FORENSIC SIGNATURE EXAMINATION

About the Author

Steven A. Slyter is a forensic document examiner, and a past president of the Association of Forensic Document Examiners. He maintains a private practice in Louisville, Kentucky. His clients include attorneys, individuals, businesses, banks, security companies, and government offices. He has been recognized as a qualified questioned document expert in state and federal courts since 1973, and has made well over 100 court appearances in which he has given testimony relating to signature and handwriting authenticity, forgery identification, disguised writings, indented writings, typewriter identification, anonymous letters, graffiti, age of documents or writings, and alteration to documents. Mr. Slyter served for three years as Technical Editor of the *Journal of the Association of Forensic Document Examiners.* He has published numerous articles in the AFDE Journal. He has also published articles on document photography in STUDIO magazine. In 1995, Mr. Slyter's article "The Effects of Alterations to Documents" was published in Volume No. 29 of *American Jurisprudence,* PROOF OF FACTS, Third Series.

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By

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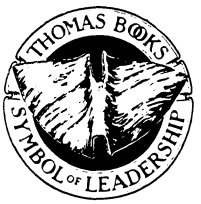

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Dedicated to My Children
Monica, Pamela and Matthew

INTRODUCTION

"This can't be right!" The client leans forward across the desk, the tone is serious with undercurrents of puzzlement and anger. The document pushed forward is of great importance to this person. A lot is at stake now—money, reputations, memories of a loved one, careers, the future, even someone's freedom . . . critical questions must be addressed; "Is this a valid signature? Or, is it a forgery?" A handwriting expert must be hired to search for the answers.

From this opening meeting through to the final resolution of the issues which are raised by the document in question, the specialized knowledge and skills of the handwriting expert will be needed if the truth is to be found. The pathway through a questioned document case does not lie in a straight line. There will be expected and unexpected twists, turns, and obstacles to navigate before the expert's work is finished. At many points in a case an expert will find the evidence confusing. It is easy to head off down a dead end path and have to backup to reestablish the direction of the investigation.

The most valuable tool with which to meet any navigation problem is a solid, well known, unmoving, distant point of reference. My own favorite aid to navigation is a prayer which, though probably thousands of years old, might just as well have been written today with the forensic expert in mind.

> From the cowardice that shrinks from new truth—
> From the laziness that is contented with half-truths—
> From the arrogance that thinks it knows all truth—
> Oh, God of Truth, deliver us.
>
> Anonymous Jewish Prayer

When setting out to become a document examiner, having a distant point by which to steer is vital. However, setting a course by focusing on that goal is easier than getting started on the trip. A document examiner may be called upon to address a wide range of questions relating to the purported history of the production and storage of critical documents.

In addition to handwriting and signature comparisons, the document examiner must be knowledgeable of inks, paper, copy machines, typing machines, indeed any process that might relate to documents.

Some experts working on questioned documents have specialized. There are experts who work almost exclusively on questions of typewriter identification or paper and ink chemistry. For most questioned document examiners a question of signature authenticity is the central issue in more than 90 percent of their cases. How does one start to build the body of knowledge necessary to become a document examiner? Start right here. There is nothing more important to the examination of questioned documents than effective, objective skills for forensic signature examination.

I began my studies toward becoming a handwriting expert in 1970. In my twenty-five years of direct involvement, and in my reading of the literature from decades before, precious little has been done to develop objective paradigms for the analysis of signature habits. While 90 percent of the document examiner's work involves signatures, more than 90 percent of the progress in terms of tools and techniques for the document examiner has been in laboratory devices for testing the physical parameters of documents.

Testing for such things as infrared luminescence of ink or indentations in a sheet of paper is wonderfully objective work. There are certain pieces of equipment which must be used and certain procedures to be followed. Anyone conducting the tests correctly will arrive at the same results. The methods and equipment that have been developed are invaluable in those cases in which they are needed. It is understandable that so much attention has been given to physical testing. When cases involving evidence gained through such testing require a court appearance the document examiner can enjoy the luxury of testifying to demonstrable facts. The jury seeing the results of physical tests is willing to view the document examiner as a scientist. By its nature, signature examination is not so scientific.

Signatures are relied upon for identification because they are unique. For our own subjective reasons each of us develops habits of pen movement which come to represent our signature. It has appeared to some outspoken critics that handwriting experts have been equally subjective in forming opinions about the authenticity of signatures. Whether due to spin-control journalism, sound-bite news, say-anything talk shows, or better education—jurors seem to be less willing to accept "I say so"

testimony. Today, anyone who appears in court as a paid witness must expect to be viewed with skepticism.

In the desire to persuade jurors, I believe that many experts have made a poor choice of strategies. Too many experts try to paint themselves as a combination high-priest and magician, in possession of some complex special knowledge that would be far beyond the grasp of mere mortal jurors. The worst of these offer condescending testimony along the line of " . . . my experience makes me terribly important, so just trust me."

When experts act as magicians they discount the value of their own work and insult the jury. If signature examination is not science—neither is it magic. It is a technical discipline. The best experts employ the scientific method in a systematic, objective search for the truth. I doubt that any of us would want our fate decided by a juror who believes that David Copperfield made the Statue of Liberty disappear. Why then would we want a juror to believe there is something magical about signature comparison? What is magic to one person is a technology to another. There is a critical difference between magicians and technicians. Using unambiguous language, the technician will gladly explain how the feat was accomplished.

By defining the parameters that guide an examination of signatures an examiner can avoid any appearance of nonobjective work. Before the case is accepted and any examination of documents begins, a competent examiner should be willing and able to define what will be compared; how the elements which will be compared relate to one another; the thresholds of significance in matching and mismatching elements; how decisions will be made about any differences that might be found; and the critical criteria for forming an opinion. No one can question the skills of an athlete who calls a shot before the action begins. Likewise, the expert whose working methods and decision-making parameters are consistently applied to every case cannot be charged with subjectivity.

One of the earmarks of a science is that it is alive and changing, always growing on what has come before. Document examiners too often view the works of founders such as Albert S. Osborn as the final word on the subject rather than an inspired beginning. In this book I explain working parameters and systems which I have developed in my own practice. These developments grew from my studies and application of the principles published by the pioneers in handwriting identification. In my own practice these tools have been used daily for many years and I have found them to be useful and effective. I hope and fully believe, that these tools can be as useful for others.

ACKNOWLEDGMENTS

The ideas and methods presented in this book have been under development and revision for more than a dozen years. I am grateful to the many friends and colleagues who contributed to this process. They have listened, offered constructive criticism, and given needed encouragement.

A document examiner works in the advocacy system. There is never a shortage of criticism. Some of the critics have not intended their remarks to be constructive. However, I have always recognized that they put a lot of thought and energy into finding any weak spot in my work. They have certainly helped me develop stronger tools.

I am grateful to Monica Hall and Jean Yingling for their assistance in editing this work. They were most helpful.

Finally, this book would not have been possible without the support and assistance of Nancy H. Cole, Questioned Document Examiner in Palo Alto, California. From the beginning, Nancy has patiently read and edited countless pages. She has helped me to bury some bad ideas and she nurtured better ideas through difficult times. Nancy, thank you.

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FORENSIC SIGNATURE EXAMINATION

Chapter One

AN OVERVIEW OF SIGNATURE IDENTIFICATION

Many document examination problems present the examiner with a straightforward question of fact. Such questions may include: Was this document altered? Were these pages prepared on the same paper? . . . with the same ink? These questions can be answered objectively with demonstrable, physical laboratory tests, and, when necessary, the examiner can be called to testify to the results.

Questions of signature identification, however, cannot be answered with such purely objective, scientific clarity. The handwriting expert must rely on special knowledge, skills, and experience to reach an honest opinion. Document examiners working with questions of handwriting identification face an ironic task. They call on techniques and skills from many of the physical sciences and base their work on the scientific method; yet, it is the very subjectivity of handwriting which makes it society's most important and most prevalent form of identification.

There is nothing unique about investigating a case in which a signature is a part of the evidence. There is often a desire to equate signature comparisons with fingerprint identification. Signatures change due to many intentional and unintentional influences. A more accurate analogy can be drawn between signature identification and physical identification.

"Blue eyes" would not be a sufficient description to identify a suspect. That descriptor would be one element in a body of information which, collectively, would establish identity. In a similar sense, handwriting habits can be viewed as elemental descriptors. These elements combine into the more complex and significant aspects of rhythm (the many aspects of how the pen is moved) and form (the designs created in the writing). It is the final, integrated *balance* of rhythm and form which, in total, is sufficiently individualized to be reliable for identification.

When building the foundation for a physical identification, an investigator needs to define a large enough combination of descriptors that the

subject might be distinguished from the group. For example, blond hair and a visible birth mark might be added to the blue-eyes description. The individuality of the information and the size of the group (universe of possible suspects) will determine whether an identification might be possible. The situation is the same for the identification of handwriting.

Just as an investigator would search for all the details that might assist in a physical identification, anyone investigating a signature should also try to establish as many details as possible early in the investigation. Even before a document examiner is retained, the investigators need to gather as much information as possible for the record.

Original documents should be secured. The statements of any parties who might have information relating to the origin or safe keeping of key documents should be preserved. And, just as in a physical search, when it is believed that a signature has been forged, it is important to develop a basis for defining the universe of possible suspects—or more accurately, the universe of possible writers.

The nature of the case and the size of the universe of possible writers will help define the requirements for gathering exemplar materials. Exemplars, also referred to as standards or known writings, are the materials presented to the document examiner as the known or acknowledged *true writings* of each subject. Exemplars might be gathered from normal course of business writings, they might be produced at the examiner's request or both. The document examiner's work begins with a brief review of the questioned signature and then moves on to the more detailed examination of the exemplars.

Any collection of a subject's exemplar signatures will show that each element of the writing varies slightly from signature to signature. For example, some parts of the signature might show slight differences of slant or design from one signature to the next. The extent of these variations is small for some writers and quite extensive for others. The document examiner must assemble sufficient exemplar materials to be satisfied that collectively they present a fair and reasonable definition of the subject's range of normal variation. A detailed definition of a subject's writing habits must be developed before the examiner has a basis for testing the elements displayed in the questioned signature. Only after normal variations have been defined by the exemplar collection can any variations seen in the questioned signature be given their proper weight.

It is obvious that for handwriting to be useful, the designs used for the letters and numbers must be conventional enough to be recognized.

That is less true for signatures. It is not unusual for signatures to include designs that are not part of any generally accepted writing system. Many people use a slant, size, or style of writing when producing their signature which is quite different from their general writing habits.[1]

A question relating to the authenticity of a signature is the problem most frequently brought to a document examiner. In these cases the circumstance surrounding the document may be unique, but the critical question to be addressed in the examination is the same. *Does this questioned signature (Q) match the known, true signatures (K) of this subject?* In other words, does Q equal K?

This book limits the discussion of examination of writing habits to the examination of signatures. Signatures are the critical issue in most document examination cases. The methods of examination and comparison for signatures presented here also apply to the examination of handwritings. Handwriting, numbers, and printing are examined with essentially the same steps necessary for the examination of signatures. By beginning with a study of signature examination, it is easier to grasp and master the techniques involved. Anyone who has practiced and mastered the processes of signature comparisons will have little difficulty extending their studies to include other writings.

The following chapters offer the reader a systematic method for learning and practicing the skills of forensic signature examination. The tools offered do not apply only to selected examples: they can be applied to the forensic study of any signature—that is their purpose.

I have chosen to limit the use of illustrations in this book in the belief that readers will gain more by applying these tools to their own collections of signatures. If a picture is worth a thousand words, firsthand experience is worth a thousand pictures. Forensic signature examination is a discipline learned through practice. Applying these tools to even one collection of signatures will be of benefit to the reader.

Before going on to the following chapters, gather together a dozen of your own canceled checks. Cut the signatures from these checks and glue them to a sheet of stiff paper. If you do not wish to cut the signatures from your checks make high quality copies of them and cut the signatures from the copies. When you have assembled your signature study board, make several high quality copies. As you read further you will be able to use these copies to test and practice what is presented.

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[1]From Hilton, O., *Scientific Examination of Questioned Documents*, ©1992 by Ordway Hilton, CRC Press, Boca Raton, Florida, publisher. With permission. p. 173.

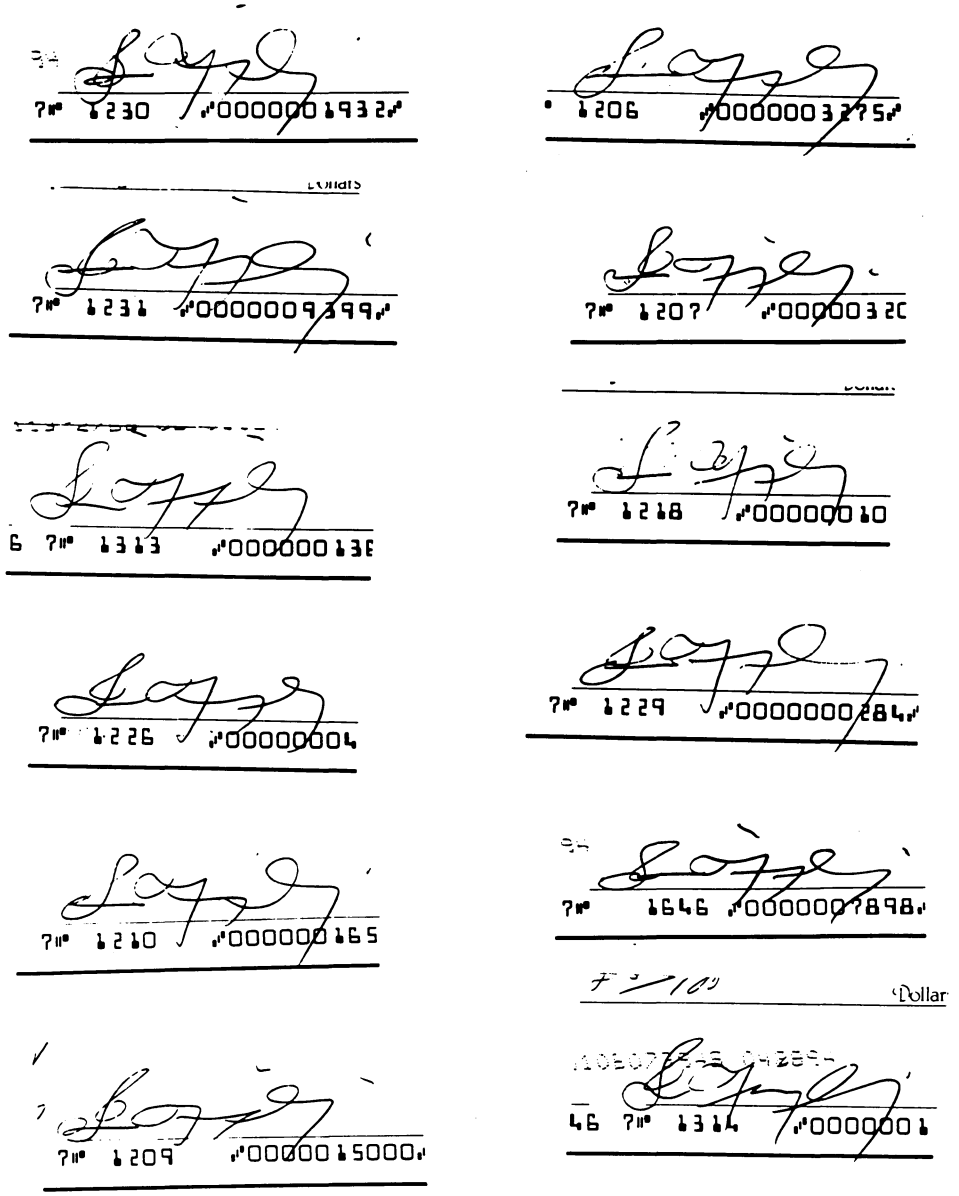

Illustration 1. A study board showing twelve signatures cut from canceled checks. Study boards are used to assist the document examiner in developing an understanding of the normal variations to be expected in any subject's signatures. The reader is encouraged to build several such study boards using signatures of friends and family members. These boards will be useful in the study of the principles presented in the following chapters.

Chapter Two

SIGNATURES

Signatures are produced by force of habit. Once the writer begins to sign, habit dictates the intricate movements of the pen. The hand moves in a personalized pattern of writing rhythms as the characters are formed. Pen speed, the proportions of each movement, and the subtleties of pen pressure are dynamically balanced without conscious effort, as the designs of the signature are formed. In a genuine signature, unconscious integration of these elements of pen movement produces a unique balance of rhythm and form.

The critical consideration in the forensic examination of signatures is this balance of the impulses controlling the movements of the pen and the intricacies of the forms created. Only automatic, unconscious force of habit can keep the whole, complex activity in dynamic balance. If a forged signature is to have a reasonable chance of being accepted as genuine, the forger must imitate both the form and the rhythmic flow of the victim's true signature.[2]

When someone attempts to imitate a signature it does not flow from unconscious habit. When effort is focused on the forms, rhythm suffers. And, if conscious effort is focused on imitating natural writing rhythm, the accuracy in matching the forms of the characters suffers. For the great majority of subjects, the balance of pen rhythms and character designs cannot be imitated by conscious effort. In Albert S. Osborn's words, "Developed, natural writing is an almost automatic act and follows the fixed grooves of habit, but as soon as attention is given to it, it necessarily becomes strained and unnatural."[3]

The key principle underlying the practice of signature identification is that only habit can keep the pen moving at a uniquely individualized, dynamic rhythm/form balance. An imitation is detectable when the writer makes an error of rhythm or form, which causes the false signa-

[2]Harrison, Wilson R.: *Forgery Detection, A Practical Guide.* New York, Frederick A. Praeger, 1964, p. 107.

[3]Osborn, Albert S.: *Questioned Documents,* Second Edition. Chicago, Nelson-Hall Co., 1929, p. 274.

ture to differ significantly from the range of normal variation defined by the victim's exemplars.

Handwriting experts are frequently asked whether they can *prove* that a questioned signature was written by an individual. Unless the examiner actually witnessed the materials being produced, he cannot claim to *prove* who produced it. Signature examination, like any other scientific inquiry, is a process by which a thoughtfully designed hypothesis is put to a series of tests. An hypothesis is a positive statement for which tests can be devised to determine whether it is valid.

As at the outset of any scientific experiment, the document examiner must define the hypothesis, or clearly state the exact purpose of the examination. It is impossible to prove a negative: therefore, the hypothesis must be expressed as a positive statement. Taking a questioned signature (Q1) and one set of exemplars at a time (K1, K2, K3, . . . etc.), the document examiner always works to test the same hypothetical statement.

For every forensic signature examination the key hypothesis is: "the writer of these exemplars is also the writer of this questioned material".

Several axioms follow the key hypothesis. Axioms are statements which must be true if the fundamental hypothesis is true. In this application of the scientific method, for the key hypothesis, "The writer of the signatures in exemplar set K1 is also the writer of the questioned signature Q1," the axioms which would follow are:

- The speed at which the pen was moved when signing Q1 is within the range of variations in pen speed defined by the signatures in Set K1.
- The proportions of the pen movements in Q1 are within the range of variation of proportions defined by Set K1.
- The pressure and pressure changes on the pen when signing Q1 is within the range of variation in pen pressure defined by the signatures in Set K1.
- The designs of the characters in Q1 are within the range of variation in designs defined by the signatures in Set K1.
- And the critical axiom—the dynamic, rhythm/form balance in signature Q1 is not significantly different from the range of variation in rhythm/form balance defined by the signatures in Set K1.

There can be legitimate reasons why someone's genuine signature does not equal his or her usual signature habits. In recognition of that possibility, there is one further axiom to consider.

• If signature Q1 is significantly different from the signatures in Set K1, then is there an acceptable explanation for that difference?

That key hypothesis and the six axioms which follow, form the basic skeleton for every signature examination. Provided with an adequate supply of reliable exemplar signatures, the examiner who systematically works out the answer to each of the six axioms will be led to the correct response (true or false) to the key hypothesis.

The document examiner does not "prove" that the signature in question is by the writer of K1 or that a questioned document is genuine. Neither is it proven that a signature is forged. An examiner's expertise and familiarity with the scientific process qualifies the expert to express a professional *opinion* as to whether the stated hypothesis is supported, or not supported, by the tests conducted.

When a questioned signature shows a significant, inexplicable difference of rhythm and/or form than that which is defined by an adequate body of the subject's exemplars, the examiner must conclude that the subject did not produce the questioned signature. Correctly stated, "the hypothesis that the signatures in Set K1 and subject Q1 were written by the same person is not supported by the measurements and comparisons carried out."[4]

[4]Harrison, Wilson R. M.Sc., Ph.D.: *Suspect Documents, Their Scientific Examination.* Chicago, Nelson-Hall, 1981, p. 343.