

## Chapter 16 Notes Part 2: Document Examination

### Alterations, Erasures, and Obliterations

- Documents are often altered or changed after preparation, to hide their original intent or to perpetrate a forgery.
- One of the most common ways to alter a document is to try to erase parts of it.
- Erasures can be done using:
  - A rubber eraser
  - Sandpaper
  - Razor blade
  - Knife
- Erasing a document by any method disturbs the upper fibers of the paper.
- These changes are apparent when examined under a microscope.
- Although microscopy may reveal that an erasure has been made, it does not necessarily reveal the original writing that was present.
- If enough of the upper fibers of the paper have been removed, identifying the original contents is impossible.
- Writing may also be obliterated with chemicals.
- Strong oxidizing agents can be placed over ink, creating a colorless product.
- Chemical obliteration is not visible to the naked eye.
- Examination under the microscope may reveal discoloration on the treated area of the paper.
- Examination of documents under UV light may also reveal fluorescent ink markings that go unnoticed in room light.
- *Infrared luminescence* is the process by which some inks reradiate infrared light when exposed to blue-green light.
- Infrared luminescence can be used to prove that a document was altered with ink that differs from that used in the original document.
- In this process, a document is illuminated with blue-green light and pictures are taken of the document using infrared-sensitive film.
- Any differences in luminescent properties of the ink indicate that different inks were used.
- Infrared luminescence can also be used to reveal writing that has been erased.
- Intentional obliteration of writing by overwriting or crossing out is seldom used for fraudulent purposes because of its obviousness.
- Obliterations are still frequently encountered in document examination for various reasons.
- If an obliteration is done with the same ink as was used to write the original material, recovery is usually impossible.
- If the two inks differ, however, photography with infrared-sensitive film may reveal the original writing.
- Infrared photography can also be used to reveal the contents of a charred document.
- Charred documents can also be deciphered by reflecting light off the paper's surface at different angles in order to contrast the writing against the burned background.
- Digital image processing can also be used to improve or enhance the visual quality of a document.
- *Digitizing* is the process by which the image is stored in memory.
- Once the document has been digitized, an image-editing program such as Adobe Photoshop is used to adjust the image.

- A document may be enhanced through:
  - Lightening
  - Darkening
  - Color adjustment
  - Contrast adjustment

### Other Document Problems

- *Indented writings* are the partially visible depressions on a sheet of paper underneath the one on which the visible writing was done.
- These depressions are due to the application of pressure on the writing instrument.
- When paper is studied under oblique or side lighting, its indented impressions are often readable.
- Indented writings can also be visualized by applying a polymer film to a questioned document and exposing the film to an electrostatic charge.
- When a toner powder is applied to the film, the indented writing appears.
- This technique has produced clearly readable images from impressions that could not be seen or were barely visible with other methods.
- A study of the chemical composition of writing ink present on documents may verify whether known and questioned documents were prepared by the same pen.
- A microspectrophotometer can be used to compare ink lines without destroying the writing sample.
- Thin layer chromatography can also be used to conduct ink comparisons.
- Most commercial inks are mixtures of several different organic dyes.
- The various dyes used in one ink can be separated using thin layer chromatography.
- Thus, two ink samples can be compared by comparing their distribution on a thin layer chromatographic plate.
- Thin layer chromatography can also be used to specifically identify the type of ink used on a document.
- The U.S. Secret Service and the IRS together maintain the U.S. International Ink Library.
- This library contains records of more than 8,500 inks, dating back to the 1920's.
- Other Document Problems
- Each year, new pen and ink formulations are added to this reference collection.
- This library has been used to prove that many documents have been fraudulently backdated.
  - For example, one document dated 1958 was proved to have been written with ink that was not produced until 1959.
- Document examiners will also examine the composition of the paper on which a document is written.
- Features varying between different paper samples include:
  - General appearance
  - Color
  - Weight
  - Watermarks

### Review

- \_\_\_\_1. Suppose you are examining a document in which the original words have been covered with a different ink than was used to compose the original. How would you go about recovering the original writing?
- A. Photograph the document with infrared sensitive film.
  - B. Examine the document under UV light
  - C. Reflect light off the paper's surface at different angles to contrast the writing with the background.
  - D. Try to wash off the second layer of ink.