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**THE BEALE CIPHER AS A BAMBOOZLEMENT - PART II**

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In 1885, James B. Ward published a pamphlet, *The Beale Papers*, which provided all the information Ward knew about the Beale treasure. Briefly, this was that in 1819 and 1821, Thomas Jefferson Beale, who headed a party of 30 hunters, buried 2,921 pounds of gold, 5,100 pounds of silver, and jewels worth \$13,000 in Buford VA (now Montvale.) In the spring of 1822, Beale left a locked iron box with Robert Morriss which contained two letters to Morriss and three papers with numerical ciphers. Other than receiving a letter from Beale dated 9 May 1822, Morriss never heard from or saw Beale again. In 1862, Morriss gave all the papers to James Ward, who subsequently solved what is known as cipher number 2. It described the treasure, said that it belonged to the people in cipher number 3, and that its exact location is given in cipher number 1.

In the more than 100 years since Ward recounted these events, there probably have been thousands of amateur and professional cryptanalysts who have tried to solve the two ciphers and who have thoroughly dissected and investigated every detail of the story in an effort to find the treasure. But, despite the massive amount of work, nothing substantial has been added to Ward's story and the two ciphers are still unsolved. It is also strange that the original Beale letters and papers containing the ciphers have disappeared and were never seen by anyone except Ward. This has led to speculation that the Beale treasure is a hoax, possibly concocted by Ward. In an earlier article [2], I described inconsistencies in Ward's account which support that view. These include the following points.

After Ward received the ciphers from Morriss he "arranged the papers in the order of their length and numbered them." But the ciphers identified by Ward as numbers 1, 2, and 3 contain 520, 763, and 618 elements, respectively. Obviously, they are not numbered in the order of their length. But, if the order of length does not determine the numbering of the ciphers, how did Ward know which of the two unsolved ciphers was numbered 1 and which was numbered 3? And, how did Beale, who supposedly wrote the cipher message found in number 2, know that it would be deciphered first? If it was not solved first his references to the other ciphers would not make sense. And, if he was confident it would be solved first, why did he not refer to the other ciphers as number 2 and number 3 which would have been the normal and logical thing to do?

	WARD	BEALE
Readability Grades:		
Kincaid	13.3	13.7
Auto	14.5	14.6
Coleman-Liau	10.4	9.7
Flesch	12.0	13.1
Sentence Information:	168 Sent., 4,756 Words	96 Sent., 2,837 Words
Average sentence length	28.30	29.60
Average word length	4.62	4.50
Number content words	49.4%	47.4%
Average length	6.36	6.23
Sentence type:		
Simple	15.0%	16.0%
Complex	37.0%	32.0%
Compound	18.0%	20.0%
Compound-complex	* } 48%	* } 52%
	30.0%	32.0%
Word usages:		
Verb types as % of total verbs		
To be	36%	37%
Aux.	21%	25%
Inf.	15%	20%
Type as % of total:		
Prepositions	12.8%	13.1%
Conjunctions	5.1%	5.2%
Adverbs	** 5.0%	** 4.4%
Nouns	22.3%	21.1%
Adjectives	** 12.8%	** 11.9%
Pronouns	9.4%	10.6%
Nominalizations	2.0%	2.0%
Frequency of selected words:		
I	8.9%	8.7%
The	5.4%	5.4%
And	*** 3.6%	*** 3.7%
Of	3.1%	3.3%
We	1.2%	1.9%
His	2.0%	1.1%
With	1.3%	1.1%

Figure 1.

- \* Most good documents of this type have a combined compounded percentage between 6% and 35%
- \*\* Adjectives and adverbs are the "only two classes of words likely to repay investigation." [3, p. 101]
- \*\*\* "The conjunction AND makes up around 5% of most English text." Morton. [3, p. 37]

Legend for Figure 1.

Also, as others have pointed out [1] why did Beale end cipher number 2 by writing that "paper number one describes the exact location of the vault so that no difficulty will be had in finding it" when that would have been obvious after it was deciphered? The suggestion is that whoever devised the cipher wanted to sell the idea that paper number 1 was worth reading.

A minor issue involves cipher number 3 which is supposed to contain the names and addresses of the 30 members of the Beale party plus the names and addresses of their relatives. For those roughly 60 names and addresses, cipher number 3 has only 618 numbers which appear insufficient to provide the information described.

In my previous paper [2] I also noted that Solomon Kullback, a colleague of William F. Friedman in the Signal Intelligence Service, had written about their work on the Beale ciphers. Their conclusion, based on a statistical stylistic comparison of the writing of Ward with the writing of Beale, was "that the writers of the two texts were the same person and thus that the whole affair was a hoax."

According to books on disputed authorship [3, 5], the most important stylistic comparisons are the average number of words used in a sentence, occurrences of certain words such as AND, use of adjectives and adverbs, and various other uses of words and grammatical structures.

Because these kinds of analyses are best done on a computer, I ended my paper with a request for computer literate Beale buffs to undertake the necessary work. Not surprisingly, there were no volunteers (who wants to debunk the possibility of finding \$30,000,000), but eventually I was able to enlist the help of a friend who works with computers and has access to a software program which analyzes document writing for the purposes of improving readability. He ran the writing for Ward and Beale through the program. For Beale he used his letters of 4 and 5 January and 8 May 1822 to Robert Morriss plus the deciphered message of cipher number 2. For Ward he used his pamphlet minus the above noted Beale items and the Declaration of Independence.

Figure 1 displays the comparative data for both Ward and Beale. Note the very close readability grades for both texts according to four different formulae.

Next is average sentence length and not only is there a close resemblance, but the computer report emphasizes that "a good average would be 20 to 25 words" and that both texts show a "very high" average. In other words, both texts deviate from the norm in the same direction.

Also, in two other distinct areas, use of compound sentences and the use of the conjunction AND, both texts again are rather close, while deviating from the average.

In the use of adjectives and adverbs, another important measure, the Ward and Beale writings show a close match.

Another analysis deals with word length. The frequency of words with 1-12 letters were counted, normalized, and then plotted on a graph. Figure 2 illustrates the marked similarity between the Beale and Ward texts.

Normalized Word Length Frequencies - Beale and Ward

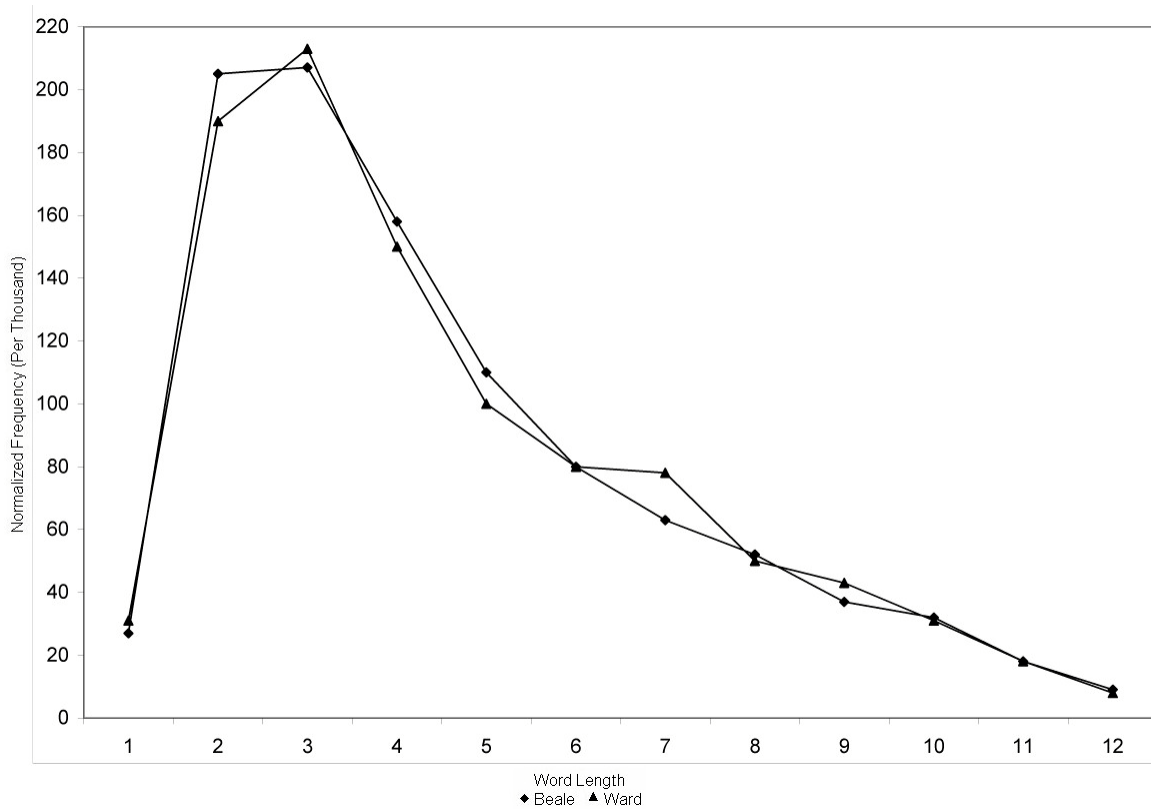


Figure 2.

Presentation of these results was going to be the end of this paper, but while it was being edited I found an article on the Beale treasure in a local historical journal written about the same time as my original paper. [4] And, coincidentally, the author not only expressed similar views, but he also arranged for statistical stylistic comparisons.

Nickell, [4] an investigative writer and an English professor at the University of Kentucky, points out some other inconsistencies in Ward's pamphlet. For example, Morriss says, "It was in the month of January, 1820, while keeping the Washington Hotel, that I first saw and became acquainted with Beale." Nickell asks how that could be, when Morriss was not associated with the

Washington Hotel until 1823, and he cites a notice in the *Lynchburg Virginian*, dated 2 December 1823, announcing that Morriss is opening the Washington Inn.

Nickell also questions the use of the words STAMPEDING and IMPROVISED in Beale's 4 January 1822 letter to Morriss, because the earliest known printed source for the former is 1883 and 1837 for the latter. Of course, the words may have been used in speech earlier than their first printed use, but he strongly doubts that the word STAMPEDING would have been in use in that form in 1822. Therefore, the suspicion again is that Ward was the real author in the mid-1880's.

	the	of	and
Beale	6.80	0.00	0.00
Ward	6.12	0.00	0.00
Marshall	8.93	2.86	0.00
Randolph	10.34	0.00	1.82
Tucker	2.90	1.73	1.54

Figure 3. Percentage of occurrence of Common Words as First Word of a Sentence

	commas	semicolons
Beale	2.60	0.06
Ward	2.40	0.06
Marshall	0.32	0.02
Randolph	1.60	0.16
Tucker	2.96	0.18

Figure 4. Average Number per Sentence

	Negatives	Negative Passives	Infinitives	Relative Clauses
Beale	24	6	44	30
Ward	36	7	40	39
Marshall	15	0	21	8
Randolph	* 29	0	18	9
Tucker	14	0	10	34

\* Ten of the negatives occur in one letter, in which Randolph tries to justify his participation in a duel.

Figure 5.

A valuable contribution is Nickell's stylistic comparisons which include control samples. These are writings of three other 19<sup>th</sup> century Virginians, John Marshall and John Randolph for comparison with Beale and John Randolph Tucker, a Ward contemporary, for another comparison.

The occurrences of common words in certain preferred positions, such as the first word of a sentence, is another criterion. Figure 3 shows that while the Beale and Ward writings are similar, they contrast with the three control samples.

Another analysis measured the frequency of use of commas and semicolons and Figure 4 shows how the Beale and Ward texts closely match each other, but differ from the controls.

Nickell provides many other examples, some of which duplicate the analyses I arranged, but with the added advantage of the control samples. All of them indicate that the Beale and Ward writings are the work of the same person.

Finally, Nickell also had a colleague at the University of Kentucky, Professor Jean G. Pival, who is a specialist in English linguistics and rhetoric, examine the texts. She conducted a study and tabulation of the syntactical features in the Beale, Ward, and control writings and her analysis is summarized in Figure 5. Professor Pival's view is that, "Although two writers might share one idiosyncratic characteristic, the sharing of several extraordinary features constitutes, I think, conclusive evidence that the same hand wrote both documents."

Readers are urged to consult Nickell's excellent article which is available from the Virginia Historical Society, Richmond, VA.

To sum up, I believe that a review of all the evidence - the inconsistencies in the Ward pamphlet and the comparative stylistic data - should lead an objective viewer to the conclusion that the Beale treasure is a very clever hoax, likely perpetrated by James B. Ward.

## REFERENCES

1. Gillogly, J. J. 1980. The Beale Cypher: A Dissenting Opinion. *Cryptologia*. 4: 116-119
2. Kruh, L. 1982. A Basic Probe of the Beale Cipher as a Bamboozlement. *Cryptologia*. 6: 378-382
3. Morton, A. 1978. *Literary Detection: How to Prove Authorship and Fraud in Literature and Documents*. New York: Charles Scribner's Sons.
4. Nickell, J. 1982. Discovered, The Secret of Beale's Treasure. *Virginia Magazine of History and Biography*. 90(3)(July): 310-324.
5. Williams, C. B. 1970. *Style and Vocabulary: Numerical Studies*. London: Charles Griffin and Co.