

Forensic Document Examination is the study of physical evidence, and physical evidence cannot lie – Roy A. Huber¹

The Application of Forensic Document Examination Techniques to the Writings of J. S. Bach and A. M. Bach

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The music-calligraphy of Johann Sebastian Bach's works has been subjected to extensive and thorough examination over the past fifty years or so. However, this calligraphy is not a reliable method of identification, as the writing styles of Johann Sebastian and Anna Magdalena Bach are remarkably similar (see Example 10). If manuscripts are to be examined reliably, a new approach is required. The Forensic Science of Document Examination (Forensic Document Examination or FDE) can, given enough handwriting specimens, offer a scientific method to identify the handwriting of both Johann Sebastian and Anna Magdalena Bach.

FDE is the scientific study of documents and handwriting for the purpose of demonstrating authenticity or otherwise. Over 100 years of research and investigation have established scientific principles which can be used to identify the writer of a suspect or Questioned Document (QD).

Handwriting and brain function

"Handwriting is a product of the brain's control over bodily movements, in particular the translation of movement by the arm and

¹ Roy A. Huber and A. Headrick, *Handwriting Identification: Facts and Fundamentals* (New York: CRC Press, 1999), p. 8.

fingers to a writing implement... these complex movements stem from 'motor programs' or 'motor memories' within the brain."²

Habituation

"The final conclusion on any...questioned document [examination] is based on individual habit patterns, and habit patterns can manifest themselves in every aspect of writing... As every person has certain habits, so does he [or she] project certain habits when he [or she] puts writing on paper."³

Complexity

"The wide range of variation found for each letter of the alphabet between different writers, the presence in many writings of unusual forms, the number of characters present in writings being compared, means that the chances of finding a match between all the features in combination must be very remote or impossible."⁴

Uniqueness

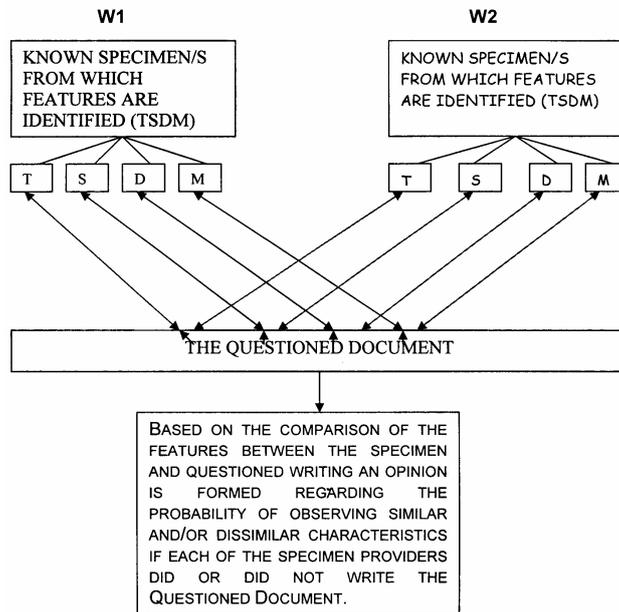
"Writing is a conscious act...made up of innumerable subconscious, habitual patterns or mannerisms [and] Only one person writes exactly the same way as the writer of the disputed material; this is the cornerstone of every identification."⁵

A number of FDE techniques would normally be applied to a handwriting specimen to identify the writer of a QD. However, I will describe the use of only one of these techniques, since space does not permit the full process to be explained in this article.

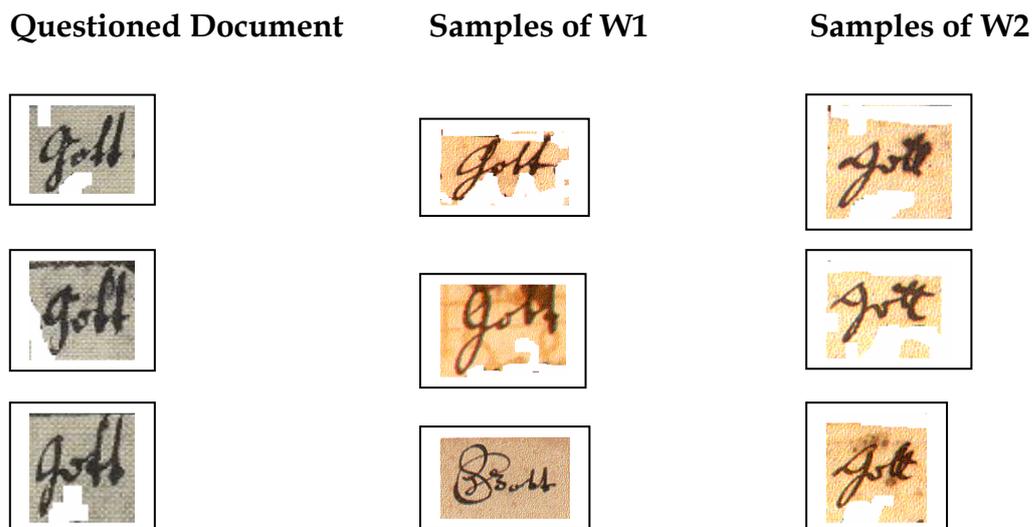
The method described below is the ideal approach for the examination of a QD where the pool of possible writers is limited. In this particular case, it is possible that either of two known individuals (W1 and W2) could have written the QD. Using this method, one of them can be effectively identified and the other excluded.

- ² Bryan Found and Douglas Rogers, 'Documentation of Forensic Handwriting Comparison and Identification Method: A Modular Approach', (1999) *Journal of Forensic Document Examination*, 12, 1-68.
- ³ D. Williamson and E. Meenach, *Cross-Check System for Forgery and Questioned Document Examination* (Nelson-Hall, 1981), pp. 2, 51.
- ⁴ David Ellen, *The Scientific Examination of Documents* (London: Taylor & Francis, 1997), p. 45.
- ⁵ Ordway Hilton, *The Scientific Examination of Questioned Documents* (New York: Elsevier, 1982), pp. 154, 160.

COMPARISON AND IDENTIFICATION METHOD I - WHERE THE WRITINGS OF TWO KNOWN AUTHORS ARE AVAILABLE TO BE COMPARED WITH THE QUESTIONED DOCUMENT



In this particular case, specimens of the handwriting of writers W1 and W2 were taken from known sources. These specimens illustrate the penmanship of both writers. Where possible, the same words were compared: to demonstrate the process used, I have selected the word 'Gott'.



Example 1: The word 'Gott' taken from the QD and the specimens from W1 and W2.

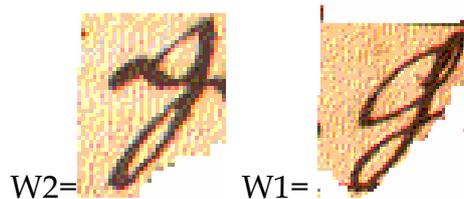
Forensic Document Examiner's comments on the word 'Gott'

It can clearly be seen in the word 'Gott', in the examples of W2's writing in Example 1, that the allograph 'G' is structured consistently. Typically W2 end-loops the flattened, and angled, down-stroke to produce a 'nose' on the large upper 'g' loop, as shown in Example 2.



Example 2

The allograph 'G' on the left in Example 3 is taken from W2 and juxtaposed to the comparable allograph associated with W1 on the right. Note the difference with respect to both structure and the pen movements, and that W1 does not add a loop to the large upper 'g' loop.



Example 3

The allograph 'G' in Example 4 is taken from the Questioned Document, and shows features which are dissimilar to the allograph of W2 (see the comparable features in the allograph on the left in Example 3). However, note the similarity in the construction of the allograph in the Questioned Document with W1, and the difference in the body of the allograph G compared to W2 (see Example 3, W1). In other words, W1's allograph is more consistent with the G allograph in the Questioned Document than that of W2.



Example 4

In Example 1 it can be clearly seen, the vertical stroke in the double 'tt' allograph of writer W2 are typically formed from a pen-stroke that is angled to the right, double looped and executed in a single movement, and further, that the double 'tt's are crossed, consistently, in the upper third (approximately) of the vertical and have a strong right leaning slant (see Example 5).



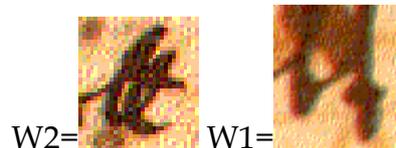
Example 5

However, W1's double 'tt' allograph is upright, and is, typically, formed entirely by a single action pen-stroke (see Example 6).



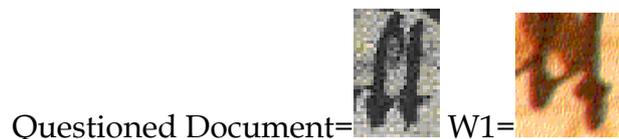
Example 6

In Example 7 the double 'tt' of writers W1 and W2 are juxtaposed. It can be clearly seen that the execution of W2's allograph is distinctly different from that of W1.



Example 7

In Example 8, the allographs from both the Questioned Document and W1 are juxtaposed clearly showing considerable consistency in execution.



Example 8

When the complete words 'Gott', written by writers W1 and W2, are juxtaposed with the Questioned Document, as in Example 9, overall, the word appears to be more in the style of W1 than in the style of W2.



Example 9

Conclusion regarding the Questioned Document

On the balance of probabilities, based only on the application of this comparative technique, the writer of the text of the Questioned Document is more likely to be W1 than W2. (It should be noted that the application of a number of other techniques to the same document confirms this conclusion.)

The range of FDE techniques can be applied to the signatures/writing of the name 'Bach'. FDE techniques can also be applied to clefs and music-calligraphy, although, as mentioned previously (see parag 1 above), the latter is less certain, due to possible emulation or simulation (see Example 10).



Example 10: A possible example of emulation or simulation, or the same writer - W1 or W2?

The outcome of the application of FDE techniques to a broad range of manuscripts and writings appears to tell quite a different story to the one with which we are familiar. In the case explored above, based on current scholarship, W1 is Anna Magdalena and W2 is Johann Sebastian, and the Questioned Document is BWV1127 - making Anna Magdalena the scribe.