

The Application of Reasoning to the Evaluation of Fundamental Differences in Handwriting Comparisons

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ABSTRACT: A cardinal tenet of forensic document analysis is that the existence of a single fundamental difference between questioned and known handwriting samples is a basis for excluding the samples as having come from a common source. But applying that doctrine to actual cases can be difficult because of different interpretations as to what constitutes a true fundamental difference. A review of the literature reveals that there is not just a single classification of a fundamental difference. When differences are observed between writing samples, an additional difficulty occurs in determining whether the suspect can be "eliminated" as the writer, or whether the examiner should merely report that "there is no basis for identifying the suspect as the author." The critical element in the analysis is in determining what constitutes a reasonable explanation for the observed characteristics. Circumstances that may lend themselves to varying interpretations of how fundamental are any observed differences include situations in which: (1) a single feature or letter differs between the questioned and known samples; (2) the format of the samples contrasts cursive handwriting with manuscript handprinting; (3) the questioned writing exhibits poorer line quality than the known writing; (4) there is only a small quantity of known comparison standards; (5) the writer has used a disguise that may cause the writing samples to appear to be fundamentally different.

KEYWORDS: forensic science, questioned documents, handwriting comparison, fundamental differences, elimination

A common perception of forensic document examiners is that their job is to identify handwriting. But to conclude that document examiners only identify handwriting narrows the scope of the discipline and reveals a bias toward identification without applying equal weight to the process of elimination.

Although much of the literature pertaining to handwriting comparisons does focus on how to identify the writer of questioned samples, any identification is subject to error if the basic principles of both identification and elimination are not equally well known and applied. Both depend on application of the same elements to arrive at a proper conclusion. The two basic ingredients of any analysis are (1) to thoroughly scrutinize the material being examined, taking note of both similarities and differences; and (2) to be well grounded in the established principles of the profession

and to accurately apply those principles so that a correct determination can be achieved. The first step is the objective component of the process and requires accurate observation, whereas the second step is the subjective component and depends on proper evaluation of that which is observed. The evaluation phase, which is essentially accurate reasoning ability, is the more difficult step in the process. Nonetheless, many errors can occur if one falls into the trap of the unskilled individual who tends to focus primarily on similarities while ignoring differences. In an important study confirming that experienced document examiners significantly outperformed college-educated nonexperts, Kam et al. stated that "... it is interesting to note that when comparing different documents for association, expert document examiners are often looking first for evidence that two examined documents emanated from two different writers, while nonprofessionals often concentrate on similar characteristics first (1).

Experienced questioned document examiners are less likely than others to fail to observe differences among handwriting samples, but the evaluation—or reasoning—applied to the significance of those differences can be a source of inconsistency even among professionals. Part of the difficulty in dealing with eliminations is the difference between enunciating a basic principle and the application of that principle to the solution of a handwriting problem. For example, most examiners would agree that a basic principle of handwriting comparisons is that an identification of a person's writing cannot be established if a single fundamental difference exists between a questioned sample and the known comparison standards. This statement appears to be quite simple and unambiguous; but, in practice, the evaluation of fundamental differences and their relationship to eliminations is a very complex issue in which even the recognized leaders of the profession reveal inconsistencies.

The basis for identifying a questioned handwriting occurs when the writing shows no signs of tracing or simulation but reveals significant unique characteristics, providing those features are also represented in the known writing without any fundamental differences. The application of reasoning in handwriting comparison involves determining what are significant unique characteristics and what are fundamental differences.

If all of the criteria for an identification are not verified, the problem of the examiner develops into determining whether the author of the known comparison standards can be eliminated as the source of the questioned writing, or whether the conclusion is expressed merely as "there is no basis for identification." McAlexander studied this situation and noted that the response of different textbook authors to this issue is not uniformly consistent (2). Osborn, in his classic volume on questioned documents, alleges

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that “If two writings cannot be identified as the same then necessarily they must be identified as having been written by different hands” (3). Few modern questioned document examiners would agree with Osborn’s statement without clearly establishing the limits by which the failure to arrive at an identification occurs. Because there is an inadequate basis to establish identity between two sets of writing does not mean that someone else necessarily wrote the disputed material. There are numerous situations which can preclude an identification—deliberate disguise, a change in the physical or emotional condition of the writer, the condition of the writing surface or writing implement, or even an inadequate quantity of comparison standards. Fortunately, in other sections of his book, Osborn does incorporate the above conditions to provide a more accurate basis for reaching an elimination.

Harrison’s rule on fundamental differences is:

[two specimens] cannot be said to be of common authorship if they display but a single consistent dissimilarity in any feature which is fundamental to the structure of the handwriting, and whose presence is not capable of reasonable explanation (4).

Harrison’s position thus establishes that a single fundamental difference can *prevent identification* without necessarily resulting in an *elimination*. His requirement of a “consistent dissimilarity” also seems to require that the difference must occur more frequently than just in a single instance. His understanding that the rule may be modified if there is a reasonable explanation of any differences is in agreement with the other textbook authors.

Conway takes a similar view to that of Harrison. He states “. . . a single fundamental difference in an identifying individuality between two writings precludes the conclusion that they were executed by the same person” (5). As with Harrison, Conway doesn’t necessarily require that a fundamental difference must result in an elimination. But Conway’s statement does not reveal whether the difference must occur more than once to be considered fundamental.

Hilton’s position differs from that of Harrison and Conway in that he considers a fundamental difference a sufficient basis for elimination rather than just a “failure to identify.” His position is:

To establish that the known and disputed material have different sources requires that there is at least one basic, significant difference between them—one fundamental identifying characteristic that does not occur in the same way in both sets of specimens (6).

As with the other authors, a deficiency in Hilton’s thesis is that he does not clearly define in words or by example what is meant by “fundamental identifying characteristic.” He does claim that for a single fundamental difference to exclude a writer, the writing specimens must be extensive and “reveal the full picture of the known writer’s habits and ability” (7).

In perusing the standard texts to determine the use of fundamental differences to establish the basis for handwriting eliminations, one encounters some problems with semantics. Hilton provides an example wherein he continues the above discussion of “different sources” between known and disputed material by referring to a conclusion of “nonidentity.” From the content of the passage, it is evident that he intends for “nonidentity” to be synonymous with “elimination.” He states: “It is a basic axiom of identification in document problems that a limited number of basic differences,

even in the face of numerous strong similarities, are controlling and accurately establish nonidentity” (8). Although Hilton considers “nonidentity” to be the same as “elimination,” it would seem that the term could also mean that the writing cannot be identified and thus would fall into the classification of “no conclusion.” In fact, in a report on the “Standardization of Handwriting Opinion Terminology” by McAlexander et al., the expression “no identification” (which equates to nonidentity) is described as a troublesome term “that could mean anything from a strong probability that the suspect wrote the questioned writing to a complete elimination” (9). McAlexander suggests that the standard terminology of document examiners should refer to “elimination” rather than “nonidentity.”

A second problem with the semantics of handwriting eliminations occurs when one attempts to distinguish between the terms of what constitutes a *basic* difference, a *significant* difference, or a *fundamental* difference. Not all examiners consider the three words to be equivalent, although the quote from Hilton previously cited does describe a *basic significant difference* as a *fundamental characteristic*. Other terms also observed in the literature include *consistent* differences and *substantial* differences. McAlexander attempts to differentiate between *significant* differences and *fundamental* differences as he describes the process for assigning weight to differences.

“. . . differences must be reasonably *judged* to be fundamental. . . . If we dealt with facts, per se, then all fundamental differences would be significant. However, since we deal in judgment about facts [such as, *reasoning ability*—F.I.W.], only those differences that we reasonably judge to be fundamental actually meet the “significance test.” A fundamental difference and a natural variation have one thing in common; until additional evidence in the handwriting puts them in their respective categories, each is simply an unexplained difference (10).

In other words, a fundamental difference does not become significant until it has been evaluated. Only then, using reasoned judgment, can a document examiner determine that a difference is fundamental and is capable of causing the elimination of a common writer.

The previously cited passages from the leaders of the profession of questioned document examinations conclude that the presence of fundamental differences between two writings should result in a failure to identify a common writer, and might even eliminate a potential suspect as the writer of the questioned document. Despite the importance in recognizing fundamental differences to accurately analyze handwriting, none of the authors clearly define what factors should be considered in setting the parameters for determining a difference as fundamental and using that difference as a basis for elimination. McAlexander attempts to fill this void by listing four conditions that need to be met before an elimination can be established:

1. The difference must be repeated and/or must be in combination with other differences, some of which similarly must be repeated.
2. Differences in features that are unusual carry more weight than those that are not.
3. There must be a judgment of naturalness in the writing.
4. There must be judgment ruling out such permanent or transitory factors as disguise, change in habit, multiple styles, accidentals, and normal variation (11).

Beck also addressed the issue of establishing the basis for an elimination in an excellent article in the *Journal of Forensic Sciences*. He made many of the same observations that McAlexander had in his paper, including the tendency of some examiners to establish a prejudice toward the *identification* of a writing based on numerous similarities between samples despite the presence of possible differences. If the differences are fundamental, rather than natural variation, an examiner might fail to correctly eliminate the suspect. Beck sets up the following factors to determine whether a difference is significant for elimination:

“The difference is significant if [1] it occurs in spontaneous writing, [2] has some individual character and is [3] preferably, repeated,—[4] [An]other test for significance [is] whether the differences in the questioned sample fall outside or inside the range of variations in the known” (12).

Both McAlexander and Beck require that for fundamental differences to result in an elimination, the writing must be natural/spontaneous; it must possess unusual/individual characteristics; and judgment must be used to rule out natural variation. McAlexander lists other factors that require judgment (disguise, accidentals, etc.), which Beck doesn't mention but no doubt would agree with. The only basic difference between the proposals is McAlexander requires that differences must be repeated, whereas Beck, although preferring repeated differences, is willing to acknowledge that a “. . . dissimilarity appearing only once may be quite fundamental in nature” (13). Beck's position agrees with Ordway Hilton's but fails to explain how a fundamental difference that appears only once can be distinguished from an accidental mark. An important consideration in evaluating differences is that in order for an examiner to determine if a writing is spontaneous or if it falls within or outside the range of variation of the known, he must use his reasoning ability. It is for the purpose of developing these reasoning skills that the questioned document discipline requires that a trainee undergo a rigorous training program under the daily supervision of an experienced professional.

Beck takes a very strong position in requiring that significant differences should result in the elimination of a suspect. Obviously, not all questioned document examiners would agree with his view. The practice of many examiners when confronted with fundamental differences to not absolutely eliminate the subject but rather to state that “the subject could not be identified” is considered by Beck to be an error.

The foregoing discussion is a review of the literature concerning the evaluation of fundamental differences and their significance in determining whether a writer can be eliminated as the source of a questioned document. Since the determination of what constitutes a fundamental difference varies among practitioners, it is obvious that reasoning ability, based on experience and judgment, must be an essential component of the evaluation process.

In comparing handwriting, there are a variety of situations examiners could encounter in which they might question the significance of the observed differences. In some instances, not all examiners will agree on the extent to which an elimination is possible. Elimination of questioned writing based on fundamental differences can be placed in three separate categories determined by the probable unanimity of the opinions among all competent document examiners.

1. Situations where a writer can *always* be eliminated if differences exist

- The writing quality on the questioned document is superior to what the suspect can produce.
- Another writer has been identified as the author of the questioned material.

Elimination in the above cases rest on a basic principle of handwriting comparison and is universally recognized.

2. Situations where a writer can *never* be eliminated if differences exist

- There is an inadequate amount of questioned writing or known comparison standards to establish the range of variation of the writer.
- One set of writing is in a different format (for example, cursive) than the other set (for example, handprinting).

The second category is actually another example of an inadequate amount of comparison material but deserves mention because it reveals a dilemma regarding fundamental differences. Most people have handprinting that is totally dissimilar to their cursive handwriting. Extensive collected specimens of comparison standards could be collected from personnel records and other normal-course-of-business sources which may never reveal any cursive writing except for a signature. If the known documents were printed and the questioned document was entirely in cursive style, the two sets of writing samples would appear fundamentally different but no examiner would eliminate based on those differences. It is a recognized fact that people have two basic writing styles which they have developed through practice during their formative years. How can a questioned document examiner be certain that someone has not acquired a third handwriting style through practice which he can consistently maintain separate from his other handprinted and cursive writing styles.

3. Situations requiring reasoning to determine if a writer can be eliminated if differences exist:

- There is the absence of a feature in one set of writing that occurs in the other set.

This scenario can have different conclusions based on the type of differences which exist. A fundamental difference in the structure of a letter might result in an elimination but a missing diacritic may not.

In the case illustrated in Fig. 1, two checks containing four signatures were forged on the account of Michelle Rogers. The suspect submitted 30 request standards, which appeared to be naturally written and clearly resembled the questioned signatures except for one feature—all of the request signatures contained a period at the end of the name but none of the four questioned signatures did. Presumably, this would be a single fundamental difference consistently used which theoretically could eliminate the suspect despite substantial similarity of other features. The identifying features were so strong in this case that the difference of the period was discounted. It is doubtful than an adherent to the principle of an elimination based on a single fundamental difference would have eliminated the suspect in this case. One could argue that the observed difference could be discounted as fundamental because of the small amount of questioned writing (four signatures). Nonetheless, this case illustrates that the principle of elimination based on a single fundamental difference is subject

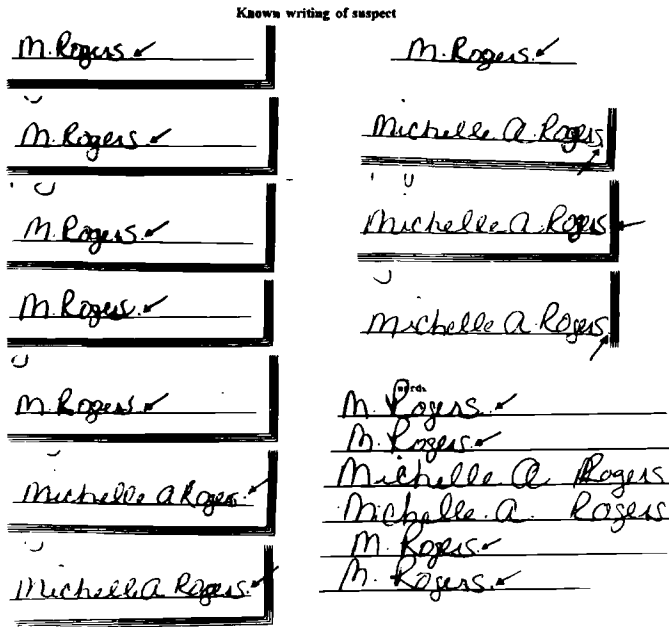
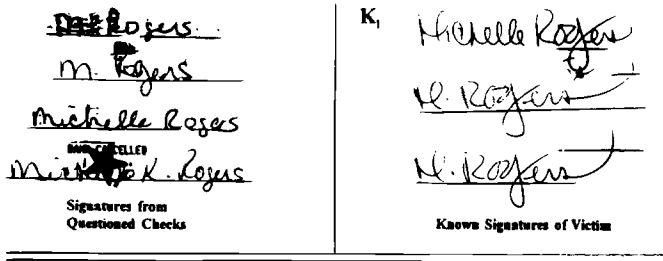


FIG. 1—Comparison of questioned writing to known writing on exemplars of suspect. All 30 signatures on the exemplars were followed by a period, although no periods were present on the questioned writing. Was this a fundamental difference? Based on this single difference, would an elimination of the suspect be correct?

to modification if other reasonable conditions apply. Careful evaluation and reasonable judgment need to be used in such cases.

- There are two sets of writing that are similar except for a single letter, which is different.

As with other determinations of fundamental differences, the resolution of this problem depends on whether the writing is spontaneous and whether there are enough samples to fully reflect the range of variation of the writer. In some instances, an elimination may be possible, but caution must be exercised because some people may occasionally substitute between cursive and hand-printed letters in a word, or between upper case letters and lower case letters. In such cases, a limited sample size may cause a different form of the same letter to appear in one sample from that which appears in the other sample. Figure 2 illustrates alternate forms of the letter "S" in the payee name "Harveys," although other features of the writing provide a sufficient basis for an identification. However, note the comparison of the authorizing signature "Michael Perez" to the known comparison standard. Is the sloppy condition of the questioned signature with the resulting letter alterations a fundamental difference which could prevent an identification?

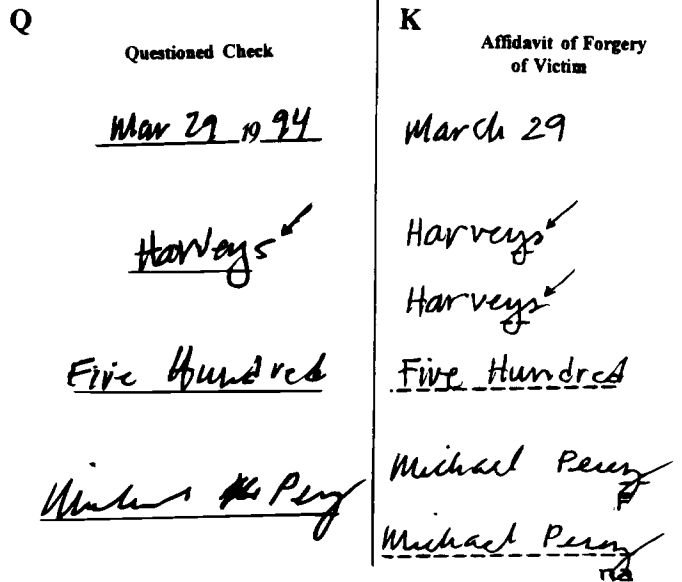


FIG. 2—Despite numerous overall similarities, note the different shape of the "s" in the payee name. Although this difference could be ascribed to the small sample size, would it be a fundamental difference if there were numerous knowns which still failed to end in a printed "s"? Based on similarities in the rest of the face writing, can the questioned "Michael M. Perez" signature be identified? Note the different proportion of the "i" to the "c" and the loss of detail of the last three letters in the two names. Despite the small sample size, should these be considered to be fundamental differences?

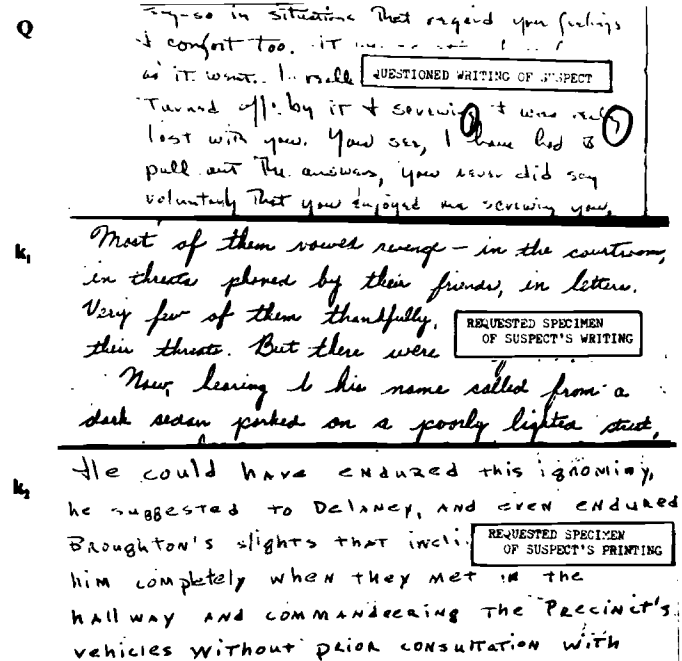


FIG. 3—A suspect in a statutory rape case corresponded with his victim in a semi-cursive writing style. The correspondence was compared against "request" samples of his cursive handwriting and manuscript handprinting, but substantial differences were observed between the questioned and known samples. Only when "collected" samples of the suspect's semi-cursive writing style were obtained, was an identification possible (see Fig. 4). Had the suspect corresponded with the victim only in his alternate writing style which he used on his "request" specimens, perhaps no matching writing could have been obtained. Yet to eliminate the suspect based on the observed fundamental differences would have been incorrect.

Q ... say-so in situations that regard your feelings
 & comfort too. It was sensational as far
 as it went. I really **QUESTIONED WRITING OF SUSPECT**
 turned off by it & severely **Q** was really
 lost with you. You see, I have had to **Q**
 pull out the answers, you never did say
 voluntarily that you enjoyed me screwing you,
 crossing you, going down on you or anything &

K Watch the ball at impact!
 Got the racket back immediately!
 heels not in position & not allow it to float around
 shift weight before hit & maintain position (not rock
 follow through to count 1, 2, 3. **COLLECTED SPECIMEN
 OF SUSPECT'S PRINTING**

FIG. 4—The apparent differences between the questioned and known writing in the previous illustration (Fig. 3) are resolved when "collected" samples of the suspect's writing are compared against the questioned correspondence.

Q Bill Davis
 Questioned signature on
 "Informed Consent for Chemotherapy"

K₁ Bill Davis
 Known signature on
 "Consent to Outpatient Treatment"

K₂ Bill J. Davis Bill Davis
Bill J. Davis Bill J. Davis
Bill J. Davis Bill J. Davis
 Collected known signatures

K₃ Ruth Moore RV Bill Davis
 Signature of nurse witness to
 "Informed Consent for Chemotherapy"
 and "Bill Davis" name she wrote on that form

FIG. 5—Bill Davis purportedly signed Q and K₁ at the same time. Later, after an adverse drug reaction occurred, he did not remember signing Q. If the nurse later had forged Davis's name to protect the doctor from a lawsuit, it should not look more sloppy than she would normally write his name (see K₃). Perhaps Davis signed Q after chemotherapy had started when his writing would be affected by the drugs.

• There is questioned handwriting that is entirely in one format (such as cursive) that contrasts with comparison standards that consist of a mixture of two formats (both cursive handwriting and manuscript handwriting).

As discussed earlier, some people have different styles of handwriting and these may be intermingled or separated. An example of this is a semi-cursive style, which consists of letters which look almost handprinted that are rapidly executed and formed by connecting strokes. A person may only use this semi-cursive style in normal transactions, yet be capable of reverting to either entirely cursive writing or entirely handprinting at will. Since neither the cursive writing nor the handprinting might look like the commonly used writing style, such a writer could execute a fraudulent document for which no matching comparison standards could be obtained. Figures 3 and 4 illustrate such a handwriting style. A male school teacher in a rural community was accused of statutory rape of a student. To prove the transgression, samples of correspondence with the student were submitted for comparison with the teacher's known writing. The original known submission included only "request" samples of manuscript handprinting and cursive handwriting supplied by the suspect. The semi-cursive questioned writing did not match either set of the submitted known writing. Eventually, "collected" writing samples from the teacher resulted in him being identified as the author of the questioned correspondence. The teacher had a normal semi-cursive writing style, but when preparing his known comparison standards, he used different, fully cursive and fully printed, styles which did not match his normal style nor did it match the questioned correspondence. If the suspect had corresponded with the student only in his alternate writing style, it is possible that no matching samples of that style could be obtained and it would appear that fundamental differences

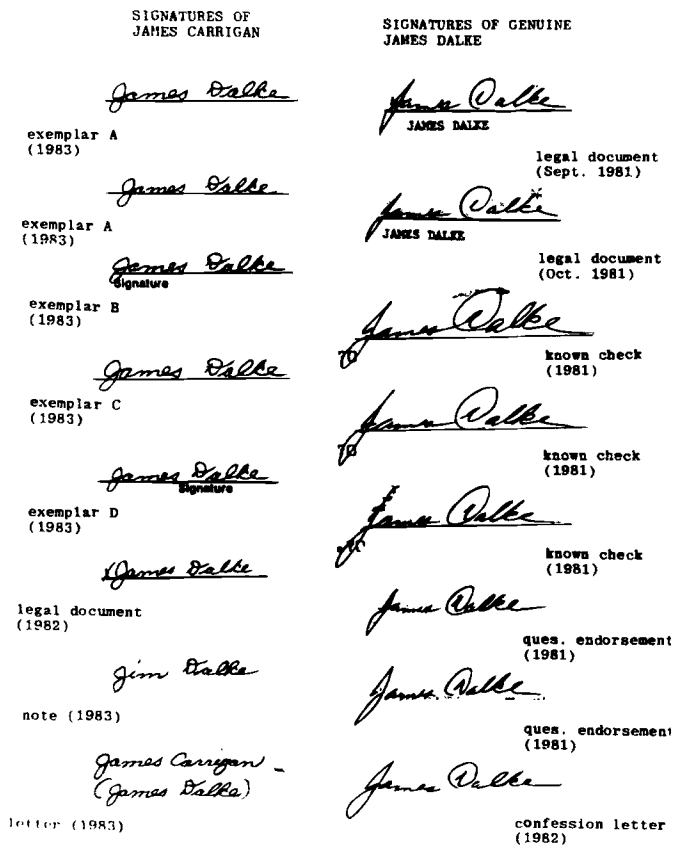


FIG. 6—Signature of the genuine James Dalke vs signatures of the purported “James Carrigan” aka “James Dalke.” Note differences in the shape of “J,” “D,” “k”; apex on “a”; “e” on shoulder of “s”; extra strokes on “s” and “a”; rounded arches on “m,” etc. Despite these differences, both names were written by the same person who had two distinct styles of cursive handwriting.

existed between the suspect’s writing and the questioned writing. Yet for him to be eliminated as the author of the questioned letters based on the obvious differences would be an error. Astute judgment and accurate evaluation of the entire body of one’s writing obviously is necessary to determine the existence of different writing styles.

- There is known handwriting that exhibits smooth line quality that contrasts with questioned writing that exhibits poor line quality.

As stated earlier, no person can produce a questioned writing that is artistically superior to that person’s natural writing ability but an individual can voluntarily decrease his writing ability in an attempt to disguise. Also, a difference in line quality might sometimes be due to differences in the physical condition of the subject that occurred between the time the questioned and known samples were produced. The most frequent examples occur when a person has had a stroke or is under the influence of alcohol, but other situations may also account for differences in writing quality. Figure 5 illustrates a case in which a man named Bill Davis was admitted to a hospital for medical treatment. He subsequently had an adverse reaction to his medication and said that he could not remember if he signed the consent form that described the possible side effects of his treatment. The signature on the consent form was very sloppily written in contrast to other signatures supposedly signed at the same time. After examining the poor writing quality, an examiner might be inclined to say that the signature was written by the attending nurse to cover up for a failure to have Mr. Davis sign the consent form. But applying logical reasoning to the circumstances of the case led to a different conclusion. The nurse who signed the consent form next to Mr. Davis’ name—who was the logical person to have forged his name—had writing quality equal to Mr. Davis’ but far superior to the sloppy signature on the consent form. A reasoned conclusion in this case was that Mr. Davis had indeed signed the consent form, but most likely after the injection of the medication had begun and he had already started reacting to it. When the reaction began, the nurse realized that he had not signed the form and she probably had him do it at that time. Because he was partially drugged, his writing quality was very poor.

This case is an example of a situation where differences did exist between the questioned and known writing samples. But a probable conclusion of identity was reached based on the circumstances of the case despite the differences in the writing quality.

- There is questioned handwriting that is matched against a fairly small sample of known standards.

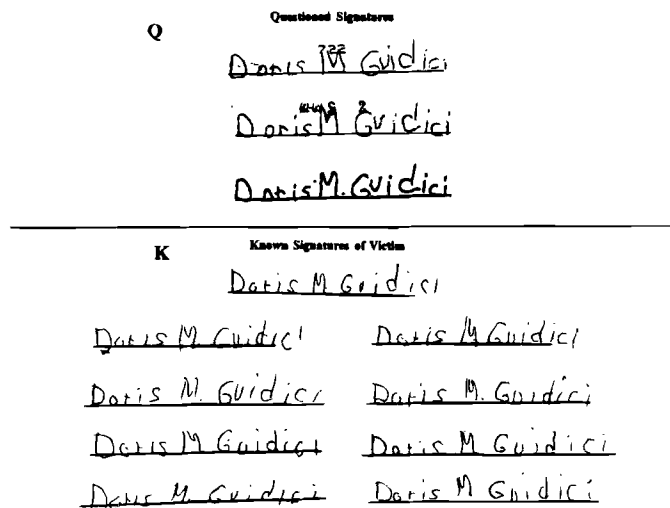


FIG. 7—Illustration of fundamental differences that distinguish between two writers despite numerous similarities. Note placement of signature at beginning of signature line, the spacing of letters, the closing of the “o” (at 11 o’clock vs 1 o’clock), the placement of the “i” dots, and the shape of the extender of the “r.”

This is a situation that frequently happens in government crime labs. Often the request exemplars that are submitted with the questioned documents are the only comparison standards available. In many instances they may not provide a good sample of the range of variation of the person’s natural writing. If differences are observed, the examiner may be unable to determine whether they are due to disguise or to other factors. Although he may believe that the subject did not write the questioned material, an absolute elimination could be misleading. For this reason, many examiners choose to word their reports to state that there was “no basis for an identification” rather than to state “the suspect can be eliminated as the source of the questioned writing.” In the article by Jan Beck previously cited, Beck states that to issue a report of “no basis for identification” rather than to completely eliminate the person is an improper conclusion if fundamental

differences are present. As this paper illustrates, the determination of what is a fundamental difference is not a simple matter and may be subject to different interpretations among various examiners. For this reason, this writer disagrees with the position of Beck that an outright elimination is generally a better conclusion than to state that there is "no basis for an identification."

- There is effective disguise which may cause writing samples to appear to be fundamentally different.

Although fundamental differences can be used to distinguish between writers in some cases, in other cases what may appear to be fundamental differences may be clever disguises. This writer presented a paper to the American Society of Questioned Document Examiners in 1983 (14) that illustrated a case in which a suspect named James Dalke was arrested for passing bad checks (see Fig. 6). The public defender who represented Mr. Dalke received a letter from an out-of-state man claiming to be the real "James Dalke" who felt remorseful because the man in jail, whose true name was "James Carrigan," had been falsely charged with the letter writer's crimes. His remorse was so great that an innocent man was unjustly charged, that he promised to return to Reno and surrender to the police immediately after they freed the jailed imposter! Although the police wisely refused to release the man in jail, a comparison of the writing from the two supposedly different men revealed some differences that were consistently maintained. If fundamental differences between two sets of writing invariably result in a conclusion that they were not authored by the same person, then Mr. Dalke was indeed two different people. However, fingerprint comparisons revealed that both of the Mr. Dalkes had the same ridge pattern.

Certainly, in many cases, fundamental differences exist between two sets of writing and should result in eliminations. Examination of a representative case illustrates a situation in which a writer can be eliminated because of fundamental differences (see Fig. 7). An elderly woman named Doris M. Guidici had difficulty with muscular control which affected her writing ability, and she also had poor memory. Mrs. Guidici suspected her housekeeper of forging her name to checks drawn on her account, although her poor memory prevented the woman from being certain that she had not signed the checks herself. The handprinted signatures on the checks had a close resemblance to the printing which Mrs. Guidici used for her own signature. But careful scrutiny of the writing revealed numerous subtle differences between the questioned and known writing. Examples include the placement of the signature at the beginning of the signature line, the spacing between the "D" and the "O," the location where the "O" closes (11:00 o'clock vs 1:00 o'clock), the shape of the extender of the "r" (longer and curved vs. short and straight), the placement of the dot over the "i," and the extent that the letters are crowded together. The consistent combination of the same differences between the two writing samples was sufficient to permit a conclusion that the

questioned signatures were not genuine but were clever simulations. In this case, fundamental differences were used to distinguish between two sets of signatures despite many similar writing characteristics.

The use of fundamental differences as the basis for excluding two writing samples as having come from a common source is a basic tenet of handwriting comparisons. But difficulties arise when one attempts to apply that doctrine to actual cases because of different interpretations as to what constitutes a true fundamental difference. A review of the literature reveals that there is not just a single classification of a fundamental difference that can always be used for the elimination of a suspect in a handwriting case. Rather, there are different applications of the principle. Experience leading to proper evaluation of all characteristics, plus use of accurate judgment and reasoning ability, are prerequisites for a conclusion that two samples of writing were authored by different individuals.

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