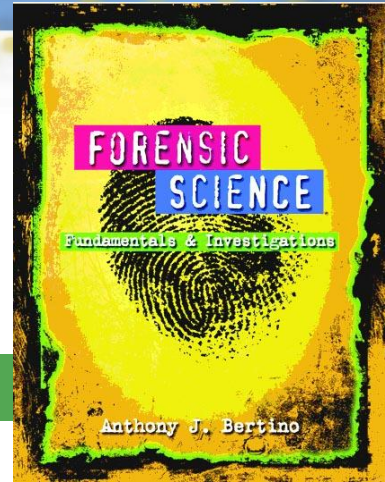


Chapter 10 *Handwriting Analysis, Forgery, and Counterfeiting*

By the end of this chapter you will be able to:

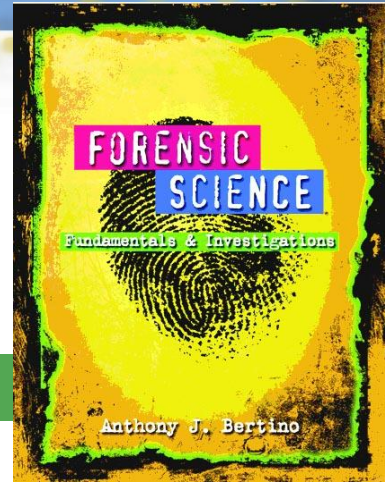


- Describe 12 types of handwriting characteristics that can be analyzed in a document
- Demonstrate an example of each of the 3 types of handwriting traits
- Identify the major goal of a forensic handwriting analysis

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Chapter 10 *Handwriting Analysis, Forgery, and Counterfeiting*

By the end of this chapter you will be able to:



- Distinguish between the terms *forgery* and *fraudulence*
- Identify several ways that businesses prevent check forgery
- Describe 4 features of paper currency that are used to detect counterfeit bills



Introduction

- Document Analysis – examination and comparison of questioned documents with known material.
- Questioned Document:
Any signature, handwriting, typewriting, or other written mark whose source or authenticity is in dispute or uncertain.



Questioned Documents

- Checks
- Certificates
- Wills
- Passports
- Licenses
- Money
- Letters
- Contracts
- Suicide Notes
- Receipts
- Lottery Tickets



Introduction

- **Document Expert** – specially trained person who scientifically (rely on data) analyzes handwriting and ***other features*** in a document.
- **Graphologist** – studies the personality of the writer based on handwriting samples.
- **Exemplar** – a *standard* document of known origin and authorship used in analysis.



Introduction

- Examine and compare questioned documents with known material
- Field investigations include:
 - Handwriting
 - Computer printouts
 - Commercial printing
 - Paper and ink
 - Threatening, ransom, or suicide notes
- Analysis helps identify a document's author



History of Forensic Handwriting Analysis

- **1930s**—handwriting analysis played a role in the famous Lindbergh case.
- **1999**—the US Court of Appeals determined that handwriting analysis qualifies as a form of expert testimony
- To be admissible in court, scientifically accepted guidelines must be followed
- Scotland Yard, the FBI, and the Secret Service use handwriting analysis



Introduction to Handwriting

Everyone's handwriting shows natural variations. Here are 6 of the 12 major, specific traits.

Specific trait	Line quality	Spacing	Size consistency	Continuous	Connecting letters	Lettering complete
Description	The letters flow or are erratic and shaky.	The letters are equally spaced or crowded.	The ratio of height to width is consistent or inconsistent.	The writing is continuous or the writer lifts the pen.	Capitals and lowercase letters are connected and continuous or are not connected and continuous.	The letter begins and ends on the page or part of the letter is missing.



Introduction to Handwriting

The traits are functions of formatting or of letter or line form. Here are the other 6 of the 12 major, specific traits.

Specific trait	Cursive and printed letters	Pen pressure	Slant	Line habits	Fancy curls or loops	Placement of crosses on t's and dots on i's
Description	Letters are cursive, printed, or both.	Pressure is equal or not when applied to upward and downward strokes.	If there is a slant, it is left, right, or variable.	Text is on, below, or above the line.	There are or are not fancy curls.	These are correct or misplaced.



Introduction to Handwriting

1. Line Quality – Do the letters flow or are they erratic or shaky?

forensic science
forensic science



Introduction to Handwriting

2. Spacing – Are the letters equally spaced or crowded?

The right of
the people to be

The right of
the people to be
secure in their

The right of
the people to be
secure in their



Introduction to Handwriting

3. Size Consistency – is the ratio of height to width consistent? (actually measure)

The Right of the People

The Right of the People

The Right of the People



Introduction to Handwriting

4. Continuous – Is the writing continuous or does the writer lift the pen?

forensic science
forensic science



Introduction to Handwriting

5. Connecting letters – Are capitals and lower-case letters connected and continuous?

The Right of the
The Right of the



Introduction to Handwriting

6. Letters complete – Are letters completely formed? Or, is a part of the letter missing?

the right of the people

th right of the people



Introduction to Handwriting

7. Cursive and printed letters— Are there printed letters, cursive letters, or both?

Forensic Science
Forensic Science
Forensic Science



Introduction to Handwriting

8. Pen Pressure— Is pressure equal when applied to upward and downward strokes?

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forensic science



Introduction to Handwriting

9. Slant— left, right, or variable?

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Introduction to Handwriting

10. Line habits— is the text on the line, above the line, or below the line?

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forensic science



Introduction to Handwriting

11. Fancy curls or loops – Are there fancy curls?

Forensic Science



Introduction to Handwriting

12. Placement of crosses on t's and dots on I's— Correct or misplaced? Are t's crossed, crossed in middle, toward top, or toward bottom? Are I's dotted, dotted toward right, left, or centered?

right right right right



Handwriting Examination

The goal of forensic handwriting analysis is to answer questions about a suspicious document and determine authorship using a variety of scientific methods.



Handwriting Examination

Two writings came from one person if:

- their similarities are unique and
- no unexplainable difference(s) are found

1. Examine the questionable document for detectable traits and record them – use the 12
 - o make measurements where possible



Handwriting Examination

2. Obtain a known sample of the suspect's writing (an *exemplar*)
 - o A sample must first be obtained without informing someone of the intention of impact.
 - o Exemplar should contain several of the words or letter combinations found in the QD.



Handwriting Examination

3. Compare and draw conclusions about the authorship of the questionable document.
 - o Look for obvious differences, then rule out
 - o For those that appear similar, analyzed more thoroughly.

Mr. Ramsey,

Listen carefully! We are a group of individuals that represent a small foreign faction. We ~~do~~ respect your business but not the country that it serves. At this time we have your daughter in our possession. She is safe and unharmed and if you want her to see 1997, you must follow our instructions to the letter.

You will withdraw \$118,000.00 from your account. \$100,000 will be in \$100 bills and the remaining \$18,000 in \$20 bills. Make sure that you bring an adequate size attache to the bank. When you get home you will put the money in a brown paper bag. I will call you between 8 and 10 am tomorrow to instruct you on delivery. The delivery will be exhausting so I advise you to be rested. If we monitor you getting the money early, we might call you early to arrange an earlier delivery of the



- born August 6, 1990 in Atlanta, Georgia; six-year-old beauty queen
- daughter of a socialite and a wealthy businessman
- found murdered in her parents' Boulder, Colorado, home on December 26, 1996
- Still unsolved, led to one of the most publicized police investigations of the 1990s.
- In 2008, new DNA technology cleared all members of her family.



Statement Analysis

- An analysis of a declaration that only indicates whether the person is being truthful or deceptive



Analysis of Ransom Note

<http://www.statementanalysis.com/ramseynote/>

- An analysis by Mark McClish
federal law enforcement officer for 26 years
- worked with the U.S. Secret Service Uniformed Division
- served as a Deputy U.S. Marshal in Springfield, IL
- Inspector/Instructor at the U.S. Marshals Service Training Academy
- created the Statement Analysis techniques for detecting deception in a verbal and written statement
- provides interviewing skills training and assists investigators in analyzing statements



Technology Used in Handwriting Analysis

- Biometric Signature Pads
 - “Learns” to recognize how a person signs
 - Evaluates speed, pressure, and rhythm of the signature
 - Recognizes forgeries by the detection of even slight differences
- Computerized Analysis
 - Compares handwriting samples objectively
 - Compared with samples stored in databases



Technology Used in Handwriting Analysis

- Computerized Analysis
 - Forensic Information System for Handwriting (FISH) – computerized handwriting database used and maintained by Secret Service
 - Documents are scanned and reviewed electronically.
 - System has verified that no two writers pen their words exactly the same, nor do they have the same combination of handwriting characteristics.



Handwriting

Connecting Letters.
Connected John Kennedy
Not Connected John Kennedy

- Evidence in the Courtroom
 - Expert explains how comparisons were made
 - Cross-examination by defense attorney may follow
- Shortcomings in Analysis
 - Are the base documents real or fake?
 - Did mood, age, fatigue impact the handwriting?
 - Did experts miss any details?



Handwriting

Connecting Letters.
Connected John Kennedy
Not Connected J ohn K ennedy

o Shortcomings in Analysis

- Now training to become an handwriting expert is certified
- American Board of Forensic Document Examiners – one of the groups offering certification
- Handwriting analysis now considered a reproducible and peer-reviewed scientific process



Forgery

- Forgery – process used by criminals to make, alter, or falsify with intent to deceive another.
- Forged documents include:
 - checks
 - employment records
 - legal agreements
 - licenses
 - wills
- Fraudulence—forgery for material gain

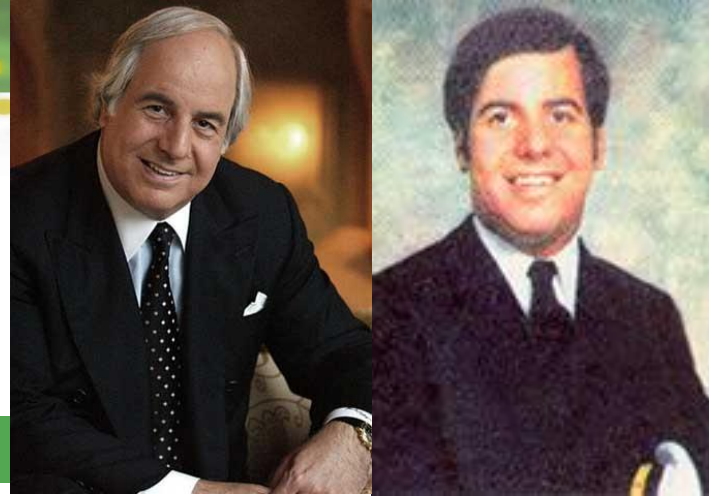


Forgery

- Check forgery can include:
 - ordering another's checks from a deposit slip
 - altering a check
 - intercepting another's check, altering, and cashing it
 - creating a check from scratch

Frank Abagnale

- Became notorious for impersonating a pilot, a doctor, and a lawyer.
- He was hired by the FBI to teach them his fraudulent tricks.
- Now heads a private company consulting businesses on forgery prevention





Frank Abagnale

Comments from Frank W. Abagnale concerning the book and the film, Catch Me If You Can.

“I feel it is necessary to make the following statement concerning the book and the film, Catch Me If You Can. The reasons for this statement is to provide clarification and accuracy.”



Frank Abagnale

“I wrote the book, *Catch Me If You Can*, more than 23 years ago. Obviously, this was written from my perspective as a 16-year old with the help of a co-writer (I'm now 54 and I sold the movie rights in 1980). I was interviewed by the co-writer only about four times. I believe he did a great job of telling the story, but he also over dramatized and exaggerated some of the story. That was his style and what the editor wanted. He always reminded me that he was just telling a story and not writing my biography. This is one of the reasons that from the very beginning, I insisted the publisher put a disclaimer in the book and tapes.”



Frank Abagnale

“It has been reported that I had written \$10 million, \$8 million and \$5 million worth of bad checks. The actual amount was \$2.5 million. I was never on the FBI's Ten Most Wanted List as this is reserved for very violent criminals who pose a threat to society. All of the crimes I committed were when I was between the ages 16 and 21. I served time in prison in France, Sweden and the United States. In the U. S. Federal Court, I was sentenced as a youthful offender because of my age at the time the crimes were committed. Even so, I was given 12 years of which I served a total of five years. This was considered harsh punishment then and almost unheard of today.”



Frank Abagnale

I have been married for over 25 years and I am the proud father of three sons. When I was 28 years old, I thought it would be great to have a movie about my life, but when I was 28, like when I was 16, I was egotistical and self-centered. We all grow up. Hopefully we get wiser. Age brings wisdom and fatherhood changes one's life completely. I consider my past immoral, unethical and illegal. It is something I am not proud of. I am proud that I have been able to turn my life around and in the past 25 years, helped my government, my clients, thousands of corporations and consumers deal with the problems of white collar crime and fraud.



Frank Abagnale

“I know that Hollywood has made a number of changes to the story, but I am honored that Steven Spielberg, Leonardo DiCaprio and Tom Hanks participated in the making of the movie inspired by my life. It is important to understand that it is just a movie... not a biographical documentary.”

Frank W. Abagnale
September 3, 2002

<http://www.abagnale.com/comments.htm>



Preventing Check Forgery

- o Chemically sensitive paper
- o Large font size requires more ink and makes alterations more difficult
- o High resolution borders that are difficult to copy
- o Multiple color patterns
- o Embed fibers that glow under different light
- o Use chemical wash detection systems that change color when a check is altered



Literary Forgery

- Forgery of a piece of writing, such as a historic letter or manuscript.
- Often occurs with documents that would be deemed valuable

Ex) letter written by Adolf Hitler, Albert Einstein, Charles Darwin



Literary Forgery

- Best forgeries aim to duplicate the materials found in the original:
 - old paper
 - chemically treated materials to fake an older look
 - inks mixed from substances that would have been used at the time
 - watermarks that add the appearance of age
 - tools and styles that would have been popular at the time



Literary Forgery – Mark Hoffman

- Forged documents, coins, and bank notes
- Created 116 pages of a supposedly lost Mormon Document; sold for a fortune to Mormon collector
- Also forged works attributed to Emily Dickinson, Abraham Lincoln, and Mark Twain
- Caught after trying to forge another Mormon document when bomb detonated in his car.



Counterfeiting

- False documents or other items are copied for the purpose of deception.
- A criminal activity existing since antiquity
- Items commonly forged today include:
 - Currency
 - Traveler's checks
 - Food stamps
 - Certain bonds
 - Postage stamps



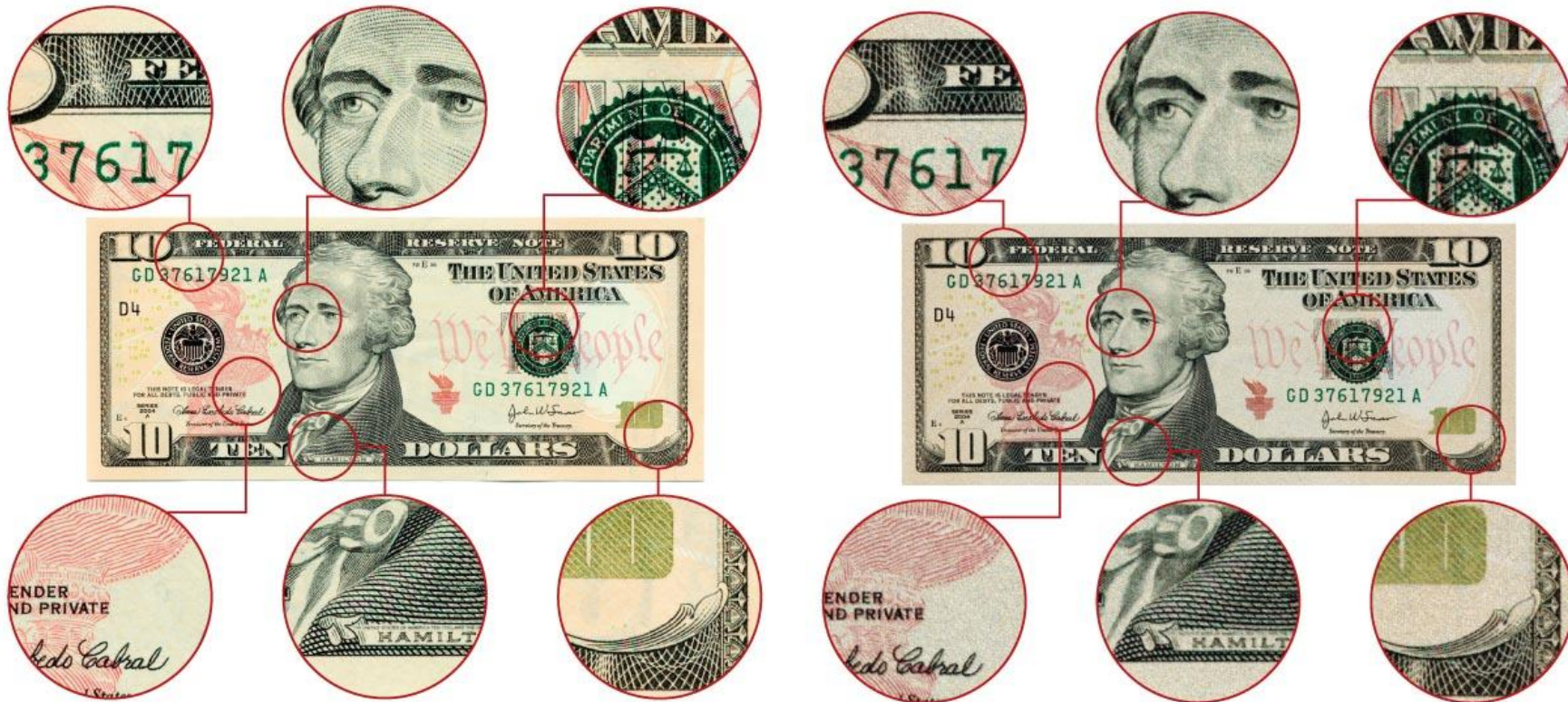
Counterfeit Currency

- Tracked by Secret Service
- Security features are added to paper currency that scanning cannot reproduce
- Regular printer paper contains starch. (check with iodine pen)
- Paper currency contains rag fiber instead of starch, and do not contain the starches that react with iodine.
- When the pen is used to mark genuine bills, the mark is yellowish or colorless.





Counterfeit vs. Authentic



Verifying Authentic Currency

New security features:

1. Portrait stands out and appears raised off the paper
2. Contains clear red and blue fibers woven throughout the bill
3. Has clear, distinct border edges
4. Treasury seal is shown with clear, sharp saw-tooth points
5. Watermark appears on the right side of the bill in the light



Verifying Authentic Currency



New security features:



6. The security thread is evident—a thin embedded vertical strip with the denomination of the bill printed in it
7. There is minute printing on the security threads, as well as around the portrait
8. When the bill is tilted, the number in the lower right-hand corner makes a color shift from copper to green



Examples of Security Features





..... Summary

- Handwriting analysis compares questioned documents with exemplars to establish authorship.
- Aspects of a person's handwriting style can be analyzed to ascertain authenticity.
- Many new features of paper currency help prevent counterfeiting.
- Technological advances have enhanced chances of detecting forged documents.