is "the onlie begetter"? Is he the "Fair Youth", the young man to whom many of the sonnets were addressed (and who is identified with "Mr. W. H." by most commentators), or is he the agent who procured the manuscript? Is "T. T." referring to himself as the "well-wishing adventurer", or is he merely signing off as the publisher, Thomas Thorpe? And, asks Kenneth Muir, "Is there any significance in the way the Dedication is set out (Muir 1982, 152)?" Undoubtedly, as Stanley Wells says, "'Mr. W. H.' provides the biggest puzzle of all" (Wells 1987, 6), and Samuel Schoenbaum calls it "a riddle that to this day remains unsolved (Schoenbaum 1970, 67)." The mystery is compounded by the difficulty of understanding what the writer of the Dedication was trying to convey by the rest of the text, which Northrop Frye characterizes as "one floundering and illiterate sentence" (Frye 1962, 28). This is the more surprising, in view of the fluency and wit displayed in Thorpe's other dedications.... A student of cryptography might well ask him or herself whether there was more in this piece than meets the eye, since as Helen Fouche Gaines has said, "awkwardness of wording" may be a pointer to a "concealment cipher", that is, a cipher designed so that superficially it appears innocent of hidden information (Gaines 1940, 4).

According to Rollett (1997, 94–5), the first person to try to decipher the dedication was Shakespeare scholar Leslie Hotson, who described it this way:

Thorpe's inscription has been termed enigmatic, puzzling, cryptic, recalling the Elizabethans' characteristic fondness for anagram, acrostic, concealment, cryptogram, 'wherein my name ciphered were'. In these ensuing sonnets Shakespeare declared, your monument shall be my gentle verse, and Thorpe has set out a monumental inscription TO...Mr. W. H. Is there possibly something more than initials, hid and barr'd from common sense here...which we are meant to look for? (Hotson, 1964, 145–157)

Peculiarities of the dedication

Rollett (1997, 95–6) describes Hotson's solution in detail, but found it arbitrary and thus rejected it. Yet he was intrigued by the possibility of a cryptogram and decided to try to decipher it himself. He first noted these seven peculiarities:

- (a) The natural order for a dedication of this kind would be... 'To the dedicatee: (1) the dedicator (2) wisheth (3) blessings.' But in this dedication the natural order is inverted, and it has the form 'To the dedicatee: (3) blessings (2) wisheth (1) the dedicator.' Hotson comments that it is the only dedication he has seen "which puts the sentence backwards". To "expose its conspicuous peculiarity," he reproduces nine other dedications as examples of normal word order....
- (b) Awkwardness of wording is evidenced further by the close conjunction of "wisheth" and "well-wishing"; surely the writer could

have avoided the repetition of the root word "wish" by saying something such as 'well-willing', 'well-disposed', 'benevolent', 'amiable' or 'friendly'? Also, the phrase "these insuing sonnets" jars slightly...; one might...have expected either 'these sonnets', or 'the insuing sonnets'....

- (c) It is all in capital letters (except for the 'r' of "Mr."). As far as has been ascertained, there are only two other lengthy dedications of the period all in capital letters (those to Spenser's *The Faerie Queene* and Jonson's *Volpone*).
- (d) The spelling of the word "onlie" is very unusual; the most common spelling of the word at the time was 'onely'. In the First Folio of 1623, the word appears as 'onely' 67 times, 'only' 5 times, 'onelie' twice, and 'onlie' once. (In the sonnets, 'onely' occurs 4 times, 'only' twice, and 'onlie' not at all.)
- (e) There are full stops after every word, a most remarkable feature, believed to be unique to this dedication; to date, no other example has been reported.
- (f) The hyphens joining two pairs of words into compound adjectives are unusual in being lower-case, instead of the expected upper-case hyphens.
- (g) The lines of the Dedication are carefully proportioned to form three blocks, each in the shape (roughly) of an inverted triangle. The line spacing is subtly increased between the middle five lines, as if to emphasize this feature. (Rollett 1997, 96–7)

The dedication as an innocent letter cipher

Turning to how he discovered what he calls the "hidden message," Rollett writes:

The full stops placed after every word are the most unusual of all the oddities listed—they immediately suggest counting words. One can imagine someone with a pencil touching the point on the paper after each word (or letter) as it is checked off, the small hyphens... indicating that compound words are to be counted separately. This prompts the idea of seeing whether a message might be found by selecting words evenly spaced, e.g., every third word, starting from the beginning, or maybe fourth or fifth, etc.... The result in every case is nonsense. The next simplest scheme would be to alternate two numbers, and (for example) to take the third word, followed by the fifth word after that, then the third, fifth, third, and so on. But there are so many possible choices of two numbers that trial and error would get us nowhere.... If the scheme were of this kind, the creator of this cipher, supposing it to be there, *must* have recorded the numbers somewhere.... Yet the page is devoid of other symbols, not even compositors' code marks... to show the binder how to collate the sheets.

The arrangement of the text into three distinct blocks, each an inverted triangle, is another strange feature, and this...provides us with a set of three numbers—6, 2, 4—the numbers of lines in each block, something...within the control of a possible cryptographer. Counting through the Dedication, using these numbers as the key, we obtain the following sequence of words:

"THESE . SONNETS . ALL . BY . EVER"

Although they lack a verb, these words appear to point to an author other than Shakespeare. Reference to the Encyclopedia Britannica shows that a leading alternative candidate for the authorship...is one Edward de Vere, 17th Earl of Oxford, whose name might perhaps be indicated by "E(.)VER".... If the supposed message had been deliberately encoded into the text, the need to incorporate these words in the right order, at predetermined intervals, could provide an explanation for the strange syntax and obscure meaning.

We now come to a crucial point. It might be wondered why the hypothetical designer of the cipher should choose, apparently at random, the set of numbers "6, 2, 4" as the cipher key (coded into the layout). But this set, remarkably enough, consists of the numbers of letters in the three parts of the name "Edward de Vere". Thus, out of perhaps a hundred available choices of sets of two or three small numbers, our cryptographer (and we can now feel more confident of his existence) chose the one set which would serve to confirm the correctness of the decipherment, once it had been carried out. (Rollett 1997, 108–9)

Finding such a message using a key encoded into the shape of the dedication, which matches the number of letters in the name "Edward de Vere," is, indeed, remarkable—a hidden message pointing to Edward de Vere, with "Edward de Vere" as its keyword.

But Rollett's article does not show the dedication at the point where he counts words to get the five-word message, so inattentive readers might not

notice that using the key 6-2-4 to count to the end of the dedication produces this seven-word sequence:

"THESE . SONNETS . ALL . BY . EVER - THE . FORTH"



Figure 2: The dedication page showing the words selected using the key 6-2-4.

Unable to explain the two additional words "THE FORTH," Rollett ignored them because he did not consider THE FORTH part of the message, then proceeded with the five-word message, which he found sufficient. Only in the discussion section did he later address the issue of the length of the message in response to a reader's comment, but even there he ignored the possibility of the two additional words having any meaning. He writes, for example, that "it had to be sufficiently long to provide enough lines of text to set out in three inverted triangles in order to record the key '6, 2, 4" (Rollett 1997, 116).

This is not a credible solution. Why devise a system to communicate a secret message but leave it ambiguous as to what the message includes? Using the key to count off words to the end, one gets seven words, not five, and nothing justifies stopping after five words. It was an arbitrary, subjective decision. The two additional words "THE FORTH" appear to be part of the message and should mean something, especially because "FORTH" is the last word in the dedication.⁶ No conscientious cryptographer would allow such a coincidence, if meaningless, knowing how misleading it would be.

In Appendix C to his article, Rollett (1997, 118–9) makes a case that "EVER" was, by itself, a clear reference to Edward de Vere. He claims that on several occasions de Vere used the words "ever" and "Ver" (spring) to refer to himself, but his examples do not demonstrate it. Shakespeare's plays contain numerous examples of the author possibly referring to himself as "ever," but none that could be said to be beyond dispute. Rollett correctly notes that "Those who support [de Vere's] authorship of the works of Shakespeare point to Sonnet 76, where lines 5 and 7 appear to employ the same device:

Why write I still all one, ever the same And keep invention in a noted weed, (well-known guise) That every word doth almost tell my name (Rollett 1997, 119).

Does line 7 here refer to "ever" in "ever the same" in line 5, meaning that "ever" is "that every word" (with "every" now used as an adjective) that almost tells his name? Maybe, but regardless of whether the author intended to refer to himself as "ever," the mere fact that "Vere" is a perfect anagram of "ever" is enough to suggest this may have been what the cryptographer intended, with the discovery that the key matches the number of letters in the three parts of Edward de Vere's name providing strong confirmation. This was enough for Rollett, but others, including myself, thought that the two additional words "THE FORTH" must mean something that would clarify the message.

It is worth mentioning here that Rollett was not looking for an alternative author in the dedication when he began his journey in trying to decipher it in the late 1960s. He was merely seeking to identify "Mr. W. H." In fact, he took it for granted that the author of the Sonnets was William Shakspere of Strat-ford and was not even aware of Edward de Vere. When he noticed the hidden message, he writes that "it appeared to be meaningless and was promptly forgotten" (1997, 117). It was a few years later that he learned Edward de

Vere was a leading alternative candidate and realized that his name might be indicated by "EVER." Even then, Rollett dismissed it as "a curiosity of no significance" (ibid). It would be 20 years before he decided to investigate the possibility further.

Meaning of "THE FORTH"

The word FORTH cannot be understood in its primary sense as an adverb since it does not fit grammatically or syntactically. Was it meant to be a homonym? Spellings were highly variable at that time, so it is natural to speculate that "FORTH" might have meant FOURTH. Rollett found a couple of obscure examples of Edward de Vere being the fourth something, but nothing a cryptographer would use to refer to him. Also, if the cryptographer meant "fourth" here, he did not include the word that "fourth" was intended to modify. The message is therefore incomplete if "fourth" was intended.

Another possibility would be an anagram, but no iteration is meaningful.

Perhaps a cryptographer at that time would have made use of another language. Most people were illiterate then, but many who were literate also knew other European languages. The literate generally learned Latin, and many also were fluent in French, Spanish, Italian, or Dutch-German, especially after England joined the Netherlands in its war with Spain in 1585. In Latin, fourth is "quartus;" in French "quatrièm;" in Spanish "cuarta," or "cuarto;" in Italian "il quarto." It makes sense that they are all similar, deriving from the same root. Nothing about them seems to shed light on the meaning of our alleged message. What about German and Dutch? In German, fourth is "vierte," and in Dutch "vierde," with "vier" meaning four. Thus, in "vierde" we have a near-homonym of "Vere." Is "THE FORTH" meant to be interpreted as "de Vierde"?⁷

Note that the punctuation mark immediately following "EVER" is a hyphen. If retained in the hidden message, it might be viewed as a dash: "EVER– THE FORTH." In that case, "THE FORTH" should elaborate on, or confirm, the meaning of "EVER," giving the seven-word message "THESE SONNETS ALL BY EVER–DE VIERDE." Could it be that "THE FORTH" confirms the meaning of "EVER" as Edward de Vere?

This is the solution proposed by Jonathan Bond in his book *The De Vere Code.*⁸ Bond points out that "the fourth," translated into Dutch, is "de Vierde," which some English soldiers who served in the Netherlands would have recognized as a pun on the name "de Vere" (Bond 2009, 52). We cannot know now how "vierde" and "Vere" were pronounced then, but they may have been virtually indistinguishable.

Is it credible that a cryptographer would have referred to de Vere this way? Was the association strong enough that it would have been recognized? It seems that it was. Furthermore, Edward de Vere himself almost certainly knew of the Dutch translation.

On August 19, 1585, Antwerp fell to the Spanish, and the next day Elizabeth I signed a treaty committing England to war against Spain on the Netherlands' behalf. On August 29, de Vere left to join the English forces, serving as Commander of the Horse. Within two months, after his political rival Robert Dudley, Earl of Leicester, became overall commander, de Vere left the Netherlands, never to return. (Ogburn Jr 1984, 683–4). Why, then, would "de Vierde" bring to mind the name "de Vere?" Bond writes:

Though de Vere's involvement in the war was curtailed, his family name would become synonymous with the great martial exploits that would eventually lead to the establishment of the independent Dutch republic. Leading English troops through the next 30 years were his...cousins Francis and Horatio, the "Fighting Veres." Francis rose to the rank of Commander in Chief of the English forces, his younger brother Horatio followed him, and between them they orchestrated the most successful years of the Dutch campaigns, leading to the truce with Spain in 1609. The association of the name de Vere with the Low Countries conflict through Francis, Horatio, and briefly Edward... was inescapable. (Bond 2009, 51–2)

A fourth Vere also fought in the Netherlands, serving under both Francis and Horatio—Sir Edward Vere, the illegitimate son of Edward de Vere. Sir Edward Vere began his military service there in the late 1590s, remaining with the English forces after 1604 when they transferred to Dutch service, returning to England often. He died in Holland in 1629 (*History of Parliament Online*: www.historyofparliamentonline.org/volume/1604-1629/member/ vere-sir-edward-1581-1629).

Sir Francis Vere and his brother, Sir Horace Vere (also known as Horatio Vere), were first cousins of Edward; moreover, both were celebrated on the London stage and in verse for their triumphs in the Dutch War of Independence. Both were interred in Westminster Abbey. Some educated persons who knew Dutch would have recognized the pun on "de Vere."

De Vere was close to both cousins, and if he helped in designing the dedication himself, as seems likely, he may have had them in mind. In 1604, de Vere named Francis as guardian of his son Henry (Ogburn Jr 1984, 765). More than most, they would have known that the translation echoed their family name, and they, or Sir Edward Vere, may have commented on it to the 17th Earl. Or he may have noticed it and commented on it to them, prompting him to use it later when writing the dedication, knowing that they would recognize the pun as his doing.

Some Oxfordians hold that de Vere's cousins are represented in *Hamlet*, which they regard as Shakespeare's most autobiographical play (Looney 1920, 407–9; Ogburn and Ogburn 1952, 648). In this view, Francisco, the sentry standing watch on Elsinore Castle's platform at the start of the play, represents de Vere's cousin Francis.⁹ Soon relieved, he exits, never to appear again. As he exits, Marcellus calls after him: "O, farewell, honest soldier."— high praise for such a minor character. We know nothing about him, but the author seems to know that he is someone deserving.

Throughout the play, Hamlet's one true friend is "Horatio" (de Vere's cousin?). At the end of the play, the dying Hamlet calls out to him:

Horatio, I am dead, Thou liv'st. Report me and my cause aright To the unsatisfied... O good Horatio, what a wounded name, Things standing thus unknown, shall live behind me. If thou didst ever hold me in thy heart, Absent thee from felicity awhile, And in this harsh world draw thy breath in pain, To tell my story. (*Hamlet*: 5.2.341–3, 347–52)

Is the author calling out to his own cousin to "report his cause aright?" We cannot know, but it is a striking coincidence, and it is credible that de Vere had his cousins in mind as being among those familiar with Dutch who would grasp the meaning of "THE FORTH."

Regardless, as Bond writes, "The 'De Vierde' translation cypher means there is a straightforward derivation of the whole phrase, and a derivation of its meaning, all of which is directly connected to de Vere" (Bond 2009, 53). This solution is more than just plausible, rendering the entire seven-word message meaningful and self-contained. The "de Vierde" translation elaborates on the meaning of the fifth word in the message, "EVER." Rather than introducing a new idea, it corroborates what is already there.

It is important to see those two words in the context of the time. If de Vere was the author Shakespeare, this is something he might have done, confident that someone would eventually solve it. The imperfection in the hidden message that confounded Rollett has therefore now been explained. We cannot be totally certain what the author intended, but this is a credible explanation.

Is the key 6-2-4 due to chance?

We now turn to a question that has received little or no scrutiny in previous examinations of the validity of the alleged "hidden message": is the key 6-2-4, found in the shape of the dedication, due to chance, or was it intentional? Rollett made three observations about the shape that show he thought it was intentional (all quoted above):

The lines of the Dedication are *carefully* proportioned to form three blocks, each in the shape (roughly) of an inverted triangle. The line spacing is subtly increased between the middle five lines, *as if to emphasize this feature* [emphasis added]. (Rollett 1997, 97)

And:

Thus, out of perhaps a hundred available choices of sets of two or three small numbers, our cryptographer (and we can now feel more confident of his existence) chose the one set which would serve to confirm the correctness of the decipherment, once it had been carried out. (Rollett 1997, 109)

These observations seem reasonable, but they can still be challenged. The lines *appear* carefully proportioned, but they would be even if it were due to chance. The increased spacing between the middle lines *suggests* intentionality but is not proof. Rollett may be right in estimating that there are "perhaps a hundred" ways that two or three small numbers might have appeared at random in the shape of the dedication (ignoring the added factor of the odds that the dedication would have a discernible shape at all), but 1 in 100 odds that the key is due to chance is not enough to resolve the question.

Now let us take a closer look at the first six lines of the dedication to see if we can uncover anything else that might shed light on the issue. First, notice that the inward slope is relatively gradual through the first four lines before turning



Figure 3: Close-up of the dedication's first six lines, with the unique "r" in "Mr.".

more sharply inward with "PROMISED" and "BY." This smoothness helps to call our attention to the shape, suggesting that it was intentional. But if the intent was a smooth slope, why put "BY" beneath "PROMISED" rather than up on the same line after it? Because then there would have been only five lines and six were needed? It certainly appears so, again suggesting intentionality.

Finally, and most important, look at the lower-case "r" in "Mr." and consider why it is there. Many reproductions of the dedication, even if otherwise accurate, make it "MR.," with an upper case "R," so infectious is the idea that the dedication is all caps (see, for example, *The Yale Shakespeare*, or *The De Vere Code*, Bond 2009, loc. 1004). What is the effect of making the "R" upper case? It usually makes the third line longer than the second, altering the first inverted triangle with six lines, making it two lines, then four (2-4-2-4). Here are the second and third lines in Times New Roman font:

THESE . INSUING . SONNETS. MR. W. H. ALL . HAPPINESSE.

But what matters is the type used in printing the dedication. Looking at it, an upper case "R" would make it difficult, though perhaps not impossible, to get the third line shorter than the second. There is a little extra space between "W. H." and "ALL," but it is needed to cue a pause before wishing the dedicatee "ALL . HAPPINESSE."

There is almost no space, however, between "Mr." and "W. H.," or between "ALL" and "HAPPINESSE" in the third line—unlike in the second line, where there is space on both sides of the two full stops. This suggests an intent to increase the spacing in the second line, and decrease it in the third, to keep the latter shorter than the former. This, in turn, supports the idea that the reason for the lower-case "r" in "Mr." is to help keep the third line shorter than the second without the third looking too tightly spaced.

Now look again at the lower-case "r" in "Mr." in the facsimile of the original. Notice that it is *not* a standard lower-case "r." There is not another like it in



Figure 4: The "r" in "Mr." compared to those in the first three lines of sonnet 1.

the entire volume of the Sonnets! Note the difference between that lower-case "r" and those in the first three lines of sonnet 1 shown in figure 4. It is miniscule and sits high above the line of print (unlike every other lower-case "r" in the volume), in the narrow space between the "M" in "Mr." and the full stop after it. Why would this be? This lower-case "r" appears to be a unique contrivance, designed just for that position, to take as little space as possible in that line to keep it shorter than the line above.

What does it mean to suggest that the shape of the dedication is due to chance? It means that a typesetter with a standard set of type, intending to make it symmetrical but otherwise making random decisions, chanced upon the shape with 6, 2, and 4 lines. The unique lower-case "r" shows that this is not what happened. There was nothing the least bit random about creating a unique contrivance and putting it in that specific spot. And it is not credible to think it accidentally got mixed in with the standard lower-case "r's" and the typesetter picked it at random at that point without noticing the difference.

If the process were random, the typesetter would have placed an upper-case "R" there along with the other upper-case letters. The fact that he chose a lower-case "r" for that position shows a clear intent to encode the key 6-2-4 in the shape of the dedication. The fact that he also went to the trouble to create a unique lower-case "r" for that spot shows that he was willing to go further and call attention to the fact that he had done it. That lower-case "r" clearly shows that the dedication was designed as a cryptogram, as the cryptographer probably knew. It is not too strong to say that it amounts to proof.

The Friedmans' validation criteria

In their seminal book *The Shakespearean Ciphers Examined*, William F. and Elizebeth S. Friedman¹⁰ rejected every proposed Shakespearean authorship cipher they examined. Yet they took the controversy seriously and did not rule out the possibility that a valid cryptographic solution might one day be discovered. To help future cryptologists avoid the errors of their predecessors, they included a chapter titled "Cryptology as a Science" (Friedman and Friedman 1957, 15–26), giving criteria for validating cipher solutions.

Rollett sought to apply their criteria, but his effort was flawed. For example, he writes that a message should be "sufficiently important to have been worth concealing," and "hidden where it had a high probability of being found" (Rollett 1997, 99). In fact, however reasonable these might sound, they are not among the Friedmans' criteria.

Rollett correctly writes that "the key...should be given unambiguously, either in the text or in some other way, and not contrived to fit...preconceived ideas" (Rollett 1997, 99). The key 6-2-4 is unambiguous, and it clearly meets this criterion. Yet Rollett neglected to also quote and follow the related criterion that "once the key to be used in a cryptogram is decided, the rest of the process must follow automatically...and he must not be allowed to exercise his judgment at all" (Friedman and Friedman 1957, 19–20). Rollett violated this criterion when he stopped counting off words before reaching the end of the dedication, rather than following the process automatically to the end. This was an arbitrary decision, based on his judgment that the words "THE FORTH" were not part of the hidden message because he could not explain their meaning. The full seven-word solution proposed here does meet this criterion.

The Friedmans also give this criterion for validating a solution: "the plaintext message must make sense, in whatever language it is supposed to have been written; it must be grammatical...and it must mean something.... The important thing is that it must say something and say it intelligibly" (Friedman and Friedman 1957, 20).

The first part of the message, "These Sonnets all by ever," lacks a verb, but "are" and "written" can be treated as understood—(These Sonnets [are] all [written] by ever). It is clear enough in pointing to an alternative author of the Sonnets if one is willing to accept that "ever" means E. Vere—by far the leading alternative authorship candidate. Confirmation is provided in two ways: (1) the key 6-2-4 corresponds to the number of letters in the three parts of his name, and (2) the additional words "the forth," translated as "the fo(u)rth" into Dutch, yield "de Vierde," which would have been seen at the time as a pun on "de Vere." The fact that part of the message is in another language makes sense in context. Thus, the seven-word message is both grammatical and meaningful.

Next, the Friedmans call for the calculation of the odds that the key occurred by chance. They write that, "The mathematical theory of probability can be applied, and the chances calculated exactly" (Friedman and Friedman 1957, 21). Rollett's estimate of odds on the order of 1 in 100 that the key 6-2-4 occurred by chance seems reasonable, but it does not account for the additional odds that the dedication would have any discernible shape, or that the typesetter would randomly place a unique lower-case "r" in the third line, where it had to be located to achieve the correct shape. Though subjective, it strains credulity to think that the odds of these two additional factors, and especially the latter one, occurring by chance are anything other than extremely remote.

In Appendix D to his article (1997, 119–21), Rollett estimates the odds that the five-word message occurred by chance at 1 in 10 billion. He manages this

by estimating odds for separate components and then combining them, the separate components being the odds that (1) a key like 6-2-4 would randomly produce *any* grammatical five-word statement in published material, (2) such a statement might have some bearing on some significant matter treated therein, (3) it would appear to focus on the issue of authorship of the work in which it appeared (an issue with a long history), identify the person now regarded as the leading alternative author, and be found in a text long seen as a cipher, and (4) the key that led to the discovery of the concealed message occurred by chance.

Rollett gives ranges for his estimates and makes no claim to having achieved precision. He concludes: "Even if this figure [1 in 10 billion] is off by a factor of 10 or 100, it might still be regarded as good evidence...that the dedication was designed as an innocent letter code..." (Rollett 1997, 121). I concur and would add that the odds of the message occurring by chance may be much more remote than Rollett estimates because the message has seven words, not five, and we now know it is much less likely that the key occurred by chance than Rollett assumes. Several aspects of the dedication suggest the shape was no accident, most notably the unique lower-case "r," and it is extremely unlikely that all of them occurred by chance.

Finally, according to the Friedmans, "The most important thing to remember is that for a solution to be valid it must be possible to show that it is the only solution.... Any method which claims to follow valid cryptographic procedures, must yield unique solutions" (Friedman and Friedman 1957, 24–5). Both the key found in the shape of the dedication and the message produced by it have proved to be unique. As far as I know, neither the advocates of William Shakspere whom we consulted after Rollett's article appeared, nor anyone in the years since, have come up with a credible alternative.

In a final observation about concealment systems such as the one involved here, the Friedmans write:

Nor is it reasonable to expect that, if cryptic messages were inserted in the text [of some Shakespeare writing], they would be signaled in some way. One does not put something in a secret hiding place and then put up a sign saying 'Notice: Secret hiding place'.... There must be no external clues. (Friedman and Friedman 1957, 26)

Here we find that our solution meets an additional criterion that the Friedmans did not require—an "external clue" to its presence. The reference to "Mr. W. H." in the dedication to a volume of poetry in which the poet promises immortality to the person to whom most are addressed, but without naming him, is an invitation to investigate—a virtual sign put up by the author of the dedication implying it is a "secret hiding place." Such a clue was needed; otherwise, the hidden message might never have been found. The Strange Case of "Mr. W. H."

Continuing, the Friedmans write:

We shall not...demand any external guide to the presence of the secret texts. We shall only ask whether the solutions are valid:...whether the plain texts make sense, and the cryptosystem and the specific keys can be, or have been, applied without ambiguity. Provided that independent investigation shows an answer to be unique, and to have been reached by valid means, we shall accept it, however much we shock the learned world by doing so. (Friedman and Friedman 1957, 26)

I suspect the Friedmans would have thought the seven-word message is valid.

Other oddities in the Sonnets publication

The foregoing analysis stands entirely on its own in making the case for the validity of the hidden message. The question arises, however, whether it makes sense to think that Edward de Vere, not Shakspere of Stratford, wrote the Sonnets as the message suggests. It is beyond our present scope to examine thoroughly the evidence for Edward de Vere. There are several books that do so for anyone who is interested (Anderson 2005; Looney 1920; Ogburn Jr 1984; Sobran 1997; Whalen 1994). It does seem appropriate, however, to look at the rest of the volume that contains the dedication—*Shake-speares Sonnets*—for other oddities that suggest things related to authorship are not as they appear, or which point to de Vere as the author. Curiosity should lead us to do so.

Author's name not on title page

We start by examining the title page of the publication (figure 5). Notice the two parallel lines about a third of the way from the bottom. Those lines mark the place where the name of the author would normally appear, but the name is missing. One could say that the author's name is in the title so it is not needed there, but it would not have been difficult to also print "by William Shakespeare" where those lines appear. And including the two lines calls attention to the fact that the author's name is not there. Also, the hyphen in "*Shake-speares*" in the title suggests that it may be a pseudonym.¹¹

Author died by 1609

Regarding the title, "*Shake-speares Sonnets*" could imply that it is a complete body of work with no further sonnets expected from this author, implying that he is deceased. Otherwise, one might expect a title such as "Sonnets, by William Shakespeare." While there could be other sonnets not included in this volume, no additional sonnets seem to be expected. The title refers to the author in the third person, as if he is not a party to the publication. It seems unlikely that a living author would give a book of his poems such a



Figure 5: The title page of Shake-speares Sonnets, published in 1609.

title. This is the first of five reasons to think the author of the Sonnets had already died by 1609. By itself it is only suggestive, but seen in context, it seems to be part of a pattern.

The next reason is the dedication's odd reference to the author as "OUR EVER-LIVING POET." An "ever-living" poet would have been understood to mean one who has died and lives on through his works. There is no example of a living author being referred to as "ever-living" during the Elizabe-than-Jacobean period (Sobran 1997, 94). The use of "our" also suggests the author has died and become a common possession.

The third reason is that the dedication was ostensibly written not by the author of the Sonnets but by the publisher, Thomas Thorpe, whose initials, "T. T.," are at the bottom. This would have been highly unusual if the author were alive at the time. The author had written the dedications to his two previous published works of poetry, *Venus and Adonis* and *The Rape of Lucrece*. (The author's name is not on their title pages either. The name only appears beneath the two dedications to Wriothesley.)

The fourth reason is that many of the Sonnets are scandalous, depicting a love triangle involving an older and a younger man sharing a dark lady (sonnets 40–42, 144). No author would have wanted such poems published during his lifetime, yet no record shows that Shakspere of Stratford objected or tried to have the publication suppressed, suggesting that he was not the author. The real author, having died, could not object.

Author an older man

The fifth reason is that the sonnets depict an older man who was nearing death, while Mr. Shakspere was still a relatively young 39 when the sequence ends about 1603. Sonnet 107, for example, appears to refer to the death of Elizabeth I, the succession of James I, and Henry Wriothesley's release from prison, all of which took place in 1603:

The mortal moon hath her eclipse endur'd, And the sad augurs mock their own presage; Incertainties now crown themselves assur'd, And peace proclaims olives of endless age. Now with the drops of this most balmy time My love looks fresh, and death to me subscribes...

Edward de Vere died the following year.

The author also makes it clear in several other sonnets that he is an older man:

Sonnet 22:

My glass shall not persuade me I am old, So long as youth and thou are of one date

Sonnet 62:

But when my glass shows me myself indeed, Beated and chopp'd with tann'd antiquity

Sonnet 63:

Against my love shall be, as I am now, With Time's injurious hand crush'd and o'erworn Sonnet 73:

That time of year thou mayst in me behold When yellow leaves, or none, or few, do hang Upon those boughs which shake against the cold, Bare ruin'd choirs, where late the sweet birds sang.

There is thus strong evidence that the author of the Sonnets was (1) much older than Mr. Shakspere, and (2) had already passed away by 1609. Edward de Vere died in 1604.¹² Indeed, he is the only major alternative candidate who died before the Sonnets appeared.

The author's lameness

In addition to being an older man, the author twice describes himself as lame:

Sonnet 37:

So I, made lame by fortune's dearest spite, Take all my comfort of thy worth and truth

Sonnet 89:

Speak of my lameness and I straight will halt

This is odd because nothing in the historical record shows that Mr. Shakspere was ever lame. De Vere, on the other hand, was seriously wounded in 1582, when attacked by Thomas Knyvet, uncle of Anne Vavasour, with whom de Vere had an illicit affair (Ogburn Jr 1984, 650). Then in 1597, in a letter to his father-in-law, Lord Burghley, de Vere wrote that he regretted being unable to attend her Majesty as "I have not a well body" (Ogburn Jr 1984, 742).

Author a nobleman?

At least two sonnets suggest that the author was a nobleman. In Sonnet 91 he does not seem to be speaking hypothetically, but from experience, when he writes:

Sonnet 91:

Thy love is better than high birth to me, Richer than wealth, prouder than garments' cost, Of more delight than hawks or horses be

Sonnet 10:

Make thee another self, for love of me, That beauty still may live in thine or thee.

This is the final couplet from one of the "procreation sonnets" (Sonnets 1-17) in which the poet urges the Youth to beget a son to perpetuate his beauty. It is remarkable that he would urge the Youth, presumably Henry

Wriothesley, to procreate "for love of me." The idea that Mr. Shakspere would have addressed an earl in this way is absurd, given the social distance between them. But the line makes perfect sense if written by Edward de Vere—an earl a generation older than Southampton and his prospective father-in-law—since Southampton was at that time a candidate to marry de Vere's daughter Elizabeth (Ogburn Jr 1984, 716). In this regard, de Vere's authorship accounts for *all* the procreation sonnets.

Author in disgrace

In several sonnets the author says that he is in disgrace for unspecified reasons:

Sonnet 29:

When, in disgrace with fortune and men's eyes, I all alone beweep my outcast state,

Sonnet 36:

I may not evermore acknowledge thee, Lest my bewailed guilt should do thee shame,

Sonnet 112:

Your love and pity doth the impression fill Which vulgar scandal stamped upon my brow;

Again, nothing in the historical record shows that Mr. Shakspere was ever in disgrace—nothing that could account for the tone of these sonnets. De Vere, on the other hand, was often in trouble with the Queen and his father-in-law William Cecil, the Lord Great Treasurer. He abandoned his wife Anne Cecil for five years (1576-81), believing he was not the father of her child before concluding that he had been mistaken (Ogburn Jr 1984, Chapter 28). While estranged from Anne, he fathered an illegitimate child with Ann Vavasour, a Maid of Honor to the Queen. Elizabeth was furious and imprisoned de Vere and Vavsour in the Tower of London, where de Vere remained for over two months (Ogburn Jr 1984, 646). The year before this episode, de Vere had turned against three Catholic-leaning friends-Lord Henry Howard, de Vere's first cousin; Charles Arundel; and Francis Southwell—accusing them of conspiring with Spain, which they had. In turn, they viciously slandered him to save themselves (Ogburn Jr 1984, 638–45). By 1586 he had sold most of his lands to pay off debts, and Elizabeth granted him a $f_{1,000}$ annuity, an enormous sum, for the remainder of her reign (Ogburn Jr 1984, 688). All of this and much more weighed heavily on his reputation.

The author's disgrace is such that he says he wants his name to be forgotten:

Sonnet 72:

My name be buried where my body is, And live no more to shame nor me nor you, Notice that this implies his real name was not then associated with his works. And remarkably, the author promises the Fair Youth that *his* name will be "immortal," while the author himself will be forgotten. He draws the contrast three different ways:

Sonnet 81:

Or I shall live your epitaph to make, Or you survive when I in earth am rotten; From hence your memory death cannot take, Although in me each part will be forgotten. Your name from hence immortal life shall have, Though I, once gone, to all the world must die: The earth can yield me but a common grave, When you entombed in men's eyes shall lie.

The poet has power to immortalize others with his poetry, but not himself.

Here again, the implication is that the author's real name is not associated with his works and "Shakespeare" is a pseudonym. Otherwise, how could he, and his name, possibly be forgotten? Yet he says he expects that this is what will and must happen.

And after promising the Fair Youth that his "name" will be immortal, his name never appears in the volume, as if the author deliberately created a mystery to be solved in Sonnet 81 and then signaled to look for the name of "Mr. W. H." in the dedication.

Pyramidal structure of the Sonnets

In 1970, Renaissance literary scholar Alastair Fowler, then at Brasenose College, Oxford, published *Triumphal Forms: Structural Patterns in Elizabethan Poetry.* His theme is that, although we have lost sight of its importance, structural art was "common to the best medieval and Renaissance poets and almost universal in the period 1580–1680, when it reached its greatest height of sophistication" (Fowler 1970, ix). In the first eight chapters he examines various types of structural patterns, leading up to a final chapter on numerological patterns in Elizabethan sonnet sequences. There he examines Philip Sidney's *Astrophil and Stella* and Edmund Spenser's *Amoretti*, showing that both have clear numerological structures, before addressing Shakespeare. Fowler writes:

It is hardly to be expected that the sonnet sequence of a poet so intellectually brilliant as Shakespeare should lack the structural art and finesse valued in his age. And in fact his sequence abounds with the intricate formal devices requisite to its genre. Of all Elizabethan sequences [except Spenser's] Shakespeare's is the most complex formally. Yet to understand the main lines of its structure, we have only to keep in mind the same two features in other sequences: first, that poems published with the sonnets belong to the structural pattern; second, that words may refer literally to their own arrangement, providing a self-referring commentary on the form. By attending to these features, Shakespeare's *Sonnets*...are easily seen to exhibit an elaborate structural symmetry.

This has interesting critical implications. But the textual implications are...still more far-reaching, since [most] scholars have believed the 1609 *Sonnets* to be disordered, so that trying to rearrange them in a better order (an order more intelligible as a biographical sequence) is a useful activity.... As we shall see, however, the rules of that game are based on false assumptions. The spatial arrangement of Shakespeare's sequence...asserts a design far too positive for us to be free to change it at will. (Fowler 1970, 183)

One implication of Fowler's observation that the sonnets are in authorial order and "exhibit an elaborate structural symmetry" (that was preserved during publication) is that the author himself most likely supervised and approved the layout of the volume. Otherwise, it is very unlikely that the publisher would have recognized and maintained the complex structure which depended on the precise execution of many subtle details. This has implications for the authorship of the dedication.

For present purposes I will call attention to just one key structural feature of *Shakespeare's Sonnets*: their triangular, or pyramidal, structure.

Fowler first points out that three of the 154 sonnets are irregular: Sonnet 99 has 15 lines; Sonnet 126 has 12 lines; and Sonnet 145 is in tetrameters, not pentameters. He writes that, "The first step in any structural analysis must be to examine the pattern formed by the irregular sonnets" (184).

He then observes that a passage in Sonnet 136, "which has never received a satisfactory explanation," may be self-referring:

In things of great receipt we may approve, Among a number one is reckoned none. Then in the number let me pass untold, Though in thy store's account I one must be, For nothing hold me... (ibid.)

He finds in this a reference to the sonnet itself, saying that it is to be "excluded from, yet at the same time included in, the reckoning" (ibid.). He notes that if we leave Sonnet 136 out, the total is 153, "one of the bestknown symbolic numbers" (ibid.), its distinctive mathematical feature in Shakespeare's time being its triangularity. "As the sum of the first 17 natural numbers, when set out in Pythagorean fashion it forms an equilateral triangle with a base of 17 (as in the diagram below)" (185).

					154		4		
					152 153		*Sonnet 136 omitted: "Among a number one is reckon'd none: Then in the number let me pass untold "		
				1	49 150 1	51			
145 146 147 148							Parati		
				140 1	41 142 1	43 144			
				133 134	135 * 13	7 138 13	9		
			12	26 127 1	28 129 1	30 131 1	32		
			118	119 120	121 122	123 124	125		
			109 13	LO 111 1	12 113 1	14 115 1	16 117		
		9	9 100	101 102	103 104	105 106	107 108		
		88	89 9	0 91 9	2 93 9	94 95	96 97 9	8	
		76 7	7 78	79 80	81 82	83 84	85 86	87	
	6	3 64	65 6	6 67 6	8 69 7	70 71	72 73 7	4 75	
	49	50 5	1 52	53 54	55 56	57 58	59 60	61 62	
	34 3	5 36	37 3	8 39 4	0 41	42 43	44 45 4	6 47 48	
18	19	20 2	1 22	23 24	25 26	27 28	29 30	31 32 33	
1	2 3	4	56	78	9 10	11 12	13 14	15 16 17	

Figure 6: The 153 sonnets (omitting sonnet 136) set out as an equilateral triangle with 17 sonnets on a side, subdivided by the three irregular sonnets on the left side.

The case for the base of the triangle being Sonnets 1–17 is clear in that they all address a single theme—the "procreation sonnets" already mentioned— with the famous Sonnet 18 being a clear departure from that theme (figure 6). The triangle thus appears intentional; and Fowler points out another feature of the triangle that clearly suggests intentionality: the three irregular sonnets line up on the left side of the triangle, equidistant from each other, subdividing the overall triangle into smaller triangles with 10, 28, and 55 sonnets. Two of these triangular numbers, he notes, "had great arithmological significance, 10 as the principal of divine creativity, 28 as a symbol of moral perfection" (186). He neglects to mention that the conspicuous position of the omitted Sonnet 136—the location of the eye in a Masonic pyramid—also clearly suggests intentionality.

Fowler gives several more examples of the numerological significance of the triangular number 153, but none provides a compelling explanation of why the poet would have chosen it. He notes that "pyramid and triangle were often synonymous" at that time (187), and that, "The pyramidal numbers imply, most obviously, that Shakespeare designed the sequence to function as a monument' (188). Sonnet 81 openly declares: "Your monument shall be my gentle verse." But why a pyramid with 17 sonnets on a side rather than some lesser or greater number? Why not make it 120 sonnets with a base of 15, or 136 sonnets with a base of 16, for example? Fowler gives no reason why the number 17 would have had any special meaning for Shakspere of Stratford. But if the poet was Edward de Vere, 17th Earl of Oxford, the reason becomes clear. He was extremely proud of his ancestry and title, and it was an obvious way to refer to himself.

Fowler describes several other structural patterns in the Sonnets, which, again, suggest authorial involvement in the publication. What is presented here is just one aspect of the overall design.

In this brief examination of the Sonnets, we find that there are, indeed, oddities. They suggest that (1) the author's real name may not be on the title page, (2) the author had died by 1609, (3) he was an older man, anticipating death in 1603, (4) he was lame, (5) a nobleman, (6) in deep disgrace, and (7) did not want, or expect, to be remembered. None of this proves that Edward de Vere wrote the Sonnets, but it does strongly support the idea; and their pyramidal structure with 17 sonnets on a side offers additional support. The hidden message therefore seems consistent with the rest of the Sonnets publication.

Conclusion to Part One

Dr. Rollett deserves much credit for his persistence in analyzing the dedication to *Shake-speares Sonnets* in detail over many years and for publishing his findings. The dedication was especially difficult to solve, and it is understandable that he could not fully grasp all its subtleties and made errors in applying the Friedmans' validation criteria. He set us on the right path, and the later discoveries presented here vindicate his effort.

It is also understandable that Rollett could not find the meaning of the additional words "THE FORTH" and concluded they were not part of the message. We cannot be certain that the cryptographer intended for "the forth" to be interpreted as a pun on the name "de Vere" when translated into Dutch, but it is a credible explanation, which means we have a seven-word grammatical message that strongly points to de Vere.

More important is that Rollett overlooked the unique lower-case "r" in "Mr." and did not see its importance in encoding the key 6-2-4 in the shape of the

dedication. This is the most significant new discovery, virtually proving that the dedication is a cryptogram. It was already remarkable that the key 6-2-4 corresponds to the number of letters in the three parts of the name Edward de Vere, which has the appearance of being intentional. The case for intentionality is greatly strengthened by our examination of the dedication. Several features suggest the shape was deliberate, especially the unique lower-case "r."

Examination of the rest of the Sonnets publication reveals several other oddities that call the authorship into question and are consistent with the authorship of de Vere. The most important of these is the overwhelming evidence that the author was an older man who had already died by 1609—this fits de Vere and no other authorship candidate. Fowler's discovery of their structure suggests that de Vere oversaw the layout before he died.

Rollett did not conclude that the message "THESE SONNETS ALL BY EVER" was necessarily valid. Being cautious, he wrote only that, "The apparent indication that the Sonnets were written by someone other than the man from Stratford may contribute to the debate on the authorship controversy..." (Rollett 1997, 118). I will go further and conclude that compelling new evidence has been found that greatly strengthens the case for the validity of a seven-word hidden message since Rollett published his article in 1997. This evidence, suggesting that the Sonnets were written by Edward de Vere, and not by Mr. Shakspere, is sufficiently compelling that it deserves to be brought to the attention of a wider audience for their consideration, including, especially, leading cryptologists. I think the Friedmans, who took the Shakespeare Authorship Question seriously, would have agreed.

Part Two: The Identity of Mr. W. H.

In Part One it was shown that the dedication to the Sonnets was designed to contain an innocent letter cipher with a hidden message pointing to Edward de Vere as the author of the Sonnets. The possibility that it might contain hidden information was suggested by the mystery of the identity of "Mr. W. H." plus the seven peculiarities that Rollett listed. Three of these—the full stops, the lower-case hyphens, and the arrangement of the text into three blocks—are explained by the requirements of the innocent letter cipher, as is a fourth peculiarity Rollett did not mention as such: the unique lower-case "r" in "Mr."

The hidden message, however, was unexpected, and the question of the identity of Mr. W. H. remains, while the other four peculiarities—the inverted syntax, awkward wording, use of capital letters and unusual spelling of "onlie"—are yet to be explained.

The Dedication as a Transposition Cipher

Here is how Rollett describes his discovery of the name that presumably reveals the identity of "Mr. W.H.":

The fact that the Dedication is all in capital letters (apart from the 'r' of "Mr.") suggests the possibility of a 'transposition cipher' (Gaines 1940, 4), a technique known in Elizabethan times to scholars such as John Dee (Deacon 1968, 290–1). The total number of letters in the text of the dedication (disregarding Thomas Thorpe's initials "T. T." at the end, offset to one side) is 144, which has many factors. It is characteristic of this kind of cipher that information is concealed in arrays of letters which form perfect rectangles, and we therefore examine each of these arrays in turn. If the Dedication is written out in 8 rows of 18 letters, we obtain the perfect rectangular array shown in figure 7.



Figure 7: The dedication as a rectangular array with 8 rows of 18 letters (originally in "The Dedication to Shakespeare's Sonnets" by Dr. John Rollett, Autumn 1997 issue of The Elizabethan Review. Reprinted with permission of the publisher).

Inspection reveals the name "WR - IOTH - ESLEY" located in columns 2, 11, and 10, reading out down, up, down. This is precisely how the family name of the Earls of Southampton was always spelt officially. It is remarkable then that the candidate favored by many scholars as the "Fair Youth" and "Mr. W.H." is *Henry Wriothesley*, 3rd Earl of Southampton, his initials reversed in a simple device.... It was to this man that Shakespeare dedicated the two long poems *Venus and Adonis* and *Lucrece*, in 1593 and 1594, respectively.

Support for the correctness of this decipherment comes from the perfect array with 9 rows of 16 letters, displayed in figure 8.

Shahan



Figure 8: The dedication as a rectangular array with 9 rows of 16 letters (originally in "The Dedication to Shakespeare's Sonnets" by Dr. John Rollett, Autumn 1997 issue of The Elizabethan Review. Reprinted with permission of the publisher).

The name "Henry" can be found running diagonally down and left from the "H" of "THESE" to the 'Y" of "BY". In an array with 15 letters in each row (the last being incomplete), the name can be read out vertically in the 7th column, as shown in figure 9. (It will be noticed that "Henry" and "Wriothesley" share the one 'Y' in the text.)

Figure 9: The dedication arranged in rows of 15 letters (figure originally appeared in "The Dedication to Shakespeare's Sonnets" by Dr. John Rollett, Autumn 1997 issue of The Elizabethan Review. Reprinted with permission of the publisher).

It is a reasonable deduction (though perhaps not an inescapable one) that the full name "Henry Wriothesley" was deliberately concealed in the Dedication in order to record for posterity his identity as "Mr. W.H." and the young man to whom many of the sonnets were addressed, and to whom the poet wrote, "Your monument shall be my gentle verse (sonnet 81)." (Rollett 1997, 97–8)

Rollett was impressed that (1) the name includes two five-letter segments ("Henry" and "esley"), (2) "esley" and "ioth" are in adjoining columns, and (3) the segment "esley" reads down from the top of a column, making it easy to spot if one is looking for the name "Wriothesley," long the leading candidate. He writes that, "The objective...is not only to conceal a name or message from casual inspection, but also to ensure that it is recognized when the right approach is adopted" (Rollett 1997, 104).

At this point Rollett addresses the possible objection that an earl would never have been referred to as "Mr." He points out that Southampton played a leading role in the Essex rebellion in 1601, and "was convicted of treason... stripped of his Earldom, and confined to the Tower, where he signed himself "of late Southampton, but now H. Wriothesley" (Stopes 1922, 226; Rollett 1997, 98–9). Thus, until his release and the restoration of his earldom by James I in April 1603, he was a commoner, "Mr. H. W." The dedication may have been written during this time when no pardon was in sight.

Friedmans' criteria revisited

Here again, Rollett looked to the Friedmans' published criteria to validate his solution, but again his interpretations are at times flawed. Regarding the criterion that the keys to a solution be given unambiguously (above), he writes that the cipher keys "are factors of 144, the number of letters in the text" (Rollett 1997, 99). This is not a genuine "key." It is not free of ambiguity (which of the many sets of factors is correct?), nor does its use follow automatically with no need for judgment.

Rollett's solution is what the Friedmans call an "unkeyed transposition cipher" (Friedman and Friedman 1957, 18, 20). They depend for their solution on rearranging, scrutinizing, and spotting meaningful patterns in texts thought to conceal information. The validation of such systems requires the use of the two remaining Friedman criteria: estimation of the odds that a solution occurred by chance and showing that it is unique.

In Appendix B to his article, Rollett shows his calculation of the odds that the name "Henry Wr-ioth-esley" occurred by chance. There he finds that the odds are "of the order of 1 in (very roughly) 30 billion" (Rollett 1997, 104). This estimate is not correct. He made two errors that greatly reduced his odds estimate. First, he multiplied his final calculation by an additional factor of 100 because it was not just any name that he had discovered but that of the leading candidate to be Mr. W. H. This step was not warranted. Second, David Webb, a mathematician at Dartmouth College, pointed out that:

Rollett only calculated the probability of chance occurrence of the *particular* way of dividing Southampton's name into shorter segments *that he found*; there are many other ways, e.g. "Wri-othes-ley," Wrioth-esley, etc., and presumably he would have been just as [satis-fied] to find any of those, yet he does not count them in determining the probability.... Rollett has made a very common but serious error here.... He should have assessed the combined odds of all possible permutations of the letters in the name "Wriothesley" which might have occurred by chance which he would have considered roughly *equally or less likely to occur* than the permutation he found [emphasis in original]. (David Webb, email to author, July 10, 1998)

Realizing that Webb was correct, I defined all possible permutations which are roughly equally or less likely to occur than what Rollett found and assessed the combined odds that one of them would occur by chance at roughly 1 in 8.3 million. While not near 1 in 30 billion, these are still very remote odds and strongly support the view that the occurrence of the complete name "Henry Wr-ioth-esley" was no accident but was deliberate. The various scenarios and calculations are presented in the Appendix.

Rollett put great effort into checking to see if his proposed solution was unique. He scanned the columns of all arrays with rows of from 6 to 30 letters, reading both up and down, to spot words three or more letters in length. Reading down only, he found "180 3-letter words, 42 4-letter words, and 3 5-letter words, plus the segment 'esley'," with similar results reading upwards (Rollett 1997, 104). One of our advocates for Mr. Shakspere¹³ did a computer search of all arrays against words allowed in Scrabble and lists of names. He found 1 seven-letter word ("tibials"), 12 six-letter words, 82 five-letter words, and 481 four-letter words. But neither he, nor anyone else I know of, has found a name as unlikely to occur by chance as "Henry Wr-ioth-esley," nor the name of anyone else from the period. Rollett's proposed solution therefore qualifies as unique.

Between the long odds of the name occurring by chance and the uniqueness of the solution, that is sufficient to meet the validation criteria specified by the Friedmans.

Additional considerations

Rollett does not stop there. First, he studies the dedication carefully and then explains how it was likely constructed as a double cryptogram (Rollett 1997,

109–112). His reconstruction is detailed and credible. He explains how each of the unusual word usages and spellings is needed to get the name Henry Wriothesley correct. He also explains why the name Henry is not in the same array as Wriothesley and why the last name had to be in at least two segments:

the cryptographer has to decide whether to place the name "Wriothesley" in the same array, and introduce a second letter 'Y', or to use the same 'Y' and go for an array of a different size. The second option has the advantage...that he does not have to search for another usable word containing a letter 'Y', and also that the name will be less obvious, since the presence of two 'Y's in the text might alert someone to the possibility that a name containing two 'Y's was concealed in the text.

To make use of the 'Y' of 'BY', the name "Wriothesley" must be broken up into segments, since the letter occurs roughly halfway through the text. (We may deduce from this that the message was composed first, and the two names then built around appropriate letters of the plaintext...) (Rollett 1997, 111)

Second, Rollett includes a discussion section in which he answers questions from readers of his draft, e.g., "If, as many writers have commented, the Dedication looks like a cryptogram, how is it that no solution has been put forward before now? Nearly 400 years have elapsed..." (Rollett 1997, 113). His answer is incisive. His main points are: (1) "it must be assumed that it was necessary, for important personal or political reasons...for the protagonists to be suppressed. Thus, no-one at the time would have published the solution, even if they had found it" (ibid.), and (2) after the first edition, the great majority of reproductions of the dedication changed the design, odd spellings, or both, making it indecipherable. Getting the details of the dedication right is critical.

A question related to the main imperfection in the "Wriothesley" cryptogram—the wide separation of the letters "WR" from the rest of the name is this one:

The fact that the name "Wriothesley" is split up into three segments tends to cast doubt on the proposition that it was deliberately enciphered. Why did the...cryptographer not arrange for the whole name to be formed by letters regularly spaced, so that it filled a single column...? And why not fit the name "Henry" into the same array, perhaps at the head of the same column? Similarly, the message would be easier to find if it consisted of every fourth word, or fifth or sixth, for example. (Rollett 1997, 115)

Rollett's reply is worth quoting in full:

A sophisticated cipher argues strong motives; this is no recreational puzzle to while away a leisure hour. If it was important not to print the names of the protagonists on the title or dedication pages, it was equally important not to make the recovery of the hidden names too easy, otherwise the objective of concealment (for perhaps two or three decades...) would have been lost at the outset. The cryptographer may have begun by trying to get the name "Wriothesley" into one column, but soon realised that this might prove too easy to solve, since a "W" near the beginning of the text would have afforded an obvious clue to anyone hearing rumours about the identity of "Mr. W. H." He chose instead to try for two columns (11 and 10 in figure 7), and if he had succeeded there would now be no doubt that the cipher was genuine. In the event, he might well have been content to fit the name into three columns, so that it would be that much more difficult to decipher. He would then have been able to argue, if the name was discovered and he was questioned by the authorities, that it was just a coincidence; he might avoid an unpleasant fate thereby.

For the same reason he might prefer to hide the name "Henry" in a different array, so that again he could rely on coincidence as a defence. If both names were enciphered, then two 'Y's would have been needed, which might perhaps have alerted someone to the possibility that a name which included two 'Y's had been concealed there. ('Henry Wriothesley' would immediately have come to mind, since the two long narrative poems had been dedicated to him.)

Similar arguments apply to the encoding of the concealed statement. If it had been made up of words regularly spaced (e.g., every fifth word), it would not have remained secret for long, and the consequences for the cryptographer or his patron might have been serious. (Rollett 1997, 115)

I agree with all of this, and especially with Rollett's point that if the entire name "Wriothesley" had appeared in two columns with the letters "WR" beneath "IOTH" in column 11, next to "ESLEY" in column 10, there would be no question as to its validity. The odds of this occurring by chance are 1 in 82.4 million (see Appendix, scenario 13). But the cryptographer decided to leave the letters "WR" widely separated from the rest of the name. This is the only real flaw in the "Wriothesley" cryptogram—the one needing an explanation. Rollett provides two: that it could not be too easy to solve, and that it be deniable if discovered too soon—both valid reasons, but not the only ones. There are two other reasons why the cryptographer may have been satisfied with leaving it as is that Rollett does not mention. First, it is important to remember that it is a *double* cryptogram. It is extremely difficult to design a cryptogram with a cover text and not just one, but two plain text messages and get all three of them to appear perfect. The cryptographer may have decided that the message pointing to an alternative author was the more important of the two, so he was willing to compromise on "Wriothesley." This fits with Rollett's deduction, quoted above, "that the message was composed first, and the two names then built around appropriate letters of the plaintext..." (1997, 111).

Second, anyone attempting to decipher the dedication would have been trying to identify "Mr. W. H." and would not be expecting a message about an alternative author. If the name, when found, had appeared perfect, or nearly perfect, the decipherer would have thought that he had succeeded and so there would be no need to look for anything else. The message pointing to de Vere might never have been suspected and so never found. This might have defeated the cryptographer's main purpose. Leaving the letters "WR" widely separated from the rest of the name in the same array makes the decipherer ask why and suggests that he should keep looking for something else that made it necessary. If enciphering the name was the main objective, it seems strange that the letters "WR" would be so separated from the rest of the name, but if not the main objective, it is not.

Rollett makes this final point about the validity of the Wriothesley cryptogram: "If there were indisputable evidence that the Dedication was a cryptogram (over and above the [peculiarities listed above])...any doubts would vanish" (Rollett 1997, 100). We now have such indisputable evidence in the unique lower-case "r" in "Mr. W. H.," which virtually proves that the dedication was designed as a cryptogram. It is incredible to think that the name of the leading candidate to be "Mr. W. H." appeared by chance, at odds of 1 in 8.3 million, in the same dedication where a key was deliberately encoded in its shape, yielding a message that points to the leading alternative Shakespeare authorship candidate. The two solutions answer the two questions that one would most like to have answered about the Sonnets: who was the "onlie begetter," and who wrote the Sonnets? The odds against both solutions occurring by chance in the dedication are astronomical.

Rollett Recants

In a strange twist, Rollett changed his mind about the validity of the five-word message in 2004. He announced this in a postscript to a chapter he wrote on the dedication in an anthology published that year (Rollett 2004, 265–6). He gives three reasons: (1) the odds of the message occurring by chance are very small, but not zero: "the two coincidences ('EVER' = Edward

de Vere = 6-2-4) are highly suggestive, but the human mind is always on the lookout for coincidences...which may just be the random workings of chance," (2) The Friedmans imply "that a sentence needs to be reasonably long before it can be confirmed as the solution of a possible cipher. Though the five words found may be grammatical (allowing ellipsis), the fact that they lack a verb (e.g., 'made' or 'written') is sufficient to cast doubt on the validity of the proposed solution," and (3) "a three-element key such as 6-2-4 is far too...sophisticated for the Elizabethan or Jacobean period. Extensive reading...found only one similar instance... (in 1888)."

Remember that Rollett is referring to the five-word message. He did not know that the additional words "THE FORTH" confirm the other references to de Vere, making it a seven-word message, nor did he appreciate that the lower-case "r" in "Mr." virtually proves intentionality in encoding the key 6-2-4 in the shape of the dedication. The case for the validity of the hidden message is now much stronger than in 2004.

Yet even in the context of 2004, his reasons are inadequate. Yes, rare coincidences do occur, but is it reasonable to dismiss odds of 1 in 10 billion (his estimate) so easily? The Friedmans say that if "the chances of [a solution] appearing by accident are one in [1 billion], confidence in the solution will be more than justified" (Friedman and Friedman 1957, 21).

There is no Friedman criterion "that a sentence needs to be reasonably long (whatever that means) before it can be confirmed" as a valid solution. They specified that it "must be grammatical...and it must mean something," as stated above. If the message is long enough to do that, it is long enough. Nor is there a Friedman criterion requiring an explicit verb if a message is grammatical and says something intelligible. The message here meets the experts' validation criteria, and that should be sufficient.

Rollett's assertion that a three-element key is too sophisticated for the Elizabethan period because he could not find another example of one is irrelevant. In his article, explaining why it took so long to discover the dedication cryptograms, he cites "a lack of appreciation of the delight the Elizabethans took in word play and word games, puns, anagrams, acrostic verses, concealed dates on tombs...literary puzzles of all kinds. The intellectual climate which produced such effective ciphers had been lost sight of" (Rollett 1997, 114). A three-element key was "too sophisticated" for these Elizabethans? If one understands keys and can make one with two elements, what is difficult about three? Here again, Rollett ignores the Friedmans' criteria and substitutes his own views. They write: "If...there are several keys, or several elements in the key..." (Friedman and Friedman 1957, 19). It does not sound as if they would have balked at a three-element key. Nor did they require a precedent for an encryption method to be considered valid. We are not talking about a significant qualitative difference, going from two elements to three; and even if we were, there is a first time for everything. No precedent is required for a solution that otherwise meets all the validation criteria because it is "too innovative." That would be a formula for rejecting encryptions because they are "too good."

The fact that Rollett was the first person to call attention to the hidden message does not imbue him with special authority to determine its validity. He is subject to the same rules and validation criteria as every other scholar, and, sadly, his revised position is illogical. It is unfortunate that he did not live to see the intentionality of the key 6-2-4 encoded in the shape of the dedication confirmed. If he had, he might have accepted the solution. If he heard the explanation of the meaning of "THE FORTH," he never informed me.

What seems to underlie Rollett's rejection of his own discovery is his conclusion that William Stanley, 6th Earl of Derby, and not Edward de Vere, wrote "Shakespeare." He wrote a book on this topic published shortly before he died (Rollett 2015). If he wanted to claim Stanley wrote Shakespeare, he had to repudiate his earlier article. Unfortunately, a big obstacle to Stanley's candidacy is the fact that he lived until 1642, 19 years after publication of the First Folio. If he wrote everything published in that collected edition of his plays, why would he then write nothing more during the last 19 years of his life?

Discussion: Who wrote the dedication?

Whoever devised the dedication as a cryptogram, revealing the identity of "Mr. W. H." and suggesting that Edward de Vere wrote the Sonnets, went to a lot of trouble to execute it. Our unknown cryptographer must have been strongly motivated to reveal these secrets.

Although Thomas Thorpe's initials are beneath the dedication, it is unlikely that he would have taken the trouble to create something so complex on his own initiative. Even if he knew the identities of the principals, the nature of their relationship, and that de Vere had promised Wriothesley that his "name from hence immortal life shall have," Thorpe would have had no stake in seeing that the promise was fulfilled, plus he would have been taking a huge personal risk in revealing what was evidently a sensitive secret. Wriothesley was still alive, and he would not have wanted to be identified as the Youth. It is also very unlikely that Thorpe, or anyone else, writing after Wriothesley's earldom was restored to him by King James in April 1603, would have referred to him as "Mr."

If de Vere authored the Sonnets and promised the Youth that his name would be immortal, no one could have had a stronger motive to see that the promise was fulfilled. Unless one believes "Shakespeare" was a feckless wonder, whose word meant nothing, then he probably had a plan in mind for fulfilling his promise when he made it. He also would have known how to create, or find someone to help with, such a communication. And by creating a *double* cryptogram to reveal not only the name of the Youth, but that he, and not Mr. Shakspere, wrote the Sonnets, he would eventually gain his recognition. It is difficult to imagine anyone other than the author thinking to do something like that. Even if Thorpe wanted to reveal the identity of the Youth, why also the author, after the author explicitly said that he neither wanted, nor expected, his name to be remembered? Only the author would have thought to create the mystery of the identity of "Mr. W. H." to reveal the identity of the Youth and at the same time reveal his identity as the author.

Why would the author design a cryptogram revealing his identity after saying in Sonnets 72 and 81 that he did not want to be remembered? He was probably ambivalent about it, resigned to the necessity of it in the short term for political or dynastic reasons, but still wanting the truth to come out eventually when the need for secrecy had passed. Although Wriothesley is warned to forget him, posterity may have been another matter. The author was complex, and probably capable of having two minds about such things. If he had really wanted never to be remembered, he would not have written Sonnets 72 and 81 at all, since both clearly suggest that the author's real name was not yet known. He may also have known that the idea that Mr. Shakspere had written the works was not credible and wanted to provide confirmation for anyone who suspected he was the real author.¹⁴

The use of "Mr." is an important clue to when the dedication was written and by whom. Rollett suggested that the dedication may have been written while Wriothesley was in the Tower, no longer an earl, just "Mr." Henry Wriothesley (Rollett 1997, 98–9). This makes sense, and if de Vere created the dedication during that period, he may not have been up to revising it before he died, just over a year after Wriothesley's earldom was restored. Getting everything to come out right again would have been a challenge.

Rather than Thorpe, it is more probable that de Vere wrote the dedication himself before dying in June of 1604, and that he supervised the layout of the dedication, and possibly the entire publication, leaving instructions that it be published some years after he died. The complex structures that Fowler found suggest authorial involvement in the publication. If he was involved in designing the rest of the publication, why not the dedication?

Perhaps he collaborated on it before dying, with Thorpe and/or a math expert like Dr. John Dee. He could have paid Thorpe enough to make it worth his while and worth taking the risk; and he could have reduced the risk by documenting that Thorpe had acted on his behalf. They both may have thought it unlikely that the encrypted information would be found soon, which turned out to be the case, as far as we know. Or maybe it *was* found before they anticipated and that explains why the 1609 publication may have been suppressed.

Finally, it seems doubtful that anyone other than de Vere would have thought to use "THE FORTH" to pun on his name in Dutch, so only certain people would understand it, but to them it would be powerful confirmation. It was obscure enough to be difficult for others to understand and offered a degree of deniability, which was evidently important. It may have helped him persuade Thomas Thorpe it would be safe to serve as publisher.

This is all speculation; we will probably never know who devised the dedication, but it is a scenario that is coherent and logically consistent with all the facts.

In hindsight it seems almost obvious that the dedication is a cryptogram and that the Sonnets was a logical place to encrypt such a message if there was a secret about the author. Only in the Sonnets does the author refer to himself in the first person, revealing personal secrets. Among the other secrets he revealed, why not include a message revealing his identity? It is unfortunate that Rollett's discovery came too late to be assessed by the Friedmans.

Conclusion to Part Two

Here again, Rollett deserves a great deal of credit for his analysis of the dedication, discovery of the name, explanation of the peculiarities in the dedication, and for his insights into the likely situation and motives of the cryptographer that led him to design it as he did. Despite errors in applying them, his solution meets the Friedmans' validation criteria. It conveys a meaningful message, confirming the identity of "Mr. W. H." as the man who was already the leading candidate. It is a unique solution, unlikely to be due to chance.

Rollett said he hoped that "The discovery that the name *Henry Wriothesley* was recorded in the Dedication...will...be welcomed by Shakespeare scholars as putting an end to more than two hundred years of speculation about the identity of 'Mr. W. H.' and the 'Fair Youth'" (Rollett 1997, 100). But his discovery has been ignored by nearly all orthodox scholars and rejected by many fellow skeptics because "Wr-ioth-esley" is in three segments, and, especially, "Wr" is widely separated from the rest of the name.

As stated above, the separation of "Wr" is the only real flaw in the way the name appears—the "imperfection" mentioned in the introduction that requires an explanation. Rollett's arguments that (1) it could not be too easy to solve, and (2) it had to be deniable if discovered too soon, make sense. To these we have now added the two new points that (1) it is a *double* cryptogram, making it difficult to get both messages right and the one pointing to another author may have been viewed as more important, and (2) if the name appeared perfect, the decipherer may have seen no need to look for anything else and the message pointing to de Vere might never have been suspected and never found. We thus now have credible explanations for the alleged imperfections in both solutions. The unique lower-case "r" in "Mr." virtually proves that the dedication is a cryptogram. Rollett's solutions (hidden message as amended) should, therefore, be considered valid.

What are the implications? First, researchers should consider the possibility that the Sonnets contain additional information that sheds light on the Authorship Question. If information was encrypted in the dedication, perhaps there is also hidden information elsewhere in the publication. Second, orthodox Shakespeare scholars should reconsider their opposition to the Shakespeare Authorship Question as a legitimate academic issue. Specifically, they should reassess their position on the authorship of the Sonnets in light of (1) the hidden message pointing to Edward de Vere as their author, (2) other oddities about the publication that call its authorship into question, and (3) the many sonnets that strongly suggest an author unlike Mr. Shakspere and much more like Edward de Vere.

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Endnotes

- For example, William Herbert, 3rd Earl of Pembroke, and William Hall, a manuscript procurer who some speculate obtained the Sonnets and passed them on to Thorpe. These scenarios are unlikely for the reasons given by Charlton Ogburn Jr, who among other reasons quotes Edward Dowden: "No example in English literature of 'begetter' in the sense of procurer has been discovered," and "it would have seemed absurd...to speak of begetting a manuscript or poem unless the begetter had been either the author or inspirer." (1984, 332). A more recent candidate is William Holme, who also knew Thomas Thorpe. Holm died in 1607, and Geoffrey Caveney proposes that Thorpe found the Sonnets among his possessions soon after he died (Caveney 2015). This also relies on "begetter" meaning procurer, and how Holme could have acquired the Sonnets is not explained. This scenario also seems unlikely.
- 2. "Ciphers are basically of two types: *transposition*, in which the letters of the original or plain-text message are rearranged; and *substitution*, in which they are replaced by other letters, by numbers, or symbols. In transposition the letters retain their identities, but their relative positions are changed; in substitution the letters retain their relative positions, but their identities are changed" (Friedman and Friedman 1957, 15).
- 3. An innocent letter cipher uses a cover text designed to appear as an ordinary communication, "innocent" of any hidden information, but which conceals some type of encrypted message.
- 4. Throughout, I have used "Shakespeare" to refer to the author, whoever he may have been, and "Mr. Shakspere," or "Shakspere of Stratford," to refer to the man from Stratford-upon-Avon. Some such convention is needed to refer to them separately, and this convention is standard.
- 5. Dr Rollett being deceased, the author secured the permission of Gary Goldstein, publisher of *The Elizabethan Review*, to use the extended excerpts from Rollett's article quoted herein.
- 6. Neither Rollett nor I continue the count past the word "FORTH" to include the second "T" at the bottom of the page. The two "T"s are much larger, in a different type face, much lower and off to the side, suggesting that they are not meant to be viewed as part of the message. They are the initials of the publisher, Thomas Thorpe, which seems very straightforward.

- 7. All translations given here are from Google Translate: https://translate. google.com/.
- 8 Please note that this is not an endorsement of all the proposed solutions in the book.
- 9. In fact, Sir Francis Vere is referred to as "Francisco" in the Latin inscription on his monument in Westminster Abbey, in the chapel of St. John the Evangelist.
- 10. William F. and Elizebeth S. Friedman are widely regarded as the greatest cryptologists of the 20th Century. They developed basic methods still used by the U.S. National Security Agency.
- 11. Doubts about the authorship began soon after the name Shakespeare first appeared in 1593. See, for example, *Early Shakespeare Authorship Doubts* (Bryan H. Wildenthal, 2019).
- 12. The main argument against Oxford has been that some of the plays were written after he died, but the traditional play dates of 1590-1612 are incorrect. Nothing proves that any of them was written after 1604, and several were written too early for Mr. Shakspere. See, for example, *Shakespeare's Apprenticeship: Identifying the Real Playwright's Earliest Works* (Ramon Jiménez, 2018). De Vere's death in 1604 is one of the strongest arguments in *favor* of his authorship claim.
- 13. An anonymous Stratfordian who would most likely disagree that Rollett's solution is unique. The web page where his search results were posted in 1998 is no longer available. He called the web page to my attention in a private email at the time, and I made and kept a hard copy.
- 14. For a summary of evidence and arguments for and against Mr. Shakspere, see the Declaration of Reasonable Doubt About the Identity of William Shakespeare: https://doubtaboutwill.org.

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Appendix: Odds Estimate

Here we estimate the odds that the name "Henry Wr-ioth-esley" appeared by chance in the arrays shown in Figures 7–9. We begin with Rollett's description of the procedure he used to estimate the odds that the name "Henry" appeared by chance, which is relatively straightforward because the name appeared in its entirety, not in segments:

First, we consider the name "Henry." We will assume that a good estimate of the odds that it might appear in any 5-letter vertical site in any array can be assessed by imagining letters picked one-by-one at random out of a notional "black bag" containing all the letters of the Dedication.

There are 144 letters in the text (disregarding Thomas Thorpe's initials "T. T." printed in larger type and offset to one side at the end); the number of 'H's is 10, 'E's 23, 'N's 13, 'R's 9, and there is just one 'Y.' The chance that an 'H' is picked first from the bag is thus 10 out of 144, and so on. The fractional likelihood of the name "Henry" being drawn from the bag is therefore the product of these 5 numbers divided by the joint product of 144, 143, 142, 141, and 140 since the total number of letters remaining in the bag is reduced by 1 after each selection.

Thus:

 $(10 \times 23 \times 13 \times 9 \times 1) \div (144 \times 143 \times 142 \times 141 \times 140)$

If we take 30 as the maximum array row size, and 6 as the minimum, the total number of possible vertical sites (reading down only) for a 5-letter word is 1,800. (In terms of picking letters out of an imaginary black bag, this means that we may make 1,800 trials of extracting 5 letters, since it is immaterial in which site the word is found.) Thus, the probability that one of these sites might contain the name "Henry" is:

1800 x 26,910 ÷ (144 x 143 x 142 x 141 x 140) = ca. 1 in 1192. (Rollett 1997, 102-3)

Similarly, Rollett calculated the odds that the segment "esley" occurred by chance in a site in any of the same arrays:

 $1800 \ge 30,360 \div (144 \ge 143 \ge 142 \ge 141 \ge 140) = ca. 1 \text{ in } 1056 \text{ (ibid.)}$

He then calculated the odds that the segment "ioth" occurred by chance somewhere in the rest of the same array (with 18 letters in each row), which has 85 possible sites:

85 x 17,920 (*sic*: should be 19,040) ÷ (139 x 138 x 137 x 136) = ca. 1 in 235,

and the odds that the segment "Wr" occurred by chance somewhere in the same array:

 $116 \ge 36 \div (135 \ge 134) = ca. 1 \text{ in } 4.33 \text{ (ibid.)}$

He then multiplied the separate odds together to obtain the overall odds that the name "Wr-ioth-esley" appeared by chance in the dedication: "(roughly) 1 in 1.1 million." This he divided by 4, since it would have been acceptable for two of the segments to be read upwards, doubling the number of possible sites, giving 1 in about 270,000.

He then multiplied the odds for the first and last names to yield overall odds for the full name "Henry Wriothesley" appearing by chance of "1 in about 320 million" (ibid).

As mentioned above, however, Rollett made the error of only calculating the odds of chance occurrence of this *particular* way of dividing Wriothesley's last name into segments. He should have assessed the combined odds of all permutations of the letters in the name which might have occurred by chance roughly *equally or less likely to occur* than the one he found. We now correct the error by doing so.

Permutations equally or less likely to occur than his are defined here as those with (1) the full last name appearing in any single array, rectangular or not, in three or fewer segments, (2) one segment with at least five letters, as in Rollett's solution, (3) the main segment reading down, making it easy to spot, as in Rollett's, (4) a second segment anywhere in the same array, reading either up or down, and (5) any third segment anywhere in the same array, reading either up or down. Allowing second and third segments to be read either up or down is equivalent to Rollett having them read down and then dividing by four. This definition is conservative in that it does not require a second segment to be in a column adjacent to the main segment, nor any third segment to be in the bottom rows, as in Rollett's permutation.

There are 53 permutations that meet this definition, including the one Rollett found. The odds of each of them occurring by chance are calculated the same way he did for his permutation: the frequencies of the letters in each segment are multiplied together, then multiplied by the number of sites where each segment could have appeared, then divided by the number of remaining letters in the dedication multiplied together. This gives the odds of each segment appearing by chance. These are then multiplied together to get overall odds for that permutation of "Wriothesley." The odds for each of the 53 permutations are then combined to get overall odds that some permutation equally or less likely to occur by chance than Rollett's permutation would appear.

We also make one additional change: Rather than Rollett's assumption of "30 as the maximum array row size, and 6 as the minimum" (see above) for either "Henry" or the longest segments of "Wriothesley" to appear, we will use the more conservative assumption that the name or segments could appear in arrays of *from 5 to 36 rows*. For "Henry," this is a total of 2,112 possible sites, rather than Rollett's 1,800. Using this assumption, the probability that one of the sites might contain "Henry" is:

 $(2112 \ge 26,910) \div (144 \ge 143 \ge 142 \ge 141 \ge 140) = 1$ in 1016, v. Rollett's 1 in 1192.

Here then, for example, are our calculations for Rollett's permutation:

ESLEY: $(2112 \ge 30,360) \div (144 \ge 143 \ge 142 \ge 141 \ge 140) =$ 1 in 900.19862 IOTH: $(170 \ge 19,040) \div (139 \ge 138 \ge 137 \ge 136) =$ 1 in 110.41741 WR: $(232 \ge 36) \div (135 \ge 134) =$ 1 in 2.16595 900.19862 \u03ex 110.41741 \u03ex 2.16595 = <u>1 in 215,290</u> = the odds Rollett's permutation occurred by chance (versus Rollett's figure of 1 in about 270,000).

Using this same procedure, the 53 permutations equally or less likely to occur than the one Rollett found, with the odds of each occurring by chance, are as follows:

1. 2, 4, 5 Wr-ioth-esley*	19. 1, 6, 4 W-riothe-sley	37. 2, 2, 7 Wr-io-thesley
(1 in 215,290)	(1 in 499,473)	(1 in 257,762)
2. 2, 5, 4 Wr-iothe-sley	20. 1, 4, 6 W-riot-hesley	38. 8, 3 Wriothes-ley
(1 in 215,290)	(1 in 499,473)	(1 in 86,183,545)
3. 5, 2, 4 Wriot-he-sley	21. 6, 3, 2 Wrioth-esl-ey	39. 3, 8 Wri-othesley
(1 in 215,290)	(1 in 236,819)	(1 in 86,183,545)
4. 5, 4, 2 Wriot-hesl-ey	22. 6, 2, 3 Wrioth-es-ley	40. 8, 2, 1 Wriothes-le-y
(1 in 215,290)	(1 in 236,819)	(1 in 559,633)
5. 4, 5, 2 Wrio-thesl-ey	23. 3, 6, 2 Wri-othesl-ey	41. 8, 1, 2 Wriothes-l-ey
(1 in 215,290)	(1 in 236,819)	(1 in 559,633)
6. 4, 2, 5 Wrio-th-esley	24. 3, 2, 6 Wri-ot-hesley	42. 2, 8, 1 Wr-iothesle-y
(1 in 215,290)	(1 in 236,819)	(1 in 559,633)
7. 5, 5, 1 Wriot-hesle-y	25. 2, 6, 3 Wr-iothes-ley	43. 2, 1, 8 Wr-i-othesley
(1 in 472,986)	(1 in 236,819)	(1 in 559,633)
8. 5, 1, 5 Wriot-h-esley	26. 2, 3, 6 Wr-iot-hesley	44. 1, 8, 2 W-riothesl-ey
(1 in 472,986)	(1 in 236,819)	(1 in 559,633)
9. 1, 5, 5 W-rioth-esley	27. 7, 4 Wriothe-sley	45. 1, 2, 8 W-ri-othesley
(1 in 472,986)	(1 in 83,721,165)	(1 in 559,633)

10. 5, 3, 3 Wriot-hes-ley	28. 4, 7 Wrio-thesley	46. 9, 2 Wriothesl-ey
(1 in 206,093)	(1 in 83,721,165)	(1 in 89,701,242)
11. 3, 5, 3 Wri-othes-ley	29. 7, 3, 1 Wriothe-sle-y	47. 2, 9 Wr-iothesley
(1 in 206,093)	(1 in 528,543)	(1 in 89,701,242)
12. 3, 3, 5 Wri-oth-esley	30. 7, 1, 3 Wriothe-s-ley	48. 9, 1, 1 Wriothesl-e-y
(1 in 206,093)	(1 in 528,543)	(1 in 1,255,079)
13. 6, 5 Wrioth-esley	31. 3, 7, 1 Wri-othesle-y	49. 1, 9, 1 W-riothesle-y
(1 in 82,413,024)	(1 in 528,543)	(1 in 1,255,079)
14. 5, 6 Wriot-hesley	32. 3, 1, 7 Wri-o-thesley	50. 1, 1, 9 W-r-iothesley
(1 in 82,413,024)	(1 in 528,543)	(1 in 1,255,079)
15. 6, 4, 1 Wrioth-else-y	33. 1, 7, 3 W-riothes-ley	51. 10, 1 Wriothesle-y
(1 in 499,473)	(1 in 528,543)	(1 in 192,072,838)
16. 6, 1, 4 Wrioth-e-sley	34. 1, 3, 7 W-rio-thesley	52. 1, 10 W-riothesley
(1 in 499,473)	(1 in 528,543)	(1 in 192,072,838)
17. 4, 6, 1 Wrio-thesle-y	35. 7, 2, 2 Wriothe-sl-ey	53. 11 Wriothesley
(1 in 499,473)	(1 in 257,7562)	(1 in 30,190,350,000)
18. 4, 1, 6 Wrio-t-hesley (1 in 499,473)	36. 2, 7, 2 Wr-iothesl-ey (1 in 257,7562)	*Rollett's permutation

To get combined odds for all 53 permutations, we divide the odds for each of the 53 into 1, sum those results, and then divide into 1. This yields odds of "Wr-ioth-esley," or some other permutation equally or less likely to occur by chance, of 1 in about 8175 (vs. Rollett's estimate of 1 in 270,000 just for "Wr-ioth-esley"). We multiply this by the odds of "Henry" appearing by chance (1 in 1016) to get the overall odds of the full name appearing by chance in a form equally or less likely to occur by chance than what Rollett found:

8175 x 1016 = 1 in 8,305,800, or roughly <u>1 in 8.3 million</u>

While nowhere near Rollett's estimate of 1 in 320 million (or 30 billion), it is still highly unlikely that the presence of the name "Henry Wr-ioth-esley" is due to chance.

The Strange Case of "Mr. W. H."

