

**The Scientific Journal of the
International Association of
Document Examiners**

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The Scientific Journal of the International Association of Document Examiners

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Editorial

I had every intention of putting out two issues of our Journal per year but I over-estimated the time I would have to devote to the Journal. As a result, I am just now getting the next Journal together so it looks like I will probably only be able to produce one issue per year. So, hopefully, one good issue will compensate.

I am fortunate to having several excellent articles to present to all of you. The first article is from our honorary member, Dr. Michael Echols. It is the result of a presentation that he gave to the IADE members in Jamaica at our First Annual Interactive Seminar and Workshop in 2015.

Students who have taken my course in document examination have to write a research paper at the end of their lessons. As a result, I have several excellent articles from my students to include in our Journal.

Members of IADE who serve in any capacity are volunteers who have to work around their schedules for work, family and whatever else is important in their lives. I appreciate all of you and hope we will continue to work together to improve not only our own knowledge but to make contributions to our field of expertise.

Kathie Koppenhaver

Error Term and Accuracy in Document Examination Work
By Dr. Michael E. Echols

It is a scientific fact that for EVERY measurement that: **V = M plus or minus E**

Where: V is the true value, M is the measured value, and E is the error term.

This is a universal fact which is not altered by standing closer to the projection screen when counting the number of nails displayed on the screen at the conference. For those of you unable to attend the live presentation, the “standing closer” is a reference to a request to get closer to the screen as a means to deal with the error term in the live nail counting exercise performed during the Jamaica conference.

The goal of the conference exercise was to first demonstrate that the scientific fact is in fact true and secondly to explain how this scientific fact relates particularly to the nettlesome question the opposing attorney asks on the witness stand, namely:

“What is the accuracy rate of your work?”

To make the scientific fact real and personal I had all of the conference attendees count (measure) the number of nails displayed on the projection screen. The results of those counts are shown in the Appendix attached to this article.

The important implication, as it applies to the courtroom cross examination, is that accuracy is not about “getting the answer right”. The opposing attorney’s attempt is to get the document examiner to admit that error does indeed exist. The conference nail counting exercise transformed the error term from an abstract, often confusing concept, to a concrete reality – something as solid and unambiguous as nails. We could say that we nailed down the fact through personal experience.

Every measurement has some error distribution as is evident in the Appendix exhibits attached. The instinct is to conclude that the work is not accurate if there is not certainty about a zero-error term. The purpose of the cross-examination question is to shake the examiner’s confidence in their presented exhibits and in turn create doubt in the minds of the judge and jury.

The point is that certainty and a zero-error term is not a reality for any measurement. The point of the conference exercise was to convert the somewhat obtuse scientific fact to a personally experienced reality for everyone in the room. That mission was certainly accomplished and made ever more real by the shaking of the container in my hand with the actual 57 nails (the V in this exercise) projected on the screen.

Some document examiners in the profession have stated that they don’t believe in error rate in handwriting comparison. The results of the conference nail counting experience establishes beyond a shadow of a doubt that an error term exists - even in the straight forward exercise of counting the number of nails projected on the screen.

The irony is that the natural variation in signatures inherently creates an error term across known signatures in every case. The very existence of known variation makes the existence of an error term a certainty even before the actual measurement of the known signatures is performed by the examiner.

Error Term and Accuracy in Document Examination Work

By Dr. Michael E. Echols

The first goal in response to the cross-examining lawyer is to establish that certainty of a zero error term is not possible under any circumstance. The immediate response to the key question is to put into the record this fundamental scientific fact. From there, the approach of the examiner's testimony is to demonstrate a basic understanding of the scientific fact and to convince the judge and jury that the examiner is fundamentally knowledgeable about the science of accuracy as well as the normal distribution characteristics of the error term frequency distribution.

As a final deliverable in the conference activity I shared with the conference attendees important actions to narrow the variance of the distribution of the error-term. The contrast in the exercise distributions is clearly revealed in the figures 2 and 3 in the Appendix. In this contrast, the only thing different is the way the nails were organized in the measurement exercises.

In summary, your work is about scientifically accepting or rejecting the hypothesis:

H0: The contested signature is authentic – i.e. the actual signer was indeed the person represented to be the signer at the time of the document creation.

Alternative hypothesis: The contested signature was not signed by represented signer at the time the document was created.

The actions available to narrow the distribution of the error term include:

1. Make sure known signatures are indeed those of the person of the contested signer.
These are known authentic signatures of independent events separate from the contested action.
2. Make sure signatures are from the time of the contested signature
Time (aging, stress, medication, illness)
3. Magnification
4. Color separation
5. Organize authentic signatures to make measurement easier
6. More authentic samples which brings in the Law of Large Numbers
7. Peer review for second opinion

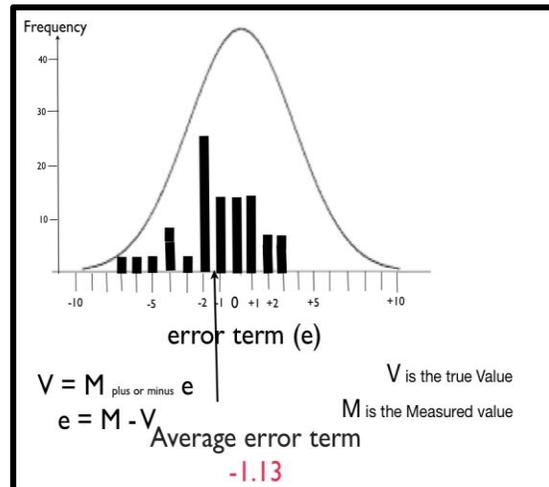
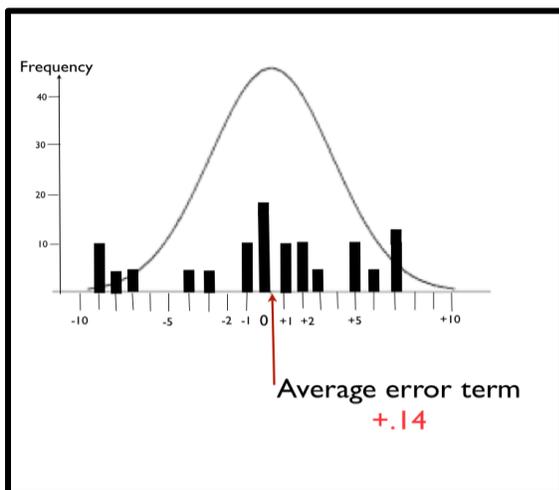


Figure 1: Four nail counters pre-conference Figure 2: Conference attendees nail counters

Error Term and Accuracy in Document Examination Work

By Dr. Michael E. Echols

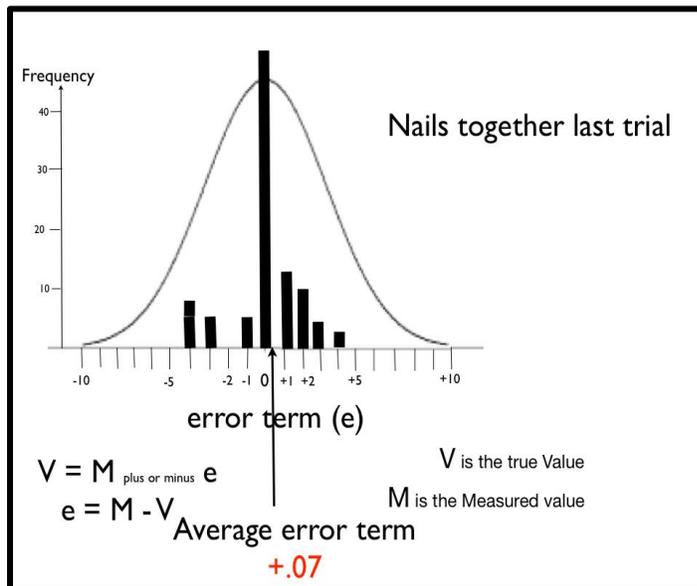


Figure 3: Nails displayed as aligned and close together. Conference attendees counters.



Dr. Michael E. Echols Ph.D.

Mike Echols is a leader in adult and corporate learning. Mike is committed to improving corporate investment in human capital and has spoken nationally and written on the subject for over a decade. He has published over 75 articles and written three books on the topic, *ROI on Human Capital Investment*, *Competitive Advantage from Human Capital Investment*, and *Creating Value with Human Capital Investment*.

In 2007, Dr. Echols was named one of the “Top Most Influential Training Professionals in the U.S.” by Training Industry, Inc. His leadership at Bellevue University resulted in over a dozen national awards, including CUBIC (Corporate University Best in Class), numerous corporate learning program awards as Chief Learning Officer. In 2015, Dr. Echols published his award-winning book “Your Future is Calling.” This latest book is designed to help adults get the education they need, to have the future they desire.

Dr. Echols’ previous experience included time as a corporate executive with General Electric as a subsidiary president and later general manager of the worldwide operations for the RTV Silicone Department. He holds a bachelor of science degree in Physics from Carnegie Mellon University, an MBA from the University of Pittsburgh and a Ph.D. from the College of Business from University Of California- Berkeley.

Sports Memorabilia By Richard Cope

The sports memorabilia and autograph industry has been viewed a profitable business since the 1800's. Unlike some other trends, sports collectibles and autographs was not merely a fad. There has been an ever-increasing demand for sports memorabilia and autographs by young and old collectors worldwide. Because of the popularity and profitability of these autographs, the industry has become plagued by a series of forgery scams. The Federal Bureau of Investigation (FBI) has said that the fraud/forgery sports industry epidemic may account for upwards of five hundred million (\$500,000,000.00) dollars in losses annually.

In the mid 1990's, the FBI Chicago Division initiated "Operation Bullpen". This investigation targeted a sports memorabilia forgery group. The investigation revealed that this network of forgers was not only composed of expert autograph "fakers" but also trusted sports memorabilia dealers, distributors, and sports authenticators. The autograph forgery ring documented sales of approximately one hundred million (\$100,000,000.00) dollars for forged sports autographs and other collectibles sold through the internet, auctions and sports shops. During the investigation, evaluations were made by the top sports authenticators in the industry of the more popular sports autographs on the market. It was determined that among ten thousand (10,000) autographs of Tiger Woods and Michael Jordan, only thirty-three (33%) percent were authentic. The process used by the forgers was complex and well thought out.

One example involved autographs on a baseball. In this case, the forger would purchase ordinary baseballs from a store with no distinguishable marks or labels. They would then wash the balls with soap and water. The balls were then provided to the "Master Forger" who would sign the balls using a fountain pen from Babe Ruth's era, 1930s to late 1940s. The balls would not look antique so they would dip the balls into a gallon of orange-rust shellac varnish to make them appear aged. It has been said that many Babe Ruth autographs were shellacked during his time to preserve the autograph. The process was nearly finished but the balls not only needed to look old, they needed to smell old. The balls were then put in bags of dog food for days then left in the sun to give them a "vintage" odor. Many of the participants of this fraudulent group were prosecuted and incarcerated. Although a significant amount of forged autographs were confiscated throughout the investigation, a large number of forged items were never recovered and are believed to be actively bought and sold throughout the marketplace today.

The most talented counterfeiter forgers use vintage paper, ink and other authentic supplies. These master forgers have been so successful with perfecting their craft, they not only deceive experts but even fool the athlete themselves. At a national sports card collectors show in Atlanta, Ga in February 1997, Joe Montana (SF 49ers Hall of Fame Quarterback) was handed a forgery of his own signature. After studying the signature, Montana confidently stated that the autograph was authentic. When Montana was told the autograph was a forgery, he could not believe it. According to PSA/DNA Authentication Services, they reject an astounding fifty percent (50%) of all autographs sent to them for authentication based on forgery. Due to the well documented forgeries being sold throughout the marketplace, sports figures have been able to capitalize on this opportunity by charging an excessive fee for in-person autographs at the various sports shows and arenas throughout the country.

Although the FBI and other federal, state and local law enforcement agencies have vowed to make investigating and prosecuting forgers of sports memorabilia a priority, the reality is it

Sports Memorabilia By Richard Cope

still remains low on their list of priorities. In the rare instance when a forger of memorabilia is prosecuted, they rarely receive a prison sentence that exceeds one (1) year.

Legitimate sports memorabilia dealers have become adversely affected by these fraudulent sellers and forgers. Reputable dealers are attempting to combat this issue by coming up with different ways to deter forgeries while building assurance in consumers regarding the sports memorabilia market. Some methods being deployed include added steps to the authentication process, tamper proof holographic seals, notarized letters from the athletes, life-time guarantees of authenticity and online registry of items that purchased or sold through the dealer to confirm authenticity of the autograph.

Detecting forgeries of sports memorabilia must be performed by skilled investigators due to the various methods used by forgers. The following are the types of known fake/forged sports autographs:

Forged – these are accomplished through copying an athlete's signature, the stroke such as, the pen used. A forger hand signs the sports memorabilia using their expertise and they must know the science of how sports stars make their signature. Expert forger, Greg Marino, said that in order for him to master Joe DiMaggio's autographs on baseball bats, he repeatedly watched video showing DiMaggio himself signing bats at the Louisville Slugger factory. Marino stated that he and DiMaggio had very similar handwriting characteristics. Marino forged sports autographs from 1994 – 1999.

Autopen – this machine signs autographs following a designated signature installed on a template. This machine is capable of recreating signatures. Some of the characteristics to look for when attempting to detect autopen signatures is a consistent thickness or thinness through the entire signature. Also, take note of dots of the letter i or at the end of a signature that are the identical size or thickness.

Secretarials – these are signature forgeries that are authorized by the athlete but still do not pass as authentic sports autographs. The signers could be a secretary or another individual hired to do the job.

Sports autograph reprints – are merely printed copies of signatures. These reprints are easy to detect by simply touching the signature. If it feels the same as the texture of the entire surface of the item, it is likely a reprint. Another method to confirm the autograph is a reprint is to see the back of the autographed picture or card under light. If you find no signature impression on the back, it is likely a reprint.

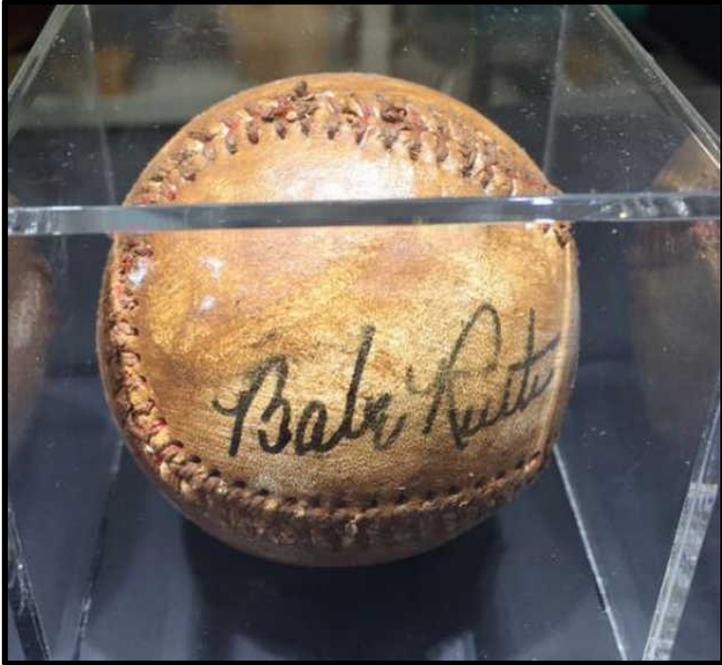
Stamped Autograph – are very easily detectable because of the ink quality. A review of the ink in these types of circumstances typically reveal a smudgy appearance.

The best defense against being scammed by a forged sports autograph is to educate yourself and think like a forger. If you study the various sports figure's signatures closely, you will become familiar with the strokes, rounds, lines, dots and overall characteristics of the signature. If you intend to invest in a sports autograph, it is highly recommended that you secure the services of an expert who is trained to investigate the signature and make an educated finding as to the authenticity of the item.

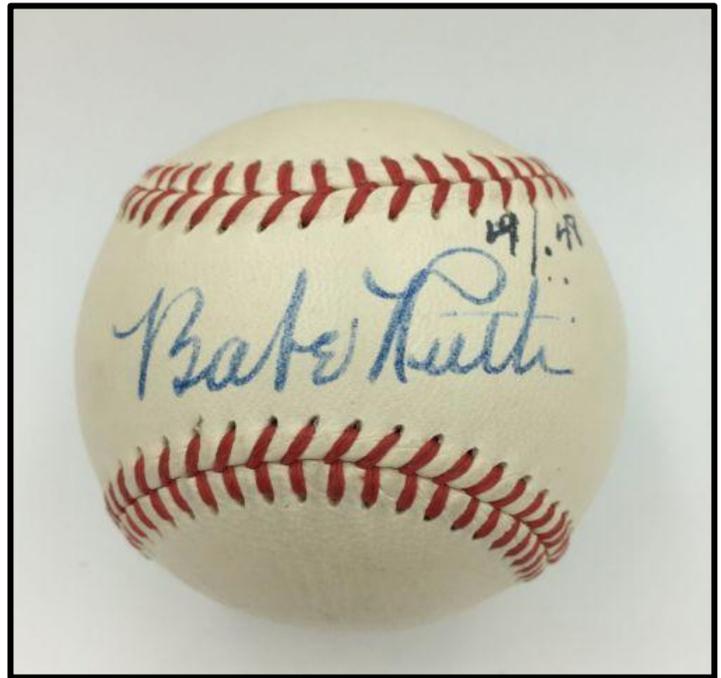
In closing, the forgery of the signatures of infamous athletes has become an extremely profitable industry with very little legal oversight and minimal criminal penalties. The ever- demanding responsibilities of law enforcement with public safety duties will continue to diminish the

resources available to investigate and prosecute forgers in the industry. Unfortunately, the fraudulent activity of these individuals may eventually lead to the end of a long enjoyed and respectable hobby enjoyed by so many, young and old.

Case Study: Babe Ruth Forgery



Forged



Authentic

Babe Ruth:

This forgery appears to be skilled and has many similar characteristics as the genuine autograph.

Upon comparing the two, the following are my observations:

The serif in B is very different between the two.

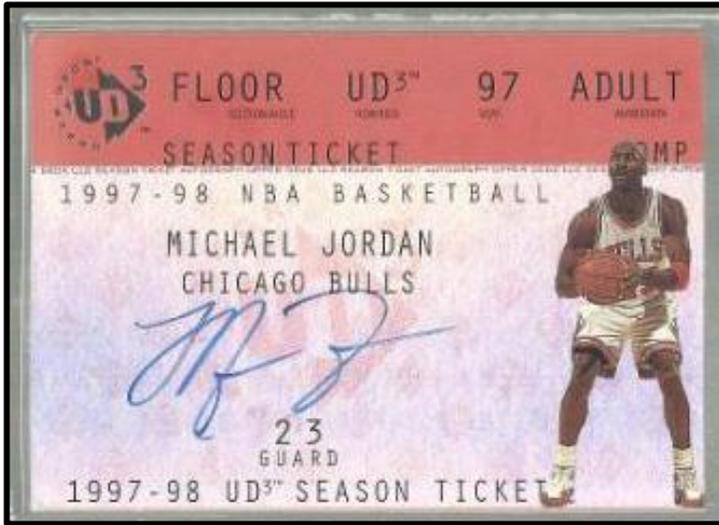
The top loop of "R" is smaller in genuine than the forgery.

The cross bar of "t" is much longer in the genuine autograph.

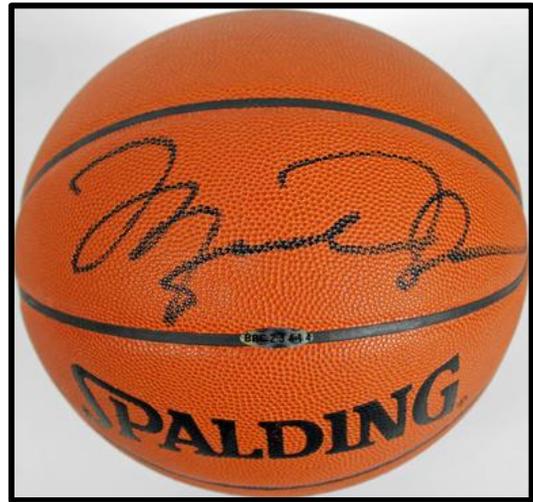
There is a connector stroke from "B" to "a" in genuine but none visible in forgery.

There is a much heavier pen pressure in the forgery.

Case Study: Michael Jordan Forgery



Forged



Authentic

Michael Jordan:

This forgery is easier to detect. Upon comparing the two, the following are my observations:

The overall letter structure of both the "M" and "J" are vastly different between the genuine and forged autographs.

The unique lower stroke of the "M" on the genuine autograph is completely different in structure than the forgery.

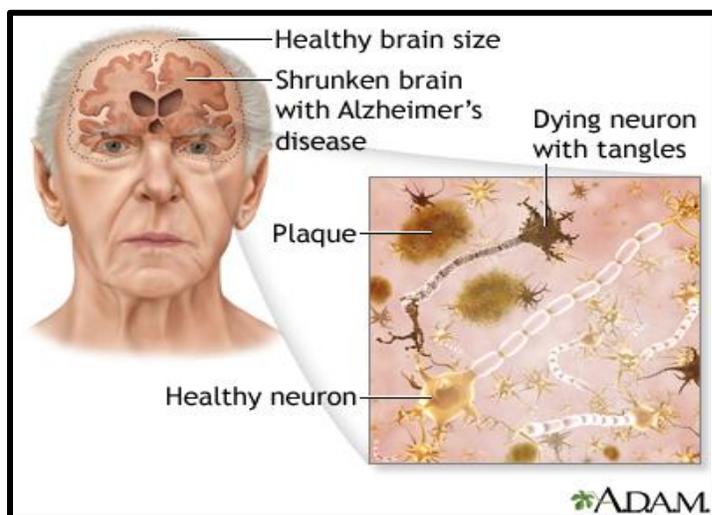
The overall spacing is consistently greater in the genuine autograph.

I believe my observations identify the major differences between the genuine and forged autographs.

Richard Cope recently completed the Forensic Document Examination Interactive Training Program. All students are required to complete a research project related to our field at the end of their training.

Alzheimer's Disease and Handwriting Research Paper
By Eleanor E. Spring, CFE, FDE, CFC

and eliminated. In Alzheimer's disease, the fragments accumulate to form hard, insoluble plaques.



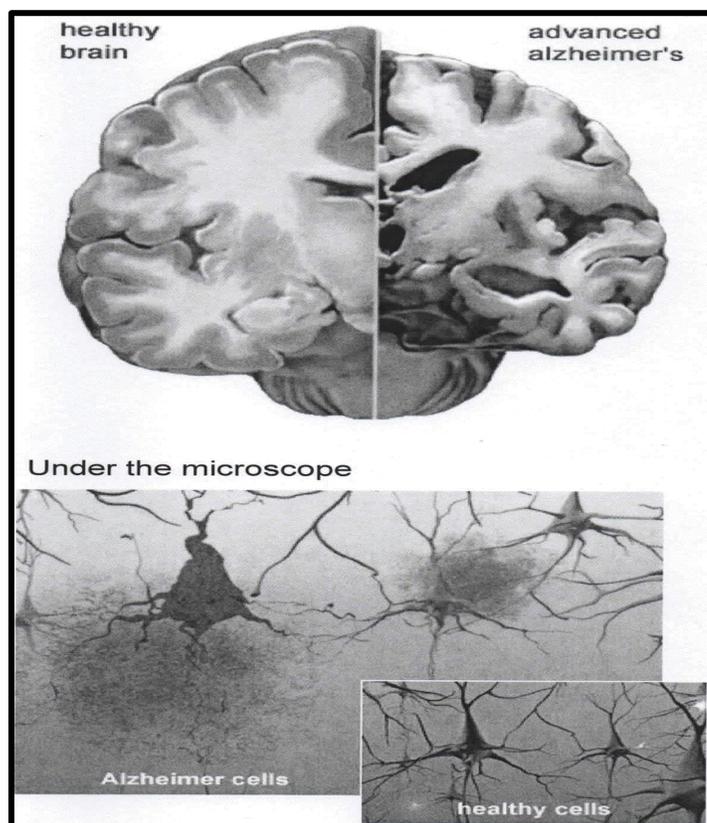
Neurofibrillary Tangles – Bright Focus Foundation

Neurofibrillary tangles are insoluble twisted fibers found inside the brain's cells. These tangles consist primarily of a protein called tau, which forms part of a structure called a microtubule. The microtubule helps transport nutrients and other important substances from one part of the nerve cell to another. In Alzheimer's disease, however, the tau protein is abnormal and the microtubule structures collapse.”

In the brain of a person with Alzheimer's disease the cortex shrivels up, damaging areas involved in thinking, planning and remembering.” *Alzheimer's Association.*

Alzheimer disease (AD) is an acquired disorder of cognitive and behavioral impairment that markedly interferes with social and occupational functioning. It is an incurable disease with a long and progressive course. In AD, plaques develop in the hippocampus, a structure deep in the brain that helps to encode memories, and in other areas of the cerebral cortex that are used in thinking and making decisions. Whether plaques themselves cause AD or whether they are a by-product of the AD process is still unknown. *Alzheimer's Association*

Over time the Alzheimer disease worsens, causing people to have difficulty in signing or initialing their name. In late stage Alzheimer's a signature may become illegible, with letters that sometimes looks like nothing more than a child's scribble. Because a person with Alzheimer's disease has impaired cognition, he or she is also likely to struggle with spelling, grammar, and writing out or completing sentences.



Alzheimer's Disease and Handwriting Research Paper

By Eleanor E. Spring, CFE, FDE, CFC

"The handwriting changes for a few reasons," said Diana Kerwin, neurologist and director of Alzheimer's and Memory Disorders at Texas Health Presbyterian Hospital in Dallas. "One is it can be due to a motor disorder caused by damage to the brain, which shows that the person literally forgets how to perform the motor tasks needed to write. Even though the motor system is intact, the instructions from the brain to the hand are impaired and it can affect handwriting." Dr. Kerwin added Alzheimer's disease can cause visuospatial impairments in which the brain has difficulty seeing things and placing them in the correct areas. (2013)

Handwriting changes may be one of the very first symptoms a family member may notice in a loved one, which in itself does not indicate Alzheimer's disease, but it could indicate the onset or progression of a disease of some sort. Elaine Pereira, author of *I Will Never Forget: A Daughter's Story of Her Mother's Arduous and Humorous Journey through Dementia*, said two years after her mother was diagnosed with Alzheimer's disease, she remembered seeing a charge slip her mother signed at a restaurant. "It was uncharacteristically 'shaky,'" said Pereira. "She was struggling to recall how to start the signature process. Once she could retrieve that, then muscle memory took over and she finished it. But it took concentration, also a diminishing skill of Alzheimer's, and thus it was shaky and not elegantly smooth." (*Jessica Firger Every Day Health Staff Writer. 2013*)

People with Alzheimer's disease encounter two types of problems when they attempt to write, one is the mechanical act of writing; the penmanship and the other is the actual content of what they are writing. In the early stages this may not be noticeable, but it does become more obvious as the disease progresses and in the late stages the handwriting gets lost altogether. (*Dementia guide.*)

The Mayfield Clinic elaborates that the cerebral hemispheres are composed of distinct fissures, which divide the brain into lobes. Both the left and right hemispheres have four lobes: the frontal, temporal, occipital and parietal lobe. The lobes are further divided into regions that serve particular functions. They have complex relationships, and they do not function alone. The frontal lobe is responsible for controlling speech, which involves writing and speaking. It also controls personality, behavior and emotions; problem solving, judgment and planning; intelligence, self-awareness and concentration, and body movement

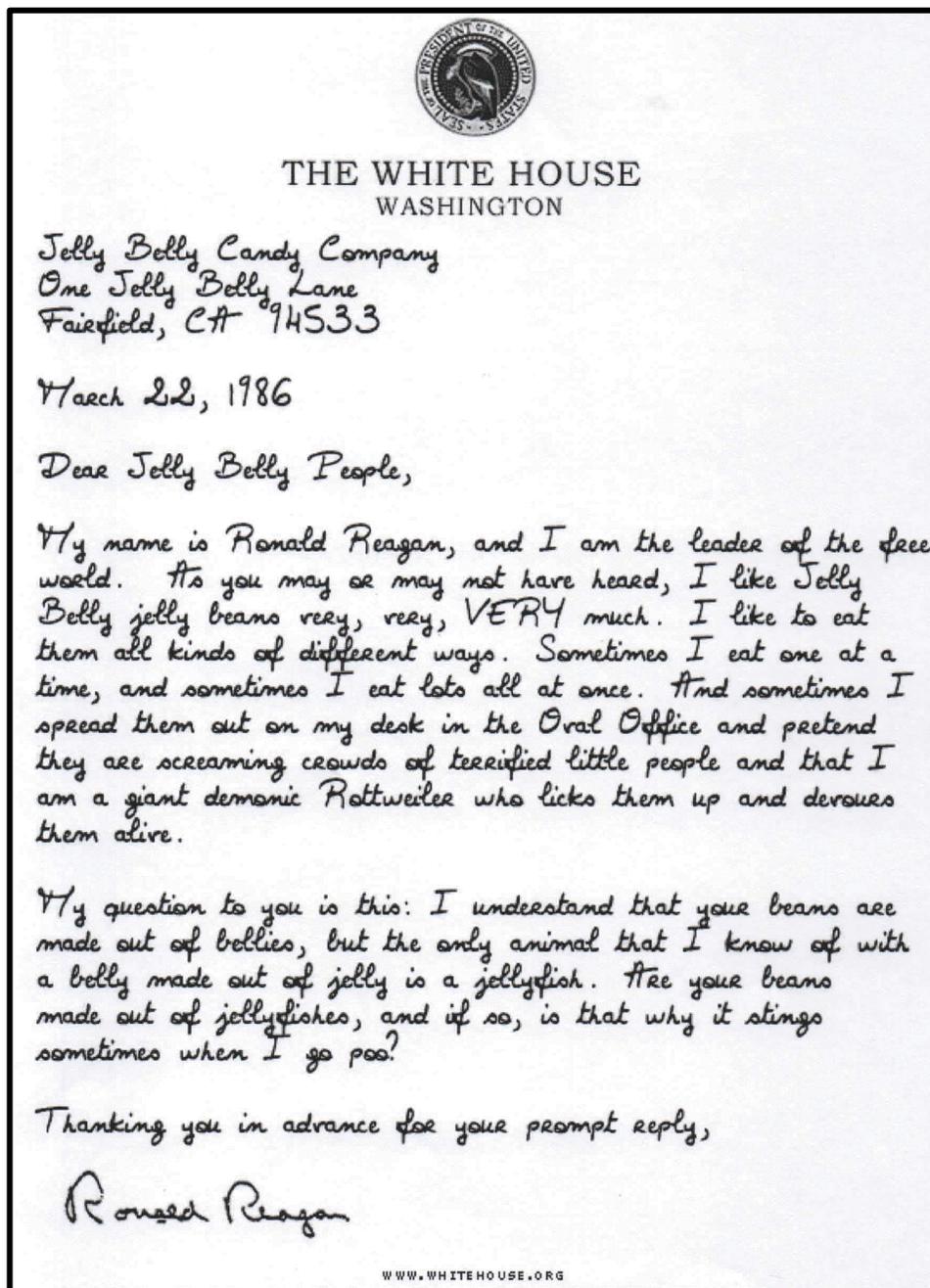
Handwriting changes may be an early indication of Alzheimer's disease, according to a University of Cincinnati communications professor, Jean Niels. He found that Alzheimer's patients often confuse words that sound alike (homophones): "nun" and "none," "gate" and "gait." Another telltale sign is that Alzheimer's patients have trouble with words containing silent letters like "through," as well as words with unusual combinations of letters, such as "fright." Patients tend to spell these words the way they sound, Niels said.

Sometimes the person you care for may have difficulty recalling words or the spelling of words, because of their memory impairments. There may also be difficulties with the motor skills involved, which can lead to the person having illegible handwriting or difficulty writing some of the letters. We see this in Alzheimer's disease, when writing is often lost even when parts of language are well preserved.

President Ronald Reagan was diagnosed with Alzheimer's disease in 1994. The Ronald and Nancy Reagan Research Institute, an affiliate of the National Alzheimer's Association in Chicago, Illinois, is an initiative founded by former United States President Ronald Reagan and First Lady Nancy Reagan to accelerate the progress of Alzheimer's disease research. The center was dedicated in 1995, and November was declared National Alzheimer Disease Awareness month.

Alzheimer's Disease and Handwriting Research Paper
By Eleanor E. Spring, CFE, FDE, CFC

Below are letters written by President Ronald Reagan in 1986, 1990 and 1998. The letter dated February 6, 1998 was written 4 years after the president was diagnosed with Alzheimer's disease and 6 years before he passed away from the disease, and it is clear to see just how much his handwriting had declined over the years. If you look at his signature from the letter of 1990 you can already begin to see the shaky writing of Alzheimer's. By 1998 his writing had declined to the point where words are being crossed out, there is retracing with ink blobs and words that are illegible.



Alzheimer's Disease and Handwriting Research Paper
By Eleanor E. Spring, CFE, FDE, CFC



RONALD REAGAN

December 18, 1990

Dear Mr. Connick:

Happy Birthday! Nancy joins me in sending our warmest wishes on this joyous occasion.

Birthdays are a time to reflect the beauty and richness of life and to share memories and hopes with family and friends. As you celebrate your special day, our wish for you is for health, happiness, and enjoyment in the coming year.

Again, Happy 106th Birthday, and may God bless you and keep you.

Sincerely,

A handwritten signature in cursive script that reads "Ronald Reagan".

Alzheimer's Disease and Handwriting Research Paper
By Eleanor E. Spring, CFE, FDE, CFC

2-6-98

RONALD REAGAN

Dear Frieda & Bob + family -
Nancy & I are deeply grateful for your
kindness following the announcement of my
illness. Individuals like you give me the
courage and inspiration to move forward and
With your prayers and God's grace, we'll
know we will be able to face this big
latest challenge. God bless you all!!!
Diane

A doctor chronicled the progression of Alzheimer's disease in one of his patients by collecting her signatures from medical forms over several years.

I understand that all information reviewed in my case file will be kept strictly confidential and that an advocate from the Arc of San Diego will be present throughout the review.

<input checked="" type="checkbox"/> Consumer	Yungard Fella	Date: 4-29-99
<input type="checkbox"/> Conservator		
<input checked="" type="checkbox"/> Consumer	Yungard Fella	Date: 8-11-00
<input type="checkbox"/> Conservator		
<input checked="" type="checkbox"/> Consumer	Yungard Fella	Date: 05-04-2001
<input type="checkbox"/> Conservator		
<input checked="" type="checkbox"/> Consumer	Yungard Fella	Date: 11/1/01
<input type="checkbox"/> Conservator		
<input checked="" type="checkbox"/> Consumer	Yungard Fella	Date: 1/1/02
<input type="checkbox"/> Conservator		
<input checked="" type="checkbox"/> Consumer	IRMA-FELLA	Date: 6/1/05
<input type="checkbox"/> Conservator		
<input checked="" type="checkbox"/> Consumer	IRMA-FELLA	Date: 6/1/06
<input type="checkbox"/> Conservator		
<input checked="" type="checkbox"/> Consumer	IRMA-FELLA	Date: 09/2/07
<input type="checkbox"/> Conservator		
<input checked="" type="checkbox"/> Consumer	IRMA-FELLA	Date: 09/19/08
<input type="checkbox"/> Conservator		
<input checked="" type="checkbox"/> Consumer	IRMA-FELLA	Date: 11/19/09
<input type="checkbox"/> Conservator		
<input checked="" type="checkbox"/> Consumer	IRMLLA	Date: 6-18-09
<input type="checkbox"/> Conservator		
<input checked="" type="checkbox"/> Consumer	IRMLM	Date: 4/8/2010
<input type="checkbox"/> Conservator		
<input checked="" type="checkbox"/> Consumer	IRI	Date: 5/16/2011
<input type="checkbox"/> Conservator		
<input type="checkbox"/> Consumer		Date:
<input type="checkbox"/> Conservator		

Everyone with a brain is at risk for Alzheimer's disease. (Alz.org. 2015)

Alzheimer's Disease and Handwriting Research Paper
By Eleanor E. Spring, CFE, FDE, CFC

Alzheimer's disease is the 6th leading cause of death in the United States. (Alz.org 2015)

Listed here are a few well-known people who were diagnosed with Alzheimer's disease.

Malcolm Young - Legendary guitarist and co-founder of rock band AC/DC.

Glenn Campbell - Country singer and guitarist.

Pat Summitt - Coached the Tennessee Lady Vols basketball team.

Perry Como - Was a popular singer and television personality.

Charles Bronson - Star of "Death Wish" and numerous other action films.

Charlton Heston - His most famous role was as Moses in "The Ten Commandments."

Norman Rockwell - One of the most famous American painters.

Rita Hayworth - She was an American film star who rose to prominence in the 1940s.

Sugar Ray Robinson - Recognized as one of the best boxers ever.

Aaron Copeland - During the 1970s, one of America's most renowned classical composers.

Estelle Getty - Best known for her role as Sophia in the "Golden Girls".

Rosa Parks - Known as "the Mother of the Freedom Movement."

James Doohan - Recognized for his military career and known for acting as "Scotty" in "Star Trek,"

Mabel Albertson - An American actress, best known for her role in the television sitcom "Bewitched".

Abe Burrows - An American author, humorist and director for radio and the stage.

Carroll Campbell - A U.S. Republican Party politician, best known as a Governor of South Carolina.

Joyce Chen - A Chinese chef, restaurateur, and entrepreneur.

Thomas Dorsey - A gospel music legend.

Burgess Meredith - May have been most famous for his role as the Penguin in the "Batman" TV series.

Peter Falk - Began his career on stage, but reached national prominence as a star of the TV series "Columbo."

James Stewart - Recognized for his military career and for his time as an actor, where he was best known for his roles in "Mr. Smith Goes to Washington" and "It's a Wonderful Life".

Eddie Albert - Best known for his roles in "Roman Holiday" and the "Heartbreak Kid," as well as his time spent playing Oliver Wendell Douglas in the 1960s-television comedy "Green Acres".

Evelyn Keyes - Well known for her role as Suellen O'Hara in the classic film, "Gone with the Wind," and for her role in "The Seven Year Itch."

Joe Adcock - American first baseman and right-handed batter in Major League Baseball, known for his years with the famous Milwaukee Braves teams of the 1950s.

Sir Rudolph Bing - An Austrian-born opera impresario and a General Manager of the Metropolitan Opera in New York.

Barry Goldwater - S. Republican Party politician, best known as a five-term United States Senator from Arizona.

John Douglas French - A famous physician for whom "John Douglas French Alzheimer's Foundation" is named after.

Eleanor E. Spring completed Forensic Document Examination Interactive Training Program. This is her research paper.

Signature Identification
By Marcela Word, CFDE

Document examiners view many handwriting characteristics when comparing questioned and known writing. Here are some examples of handwriting characteristics that are considered.

Signature baseline alignments:

- A. Does the writing rest on the signature line?
- B. Does it ride slightly above the line or high above the line?
- C. Does the writing slant to the left, vertical or to the right on the signature line? Change of slant alters the appearance of the writing. Slant is usually the first choice as an attempt at disguise.

Consistent slant patterns between writings can assist in identifying a writer when comparing questioned and known signatures. However, a different slant may be due to writing position or pen grip rather than a different writer.

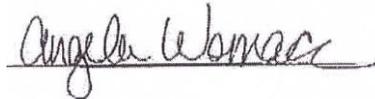
- A. Signature rests on signature line.



- B. Signature rides slightly above signature line.



- C. Signature is vertical.



Simulation of tremor: Genuine fine tremor consists of involuntary and inconsistent horizontal and vertical lines that are often abrupt and zigzagging. The forger may utilize too much shakiness, or place tremor in the wrong strokes. However, it is still very difficult to analyze the authentic with the forged tremor.



Simple forgeries: Involves writing another person's name without any attempt at imitating the signature.

Signature Identification
By Marcela Word, CFDE

Freehand simulations: The forger makes an attempt to copy a genuine signature, usually by keeping the signature in front of him while trying to reproduce it. These are more like drawings than writings. Rehearsed simulations could appear more smoothly written, but will still show evidence of uncertainty or inconsistent movement unlike the genuine signature.



These are a few of the characteristics that document examiners consider when comparing handwriting samples.

Marcela Word is an independent, certified and court-qualified forensic document examiner from Oklahoma. She is a member of the National Association of Forensic Document Examiners (NADE), Scientific Association of Forensic Examiners (SAFE), International Association of Document Examiners (IADE). She serves on IADE'S board of directors. Marcela Word, CDE, Tulsa, OK www.oklahomadocumentexaminer.com

The Effects Of Alcohol, Substance Abuse and Mental and Physical Health Deterioration in Handwriting

By Daniel Klotz

Handwriting is a dying art. Technology has replaced the common pen letters with typed-generated correspondence. Although children are schooled at an early age to use computers, IPADS, IPODS, laptops and handheld games, most begin handwriting training and establish their individual characteristics before starting kindergarten. This research paper will discuss the effects of health, substance abuse and intoxication on one's handwriting.

To date, there has been a large amount of research with various opinions. It's logical that people who have arthritis will have difficulty holding their hands steady depending on the severity of condition. A person that doesn't have this condition will have more control over their writing hand that would reflect in their writing. Research presented by Dr. Oz (<http://www.doctoroz.com/print/44481>) has shown us that a person with high blood pressure may often have writing with variable pressure, especially when it goes from light to dark. Pressure irregularity is the result of loss of co-ordination. The same researcher believed that a person with Alzheimer's often begins with script writing that changes to irregular or altered letters coupled with tremors in the writing. The writing speed will slow down.

Mental illness including depression or schizophrenia is easily spotted in handwriting. When the slant varies frequently within a sentence or within the same word in a given handwriting sample, it is one indicator that the writer may not be constantly in touch with reality and the handwriting is severely affected. Crossing out your name is a classic sign. This potentially exposes a deep subconscious belief that you do not believe you deserve to take up space in your own life. The writer will ultimately seek out ways to self-destruct in varying degrees of severity. Unfortunately, I have had to read suicide notes on multiple occasions during my work responsibilities. I cannot share the writings because they are evidence. They were written with various pen pressures, some very dark like anger and some very faint like the person was disinterested in writing the letter. Often one rambles when mental illness is a condition of their health. Depression causes writers to write downhill.

Another study indicates that autism in teenagers shows an inability to form letters. Could this be an indicator of one's intellectual capacity? Autism affects the motor skills, which affect the way the writer holds a pen or pencil and writes. These are just a few of the mental and/or physical challenges that could have an impact on writing styles, letter formations and arrangement in handwriting.

Handwriting is "brainwriting." Brainwriting is the result of a person having developed the ability to write without concentrating on the method of writing but on the message being written. At this point, writing has become a habit and is done automatically. If a person no longer has use of his normal writing arm and he learns to write using a different method such as his opposite hand, a pen in his teeth or between his toes, his writing resembles writing done before his original writing arm became incapacitated.

Tremors in one's writing could be the result of several issues. Those factors could be illness, alcoholism, and aging as well as someone trying to imitate another's handwriting.

When an individual is under the influence of alcohol it is difficult for them to focus and to have a steady hand when writing. Their handwriting will expand. They will find it difficult to stay on the baseline. A person loses muscle control when drunk. Their judgment is impaired and muscular co-ordination begins to fail. A person's hands begin to tremor when impaired

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which further impacts normal handwriting. Depending on the amount of alcohol consumed, a person may develop blurred vision because the ciliary muscle becomes relaxed. Common sense tells us that when inebriated one cannot gauge the amount of pressure they are putting onto the writing instrument or the paper. Alcohol also affects one's mood which can also alter one's natural handwriting. The strokes will not be retouched and the individual lacks precision. Alignment and relative position of the letters are also affected by intoxication.

There have been many research projects and researchers for that matter who differ in their opinion regarding handwriting. However, most people will agree that health, medication, drug abuse and alcoholism will have a detrimental effect on anyone's handwriting.

Handwriting is unique in that everyone has their own individual style of writing. Unfortunately, there are people in this world that create bogus documents for their personal gain.

Handwriting is like a fingerprint or snowflake. Each has some similar traits; all have some natural variation. The brain has such an impact on a writer's hand that something as normal as a mood may change a signature or handwriting to some degree.

Although I have reviewed numerous case studies, (University of Plymouth 1999, Motion Analysis Laboratory 2009, Kennedy Kreiger Institute 2007, Researcher Christina Strang, K.S. Puri 1965), the most important thing to do is support my findings on what I have learned from the course on document examination that I have completed.

I had the opportunity to conduct a fugitive investigation. A man escaped from prison in the 1970's and was located across the country approximately 30 years later. I knew that the only drastic change in his condition was his age. I knew of no serious health concerns. I had genuine signatures from his time of incarceration in New Jersey. I was able to learn of his alias and was able to obtain his fraudulent California Driver's License. The signatures when compared were very similar. Age in this particular case didn't affect this individual's handwriting and no health issues played a role. There would have been indications of health issues affecting handwriting if the writer had any of those problems. To what degree that remains to be seen since illnesses and substance affects people differently. It is up to the examiner that is viewing the documents to develop the skill to spot these factors that affect handwriting.

Using Handwriting Complexity to Develop Unifying Handwriting Identification Theory
By Katherine M. Koppenhaver, CFDE

Handwriting is a complex and very beautiful psychomotor skill whose properties are cultural, perceptual, technical, linguistic, motor and biomechanical. Writing is fixed motor memory.

Handwriting is a classic example of a well-organized, over-learned, goal-directed behavior: It is learned and acquired through practice.

We observe constancy of form production within a writer in spite of: body position, hand movement within words, hand and arm movements between words, hand and arm movement across lines and down the page.

Forensic Document Examiners believe that they can express opinions as to authorship of handwriting based upon the facts that:

- 1) given a sufficient sample of an individual's skilled writing, the chance that another writer shares all combinations of handwriting features is a very low and
- 2) individuals find it difficult to reproduce faithfully the handwriting characteristics of others.

In terms of scientific method, if we are to support the proposition that the writer of the specimens wrote the questioned material, we need a theory that can show that simulation and chance match are not supportable. Thus, Bryan Found has created the complexity theory. This theory says that as the complexity of the writing increases, the likelihood of a chance match decreases. The more complex the handwriting, the more difficult it is to simulate.

Document examiners must first identify complexity. The elements of complexity include the total line length, the number of turning points in the writing, the number of intersections, the number of retraces, the number of pen lifts, spatio-temporal superimposition, pressure differentials, feature units, formation style, variation and skill.

According to Dr. Found, counting the number of turning points, intersections and retraces was sufficient to determine complexity. These variables can be thought of as a way to define shape and form. These may be the best spatio-temporal features out there to show the extent of inter-writer variation even in handwritten text allographs.

However, I disagree with some of Dr. Found's theory as Figure 1 below shows a large number of changes of direction and intersections but it is not a complex signature because of the lack of variation. Figure 1 contains of the features of complexity without being a complex signature. Additional features must be taken into consideration when determining complexity.

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Figure 1 – Lack of Complexity



Figure 2 Complexity

This article is based upon a lecture given by Bryan Found, PhD at the 2004 NADE Conference.



Dr. Bryan Found died on October 23, 2016 from a heart attack. He was 55 years old. He was Chief Scientist at Victoria State Police, and also held research positions at La Trobe University and at the University of New South Wales.

He was world-renowned as a forensic scientist dedicated to the mission of enhancing the rigor of forensic science across many domains, particularly across the traditional pattern-matching sciences.

Thesis on the Prevalence of Illegible Signatures
A Case Study on the Widespread Trait of the Disappearing Legible Signature
By Mike Maran

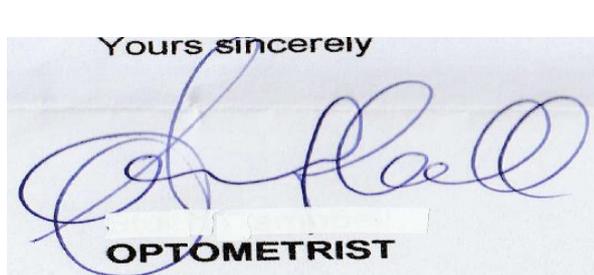
As part of my profession as a Document and Handwriting examiner, I have noticed the trend over the past few years for more signatures on all aspects of legal and other formal documents and agreements to have disintegrated into distorted illegible letter forms, that make any identification of the author questionable.

These types of signatures can be described as squiggles or a series of loops with intersections, others with indecipherable snake type lines.

The question is why are more authors signing in this way? Is it because the moto-neuro zones in the brain are dictating the author's unconscious pen movements to sign in an illegible manner? What are the reasons behind an increasing number of illegible signatures?

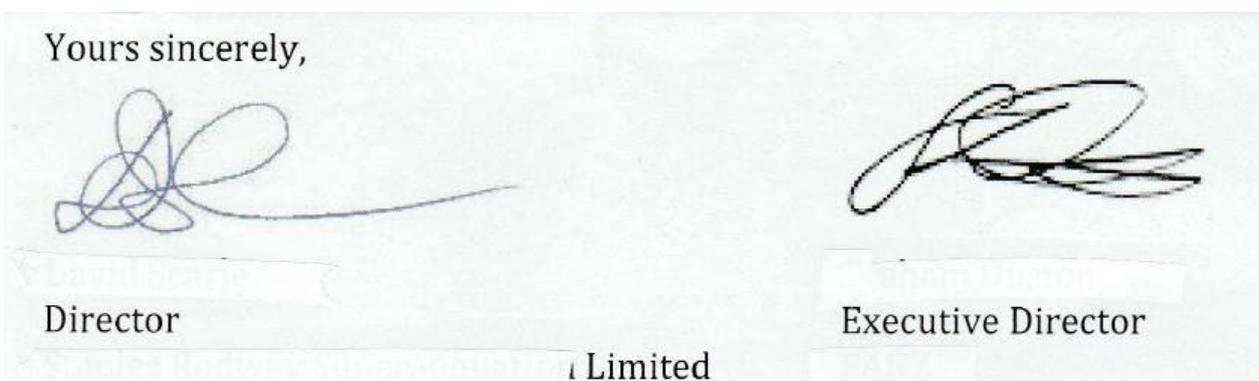
This new trend certainly makes identifying and authenticating signatures in the case of forgeries or denial of the signatory challenging for Document Examiners.

Illegible signatures can be associated with some professions. This is particularly evident with doctors or medical personnel, as noted on the bottom of prescription forms. This could be because a good percentage of the day is taken up by signing forms and patient's medical records. The illegible signature may be a time saving habit. If he or she was to sign more slowly and clearly, this action would take up more of his valuable time.



1.

In particular, company directors and managers are notorious in signing in an illegible manner. Of the many company documents and records it is very rare to find a signature in this respect that is legible.



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Looking at my files and collections of illegible signatures, this seems to be dominated by male authors. Female authors are more likely to sign in a legible manner.

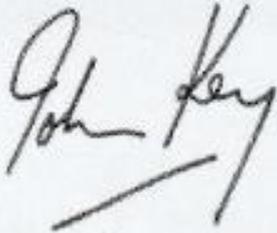
Yours sincerely

A handwritten signature in blue ink that is mostly illegible, appearing to be 'Jill Owens'.A handwritten signature in blue ink that is illegible, appearing to be 'Regards'.A handwritten signature in blue ink that is illegible, appearing to be 'Aarel Teae President'.

Strategic Industry Leader
Public and Commercial Services

How do politicians shape up when it comes to legible signatures? This can be mixed and varies with each of their own circumstances and personalities. Our own NZ Prime Minister has a very clear and legible signature. An attempt at signing a legible signature would go a long way in improving their public image and relations.

Yours sincerely

A handwritten signature in black ink that is legible, appearing to be 'John Key'.

Rt Hon John Key

Ka kite ano

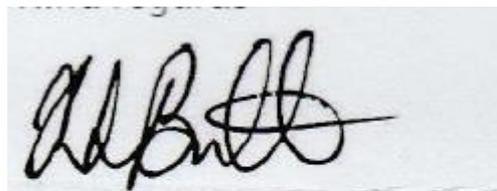
A handwritten signature in black ink that is illegible, appearing to be a stylized name.

Chief Executive

What can we deduce from those who have semi-legible signatures? There may be a desire to partly hide their outer public image. Some authors may feel uncomfortable in using their full personal name on a transaction or a document and prefer to give emphasis and clarity on just one of part of their names.

A handwritten signature in black ink that is illegible, appearing to be a stylized name.

Area Manager
for Chief Review Officer

A handwritten signature in black ink that is illegible, appearing to be a stylized name.

Contact Centre Manager

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An illegible signature can be linked to the person's occupation Artists, bankers and salespeople often sign their signature that reflects their vocation. It is not uncommon for salespeople to have large flourished signatures. Many artists have distinct illegible signatures. Their signatures are often unique in design and distinguished by their originality. Musicians often have musical symbols included. Bankers and those in the finance industry can also have dollar or numerical symbols interchanged within the signatures structure. We cannot assume that all illegible signatures from those in distinct vocations have the same personality traits as those with other illegible signatures.



Licensee Salesperson



Publisher

In summary, why are illegible signatures becoming more prominent?

There are many factors that contribute to this trend.

1. In today's world, there are more demands and time pressures within our work and home environments, so when it comes to saving a bit of time, an illegible signature which is always signed in haste or the replacement of a usual signature with initials, is now more common.
2. Document Examiners are now seeing an increasing trend and work load in questioned signatures and documents. These are mostly associated with intent for financial gain. Almost all the signatures that are associated with fraudulent documents are illegible or comprised of squiggles and intersections. It is very rare come upon a legible signature, especially in questioned corporate agreements and contracts.
3. Certain professions like to express themselves by distinguishing their signature in an unusual and illegible manner. These signatures are like a mirror on how they like to express themselves in public. The use of individual illegible signatures is a 'statement' which does reflect on their personality and again this is a growing trend.
4. Not all persons with illegible signatures are deemed untrustworthy. One has to examine other factors like personal background, circumstances and comparison with the script to have a correct indication of their intentions and personality traits.

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5. If I ask 10 persons to submit me a specimen signature, for the above reasons I can be almost certain that half of those signatures will be illegible and that growing trend will increase as we move from signing on hard copies to the present digital format.



2 samples of atrocious illegible signatures with indecipherable letter formations.

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Response to Forensic Handwriting Comparison Examination in the Courtroom
By Thomas Vastrick
Article by Katherine Koppenhaver, CFDE

This article is a response to the aforementioned article. All document examiners need to be aware of the article, since any examiner who does not meet Mr. Vastrick's approval may have to defend his professionalism based upon the misconceptions circulated by Mr. Vastrick. I have made an attempt to provide suggestions for countering Mr. Vastrick's attack on those of us in private practice.

Thomas W. Vastrick is a board-certified document examiner out of Orlando, Florida who wrote an article for The Judges' Journal in 2015 entitled "Forensic Handwriting Comparison Examination in the Courtroom." (Volume 54 No. 3). The section entitled *Gatekeeping Tips from a Practitioner* lists qualifications for accepting a forensic document examiner as an expert in court.

He refers to two types of practitioners, those who have limited qualifications and those who are professionals in the field of questioned documents.

He stated that ABFDE is "*the only certification board recognized by the broader forensic science community, law enforcement, and courts.*" His statement is interesting since I have been training law enforcement for several years now.

Thomas Vastick describes two types of document examiners:

Group 1

1. Certified by the American Board of Forensic Document Examiners,
2. Members of the American Society of Questioned Document Examiners,
3. Members of Questioned Document Section of the American Academy of Forensic Sciences,
4. Member of the Southeastern or Southwestern Association of Forensic Document Examiners,
5. Full-time, 24-month, on-site training.

And those who do not belong to the above-listed organizations and who are Group 2.

1. Certified by another board,
2. People who practice or have studied graphology,
3. Distance learning, and
4. On-line classes.

Membership in the first group is by invitation only and not based upon skill.

There is no proof that document examiners in the first group are superior to private examiners from the second group. No testing has been done to determine if one group performs better than the other. There are various skill-levels in both groups.

The most important criteria for choosing a professional in any field is his or her ability to do the job and do it well. This is especially true in the field of document examination. Document examiners must be able to draw correct conclusions about questioned documents and present the evidence concisely and clearly in a court of law. How does one go about finding a qualified and competent document examiner?

Ordway Hilton wrote in *The Scientific Examination of Questioned Documents*, "[t]he most important criteria of a witness is his ability to do the work. There is no school at which a document examiner, unlike an engineer or a doctor, can study to prepare himself. Some universities have offered special courses on questioned document examination, but these have not as yet been of high enough caliber to develop a proficient work. (p 406)"

He continues, "Self-study is the chief means of gaining this special knowledge." And he concludes, "Self-education must include study by experimentation and systematic research." Many

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document examiners have learned the field through self-education. Other examiners get their training through an apprenticeship program. However, the student is only as good as his teacher. There is no guarantee that a two-year apprentice leads to correct opinions.

In 1995, the Strategic Planning Committee of the American Academy of Forensic Sciences (AAFS) recommended establishing a mechanism to access certification in the various fields of Forensic Science. As a result, the Forensic Specialty Accreditation Board (FSAB) was formed in 2000 to accredit certification in the various fields of Forensic Science. Each certifying board must test all the areas of expertise required for their field. A list of accredited boards can be found on the FSAB website at www.thefsab.org.

There is no standard training program for document examiners. Science consists of principles and standards that a scientist must know in order to work in that field. Document examination is no exception. Students of document examination need to understand the principles of handwriting and handwriting identification in order to become proficient at determining the authenticity of handwriting. Once the student understands the principles, he can learn the practical aspects of document examination. At present, there are very few courses available in higher institutions of learning that offer the basic training in document examination. Hopefully, colleges will offer basic training in the principles of document examination.

The proper criteria for admitting expert testimony according to Federal Rule 702 is: If scientific, technical or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training or education may testify thereto in the form of an opinion or otherwise, if

- (1) the testimony is based upon sufficient facts or data.
- (2) The testimony is the product of reliable principles and methods and
- (3) the witness has applied the principles and methods reliably to the facts of the case.

The following factors must be considered in determining admissibility of scientific evidence:

- whether the theory can or has been tested;
- whether the theory has been subjected to peer review in publication;
- the known or potential rate of error;
- the extent of acceptance in the relevant scientific community;
- compliance with the hearsay exception;
- balance of probative value versus prejudicial effect.
- reliable (grounded on scientific methods and procedures supported by appropriate validation); and
- relevant (sufficiently tied to the facts of the case to be helpful to the jury)

At no place does it state that a witness must belong to a certain group in order to be qualified in court.

There are about 5000 courts in the USA. Of those, 94 are U.S. District Courts. There are over 3,000 counties or county-equivalent (borough, parish) state courts. That does not include Arbitrations and other Hearing Boards that oversee various professions.

There are over 300,000,000 people in the USA. 150 million cases are filed each year in U.S. courts. There are approximately 105 members of ABFDE who are taking cases according to the ABFDE website. About one in ten cases filed ever end up in court. While all cases do not involve questioned documents, it is obvious that 105 people cannot handle the workload generated by lawsuits filed in this country each year. And the workload keeps growing.

DO YOU NEED A DOCUMENT EXAMINER OR A HANDWRITING ANALYST?

By Bruce B. Redding, CFDE

Often when someone questions a signature on a document, they look for a handwriting analyst to help them answer their questions when they really should be looking for a document examiner. A handwriting analyst is a graphologist who specializes in the physical characteristics and patterns of handwriting in order to identify the writer's psychological state at the time of writing, or for evaluating personality characteristics. The document examiner has skills in the identification of handwriting and has training with pens, ink, paper, stamps, watermarks, alterations, typewriters, faxed documents, trash marks, multi-generational documents, indented writing, obliterations, disguised writing, graffiti, numbers, corporate meeting notes, and corporate resolutions. A document examiner who successfully passes a certification test becomes a Certified Forensic Document Examiner (CFDE).

The American Society for Testing and Materials International (ASTM) published standards for document examiners; however, in 2012 the Questioned Document Section of ASTM was disbanded and they stopped publishing their standards. A group called the "Scientific Work Group for Forensic Document Examination" (SWGDOC) began self-publishing their standards which are now utilized by most document examiners. The opening page of the SWGDOC website describes "*What forensic document examination is not*". "Forensic document examination does not involve the employment or practice of the study of handwriting in an attempt to create a personality profile or identify a writer's personality. "A questioned document, like other documents, may have been prepared with any of the numerous materials available. Sometimes the very materials of which it is constructed bring discredit and suspicion upon it." (Ordway Hilton *Scientific Examination of Questioned Documents*).

The examiner must have comparable handwriting samples from the author of the questioned document which is being examined. These samples are referred to as "exemplars".

The document examiner employs a comparative analysis approach. This comparison process of document examination is to note the similarities and differences between the exemplars and the questioned handwriting. The process needs to have a sufficient number of differences or similarities so the preponderance will support the document examiner's opinion. Upon completion of the examination, the document examiner renders an opinion to his client.

Typically, the documents include signatures; however, other documents may have altered or substituted material or questions pertaining to typewriting, printers, sequence of entries, paper type, or type of writing instrument used. The types of documents range from checks, wills, deeds, loans, notes, letters, legal documents and graffiti.

Document examiners are trained in evaluation and analysis of various types of documentation for detecting forgery. It often includes identifying writers and proving or disproving document authenticity or origin.

Some typical types of examination are signatures, typed documents, affixed stamps (i.e. notary), paper, typewriters (manual and electric), font type and anonymous letters.

Testimony

Should the case go to trial, the document examiner will be requested to testify; however, the Judge must accept the examiner's credentials prior to testimony. An expert witness must possess special skills not possessed by the layman. Federal Rules of Civil Procedure, 702 describes the requirements for expert testimony.

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If scientific, technical or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training or education may testify thereto in the form of an opinion or otherwise, if

- (4) The testimony is based upon sufficient facts or data.
- (5) The testimony is the product of reliable principles and methods and
- (6) The witness has applied the principles and methods reliably to the facts of the case.

An expert is therefore permitted to draw conclusions or express opinions that are otherwise inadmissible in testimony. Once accepted by the court, the document examiner will be considered an expert witness.

Certification

Each certifying organization has their own requirements for certification of its members. Generally, it requires a completed course by a recognized certified document examiner and a test by that organization. It is expected that you belong to at least one document examiner organization. Some organizations require a 2 to 4-year degree plus an apprenticeship in a “government approved laboratory”; however, no official definition for a government approved laboratory is published.

Professional Organizations and Certification

Certifications for “Certified Forensic Document Examiner” are obtained from the following professional organizations:

- American Board of Forensic Document Examiners (ADFDE)
- American Society of Questioned Document Examiners (ASQDE)
- International Association of Document Examiners (IADE)
- National Association of Document Examiners (NADE)
- Scientific Association of Forensic Examiners (SAFE)
- Association of Forensic Document Examiners (AFDE)

Literary references: Questioned Documents, Albert S. Osborn 1929;

Handwriting Analysis, Ulrich Sonnemann, Analysis of Handwriting, H. J. Jacoby;

Scientific Examination of Questioned Documents, Ordway Hilton, 1993.

Bruce B. Redding is a Certified Forensic Document Examiner. He is a Member of the International Association of Document Examiners and is the Budget Chairman for the organization.