

## Art Forgery: The Role of the Document Examiner

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**ABSTRACT:** Art fraud constitutes a new area of investigation. Consequently, the legal profession is exploring the use of various fields of expertise to assist them in determining the authenticity of art. This paper defines the latitude of the document examiner in such cases.

In so doing, it describes the types of art applicable to document examination, enumerates the inherent limitations and hazards, and discusses the process and conclusions of this type of examination.

**KEYWORDS:** questioned documents, signature examination, simulation, printing processes

Art fraud is not new. It has been around for centuries. What is new is its magnitude. This is due largely to the affordable type of art that attracts a great number of consumers and is easier to duplicate. Because art fraud is a growing area of criminal investigation, the legal profession is exploring the use of various fields of expertise to assist in determining the authenticity of art. For this reason, document examiners will increasingly be asked for assistance. The techniques of forensic document examination can play a significant role in the investigations of certain types of art. There are also inherent limitations.

Document examiners are trained to determine the authenticity of signatures and make distinctions about papers and inks. When the substrate of art is paper and it bears a signature made with pencil, pen or crayon, then it falls within the sphere of forensic document examination. This may involve the comparison of known pieces to questioned pieces to determine if both are from the same source, or whether the paper existed at the time the work was authorized and in the period of a particular type of signature, or whether the ink on the questioned work is made up of the same components as that on the known works. These are generic problems that are submitted to document examiners everyday. For this reason, it may seem that the examination of art is the same as an examination of a document. However, forensic document examinations of art are more complex than the usual document case.

This paper makes distinctions that clarify the type of art that falls within the realm of forensic document examination, and explores the examiner's role when called upon to help in determining art fraud or forgery. In so doing, it will attempt to set guidelines to determine when a document examiner should accept or reject a case. It also discusses the types of examinations that can be performed as well as the process of examination and types of conclusions that can be rendered.

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### Types of Art Applicable to Forensic Document Examination

The type of art that can be examined using forensic document examination methods are pieces that either in whole or part involve the same implements, processes and materials as documents. This includes ink, paper, printing processes, water marks, mechanical impressions (chop marks), signatures, and other handwritten notations made by a conventional writing instrument such as a pen or pencil. Anything outside these areas would require a broader base of knowledge than is afforded by the traditional training of forensic document examiners.

Art that uses the same implements, processes or material as documents falls into two broad categories: single works and multiple works (Table 1). Museums classify these categories as drawings and prints. Both categories are subdivided into types of art. Single works, as the name states, are one of a kind. They include drawings, watercolors and pastels that bear a penciled, inked, or crayoned signature. Multiple works are numerous copies of one image that are printed as an edition. They include lithographs, silkscreens,<sup>2</sup> intaglio and woodcut prints that are signed and numbered.

#### Single Works

Single works are produced by the artist's hand imaging the paper. As such they are original works. Drawings are made by any medium that images the paper: pencil, charcoal, crayon, and ink. Pastels are created by wax- or powered-based colors by pencils, crayons, or chalk. Watercolors and gouaches are water-base paint applied by brush, but often signed by a writing implement.

#### Multiple Works

Printmaking is the means of producing art on a mass scale. All prints are made by transferring the inked image to a sheet of paper either by machine or hand pressing the printing matrix against the paper. A printing matrix can be a block of wood, a slab of limestone, or some type of metal plate. There are four processes to create the image onto the printing matrix.

#### *Lithograph*

The image is drawn or transferred by a photographic process onto a limestone or fine-grain metal with a greasy ink. Based on the principle that water and oil do not mix, the

<sup>2</sup>The commercial term for silkscreen is serigraph.

TABLE 1—*Works of art on paper.*<sup>a</sup>

Drawings (Single Works)	Prints (Multiple Works)
1. Drawings	1. Lithographs
Pen & Ink	2. Silkscreen (Serigraphs)
Pencil	3. Intaglio
Charcoal	Drypoint & Engraving
Pastels	Mezzotint
2. Watercolors	Etchings & Aquatint
Gouaches	4. Woodcuts (Reliefs)

<sup>a</sup>Categories of art on paper that have signatures written by a conventional writing instrument such as a pen, pencil or crayon.

plate surface is covered with water that is rejected by the greasy image and adheres only to the nonimage area. The application of oil based printing ink adheres only to the image area and not the surface of water. The plate or stone is overlaid by paper and run through a press. The inked image is transferred to the paper making the print. The print lacks indented or embossed areas.

### *Silkscreens*

A stencil process, also known as serigraphs, by which fine fabric is stretched on a frame. The fabric is blocked out wherever unprinted areas are to appear, and ink is squeegeed or brushed through the open mesh of the fabric producing the image onto the paper below. Each color is applied separately. The next color is squeegeed through a different stencil by which new areas are blocked out. The process is continued until the image is completed. As with lithography this method lacks indented or embossed areas.

### *Intaglio*

Also known by the French work gravure. The image is cut, etched or scratched into a plate surface. The printing ink is rubbed into the incised areas and the surface is wiped clean. The inked plate is overlaid with wet paper and run through a press transferring the image to the paper. The inked image is embossed and the plate edges are indented on the paper.

### *Woodcuts*

The raised surface of the matrix (wood, linoleum, etc.) is the image and the background or nonimage area is cut away or recessed. A relief printing process by which the ink is rolled onto the raised areas, paper is placed over it, and the back of the paper is rubbed or it is run through a press to transfer the image to the paper. The inked image is impressed into the paper.

Prints are normally produced through a publishing printshop. The printer first makes proofs of the work until the artist is satisfied. Then the designated number of prints are made plus a number of proofs. Once the edition is completed, the prints are examined to make sure they are all good quality. Prints are signed by the artist, and numbered by the artist or someone designated by the artist. The numbers will be in one person's handwriting usually written below the lower left corner of the image.<sup>3</sup> Many printers then mark each print with a "chop" impression that is a symbol embossed on the print, usually in the lower margin, to designate the printer. After the edition is completed, the printing plate is voided with a hole or a mark so that the plate cannot be printed again without revealing the cancellation mark. If the printing surface is a lithographic stone, it is ground down to be used over for another work.

### **Proofs**

All editions of prints include proofs that are not numbered. They are marked as proofs and signed by the artist. They are identical to the prints in the edition and will bear one of the following notations.

<sup>3</sup>The edition number is composed of the print number, a slash, and then the total number of prints in the edition. The print number does not reflect the sequence of actual printing. For example, print  $\frac{1}{200}$  does not necessarily mean that it was the first printed in a series of 200. Numbering takes the form of Roman or Arabic numerals. The edition size is dependent on either the life span of the printing matrix or the specific number of prints authorized by the contract between the artist and the publisher/printer.

“*Bon a tirer*” (*right to print*)—The first good print that meets the artist’s approval for the edition printing.<sup>4</sup>

“*A.P.*” *Artist Proof* or “*E.A.*” *Epreuve d’Artiste*—The common practice is that 10 to 15% of an edition is reserved for the artists.

“*HC*” *Hors de Commerce*—Prints outside of the edition but are the same as the edition and are used as gifts or payment to those involved in the production of the edition.

*P.P.* “*Printer’s proof*” *epreuve d’imprimeur* or a notation for the printer—Archival proofs kept by the printer. These can be marked with the printer’s initials.

*Cancellation proof*—After the edition is completed, the plate is defaced with a mark to cancel it. A proof is made of the plate and signed by the artist.

### Types of Paper & Inks

There are endless variations of art paper in size, weight, color, texture, archival qualities, fiber content, and other properties. They are created for the specifications needed in each medium. One of the most important properties of art paper is its archival quality. This depends on its pH that gives the paper the ability to last indefinitely under proper care and preservation. The molecular make-up of paper is susceptible to destruction by acid. Nonarchival art papers may have optical brighteners. Most art papers have internal sizing and some papers have surface sizing that can accept the medium such as lithography and watercolors so that the inks don’t feather. Papers are machinemade, mouldmade and handmade and come from every size mill in the world. They come in single sheets or in rolls. Sheet paper may or may not have watermarks and generally roll paper does not. Sheet paper is more prevalently used.<sup>5</sup> The edges of a sheet are cut or deckled. A deckle edge is the feathered edge of the paper illustrated in Fig. 1, created by the wood frame (a deckle) placed over the mold. An imitation deckled edge is created by tearing or sawing the edges of the paper to give a ragged edge.

Unlike business paper that can be referenced by Lockwood’s Directory, there are no catalogues or directories of art paper or 20th century watermarks on fine papers. Some mills keep records of when certain papers are produced and when watermarks are changed. Art paper distributors, printers, and artists are among the most knowledgeable people in this area.

Most printing is done with oil-based inks because of their permanence and durability, but water-based inks are becoming more acceptable in some kinds of printmaking. They are less toxic, provide for easier cleanup and because they dry faster, the printing process is more rapid. Inks for drawing, such as the traditional India ink, are usually water-based.

### Types of Art Fraud

Authentication of art is a difficult issue. However, the key element is deception. If art is attributed to an artist who was not in any way involved with its production, but, is represented as such, then the piece is a fake. In the category of single works such as watercolors and drawings, a fake is an involved process dependent on the skill of the

<sup>4</sup>During the run, this print gets soiled, so during the numbering of the prints a clean print is marked with this designation and signed by the artist. Occasionally, there are two or three proofs so designated: one for the primary printer and one for the assistant printer or printers.

<sup>5</sup>Dawes, Wallace, “Paper Facts for Creativity and the Pen,” unpublished paper presented at the International Conference for Calligraphy in Claremont, CA, Paper Source Ltd., Los Angeles, CA 1985.

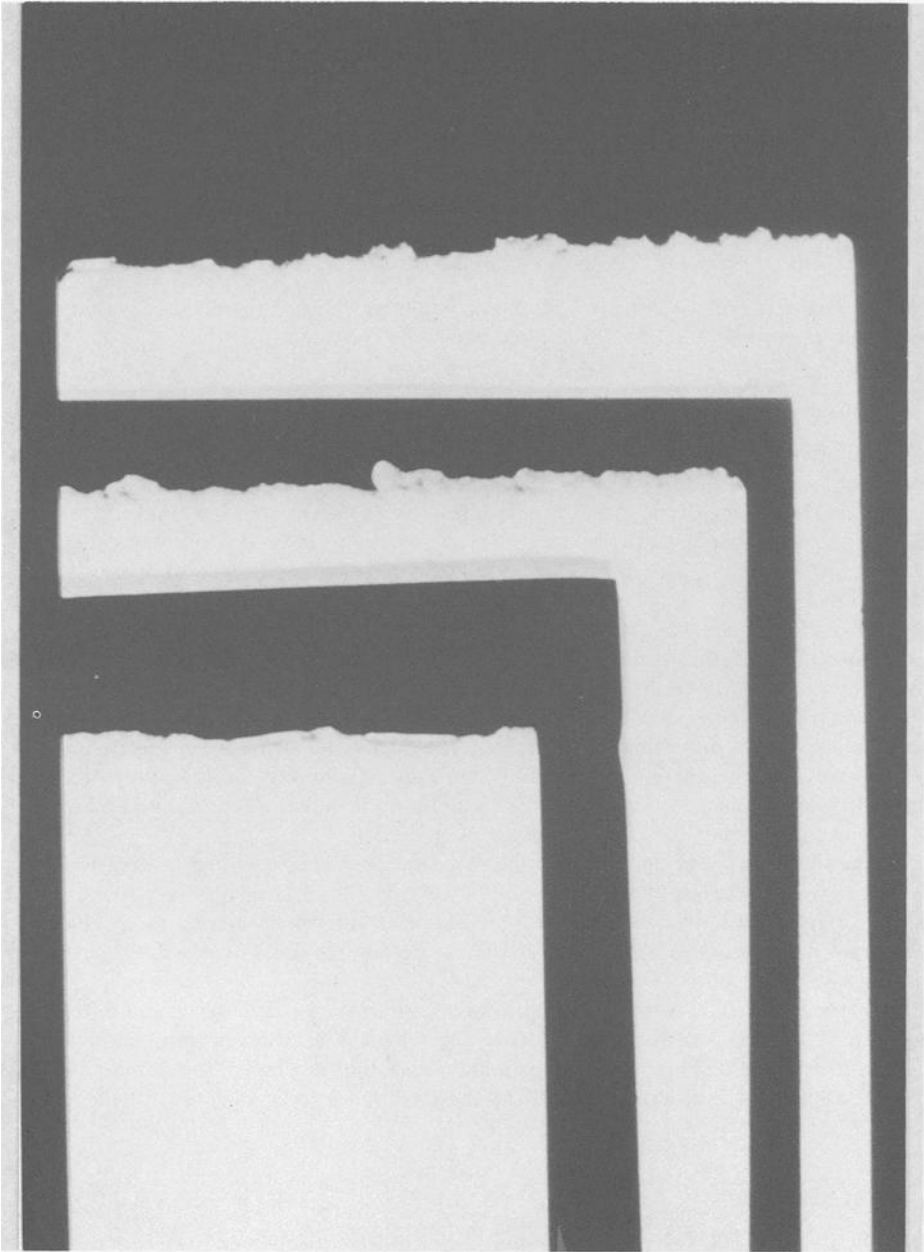


FIG. 1—*The deckled edge of three sheets of paper.*

forgery. In the printmaking medium this may also be the case, but most fake prints are produced by photomechanical means either by a reproduction of an existing print passed off as part of the edition, or a print of a work already existing in another medium (such as a painting or watercolor) that was not made by nor authorized by the artist [1]. Another form of fake is a pastiche, which is more likely found in the single-work category, but can also be found in the printmaking medium. A pastiche is a composition made in the style of an artist by combining features from authentic works.

The detection of fakes in the print medium is complicated by the degrees of authenticity and contractual agreement. An important factor in the scientific analysis of art is an understanding of the degrees of authenticity and requires an intricate knowledge of what the art community considers as criteria. Generally, authenticity is two-fold and is determined by who created the piece.

1. If the piece was created by the artist, then it is authentic and original.
2. If the artist authorized a reproduction of his creation, but did not participate in the printing process, then it is authentic, but not original.

Of the four types of printmaking, lithographic prints cause the most confusion in determining this difference between authenticity and originality. This is due to three distinct methods in making lithos.

**A fine print:** the artist creates the image on the printing matrix, it is printed by a flat-bed press and hand pulled. This means that after each print is made the printing matrix is cleaned and reinked by hand.<sup>6</sup>

**An after print:** a photographic method is used to transfer the image to the printing matrix, it is generally printed by a flat-bed press and hand pulled. These are reproductions of single works such as watercolors, drawings, paintings, and sculpture. They are facsimiles authorized by the artist.<sup>7</sup>

**Commercial print:** a photographic method is used to transfer the image to the printing matrix and then printing with high-speed presses. This is the process by which museum posters are created.

Semantics play a major role in making distinctions of how a particular litho is categorized. A litho is considered original when it is produced from the plate or stone that the artist worked on. A fine print is an original. A litho is considered authentic when it is an authorized reproduction of the artist's original work, but did not personally work on. This type of "after" is authentic. Both are legitimate works when signed by the artist. Commercial prints may or may not be authorized by the artist, but are not generally signed, usually produced for promotional purposes, and are usually termed posters.

### **Process of Examination**

There are three phases in the examination of art on paper: typing the art, research, and collection of standards and comparison of known materials with the questioned art. In the first phase, the physical properties are examined to determine if they are consistent with the claim of the work. For example, has the paper yellowed and the ink faded relative to the purported age and storage of the work, or is the printing method different than the original pieces. In the second phase, information about the technical aspects of the piece may suffice. For example, the records may show that the paper was machine deckled on the bottom and the questioned piece is hand deckled on the top, or the paper has a watermark subsequent to the printing of the piece. In most cases standards are necessary for examination to determine the physical properties of the piece as well as the habits and customs of the artist. In the third phase, the examination of the physical properties are compared between the standards and the questioned pieces.

<sup>6</sup>What must be kept in mind is that any method that an artist chooses to use in creating a work is valid, including using offset lithography or photographic transfer. The process is then considered a tool that the artist is using. However, once the offset process is used solely for reproducing existing art, it is no longer within the realm of creation and is no longer categorized as an original. Only by understanding the artist's intention can the examiner determine the originality of a piece.

<sup>7</sup>An "after" can also be an imitation, acknowledged as an imitation, as well as an authorized print that was produced via contract after the artist dies. In both instances, there can not be an authentic signature by the original artist.

### *Typing the Art*

With 10 to 30 power magnification the image area should reveal whether it is a single work or a print, what type of print, and whether it is a photomechanical or hand-pulled lithograph. The texture of the paper and the highlights of the imaged area make their strongest effect under oblique light.

*Single Works*—Watercolors can be distinguished by the transparent quality of the image that has minute particles of color peppering the surface and the migration of color at the edges of the image, as illustrated in Fig. 2. Pastels can be distinguished by the wax or chalk texture of the image. Pencil and charcoal drawings have a dusty quality. The particles of chalk, crayon, graphite, or charcoal are embedded between the paper fibers, as illustrated in Fig. 3. Ink drawings have feathered strokes that bleed between the paper fibers, as illustrated in Fig. 4.

Single works will be signed in a variety of ways. The signature may be written with the same medium as the image or a different medium. For example, an ink drawing made with a brush may be signed with a brush or a pen.

*Prints*—Lithographs and silkscreens are planographic techniques that will not leave indentations or raised areas on the paper. The image on lithographs will be smooth and solid to the edges illustrated in Fig. 5. With high-speed offset presses the image will appear to be made up of dots. Although, it is reported in Goetschel's study that this dot pattern is invisible on prints made with high resolution printing presses [2]. In this study, examination of high resolution prints of 400 lines per inch using 10x magnification, the dot pattern was still quite apparent, as illustrated in Fig. 6.

Silkscreens will generally have a heavier coat of ink on the print and the registration of colors will overlap slightly or have a thin space between colors. Intaglio prints will have an indentation from the plate that surrounds the image area and the ink will be embossed on the paper. The edges of the lines themselves will be serrated. This can readily be seen with oblique lighting that produces shadows on the sides of the lines opposite the light source<sup>8</sup> illustrated in Fig. 7. The lines in a woodcut print are sunk below the surface of the paper that itself is convex in the spaces between the inked areas. The edges of the image lines will have a buildup of ink. They will show more ink at the fringes of the image areas, like a framing of each inked area, illustrated in Fig. 8.

The signatures on prints are usually written with pencil and will bear additional writing for comparison in the form of the edition number or proof notation. Sometimes the artist's name is cut into the image area so that it is a printed signature. In this case, the edges of the signature strokes will have a serrated quality and have the same properties as the image area.

### *Research and Collection of Standards*

More often than not, the examiner will have to work in collaboration with other specialists when collecting standards. Art historians, museum curators, art conservators, printers, and art appraisers specialize in artists, genres, techniques, mediums, and art periods.<sup>9</sup> They also have at their disposal an abundance of reference material to determine

<sup>8</sup>It must be noted that prints are considered fragile by the connoisseurs and touching is generally not allowed, otherwise the raised ink on the surface can be felt.

<sup>9</sup>Museums, printers, publishers, paper distributors, appraisers, collectors, and dealers are all sources that can help in gathering the standards necessary for making examinations in art. Some sources that will inevitably be mentioned in this quest are IFAR and ASA. International Foundation of Art Research (IFAR) is an agency that catalogs thefts, forgeries, and cases of fraud in art and antiques, then publishes and disseminates the information worldwide in cooperation with the art

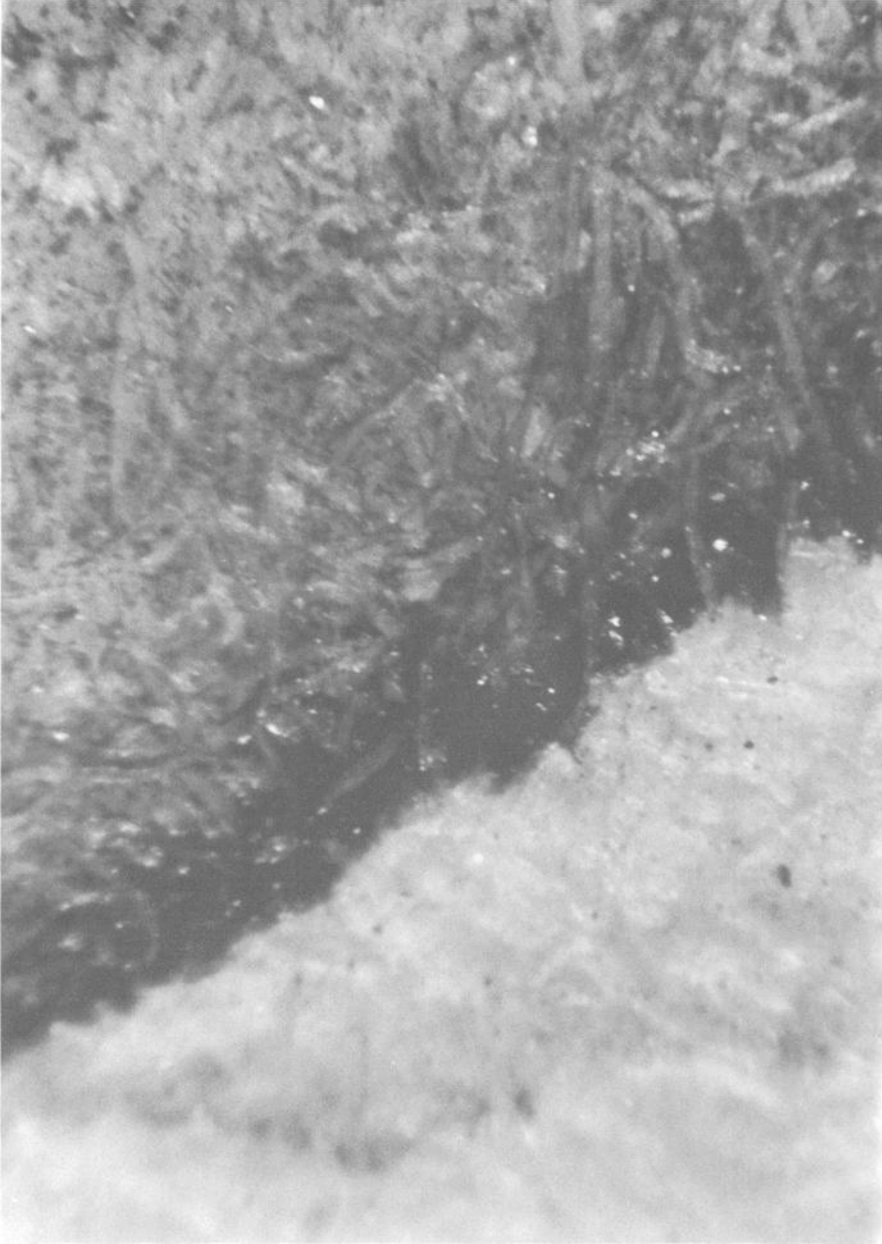


FIG. 2—Watercolor magnified shows the migration of color pigments to the edges of the image, pigments speckling the transparent image.

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community, insurance companies, police, the FBI, and Interpol. IFAR is located at 46 E. 70th St., New York, NY 10021. The American Society of Appraisers (ASA) is an association of art appraisers that specializes in all types of property. Members are tested and certified and bound by ethical standards and practices. Headquarters: P.O. Box 17265, Washington, DC, 20041.



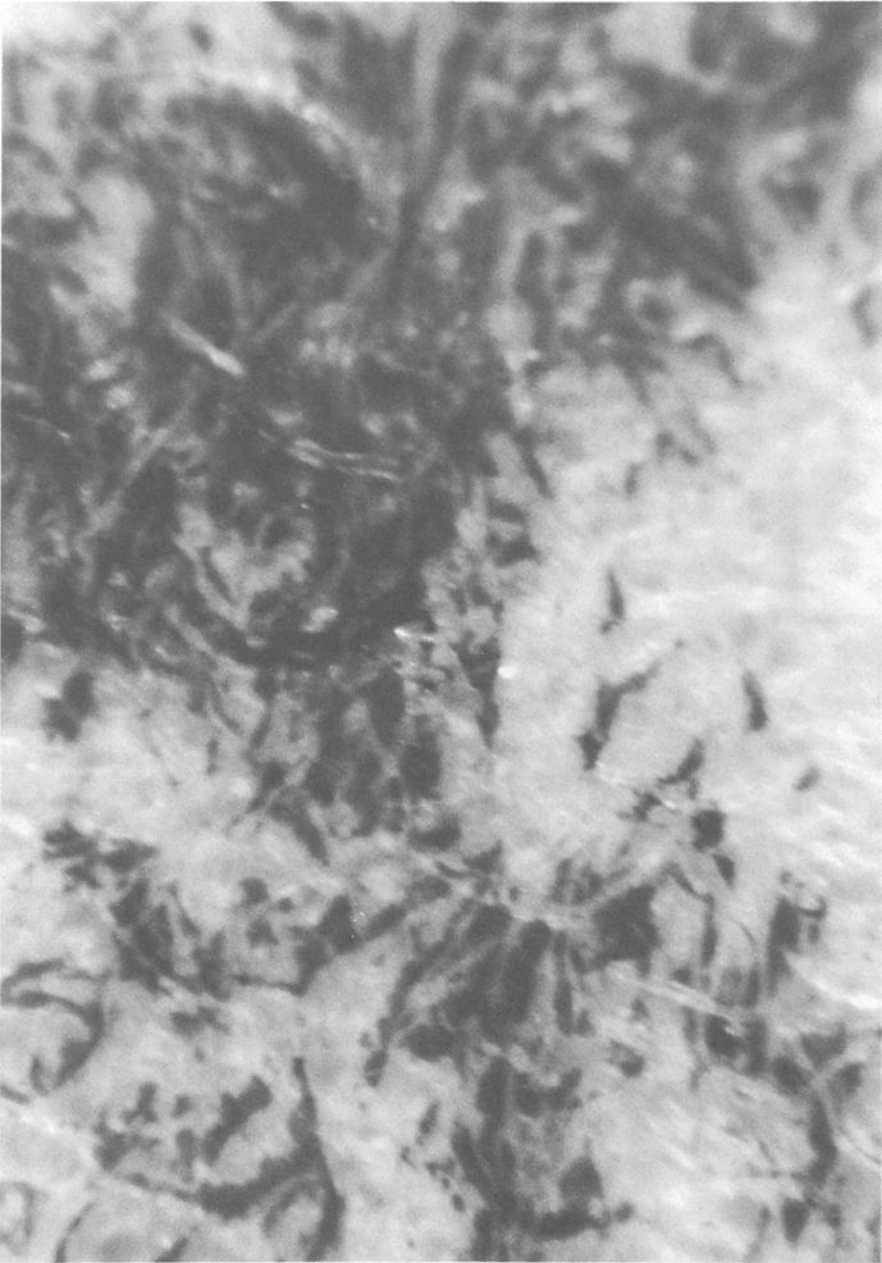


FIG. 3—*Pencil drawing magnified shows the graphite embedded between the paper fibers.*

whether the technical aspects of the questioned art are consistent with that of the authentic works. A catalogue raisonné is a primary reference source. It is a record of the works by an artist, a print shop or museum collection. This record includes the artist, title, date, medium, paper, dimensions, and for prints, the edition size and number of proofs. The art specialist examines the measurements, colors, and sequence of colors, materials,

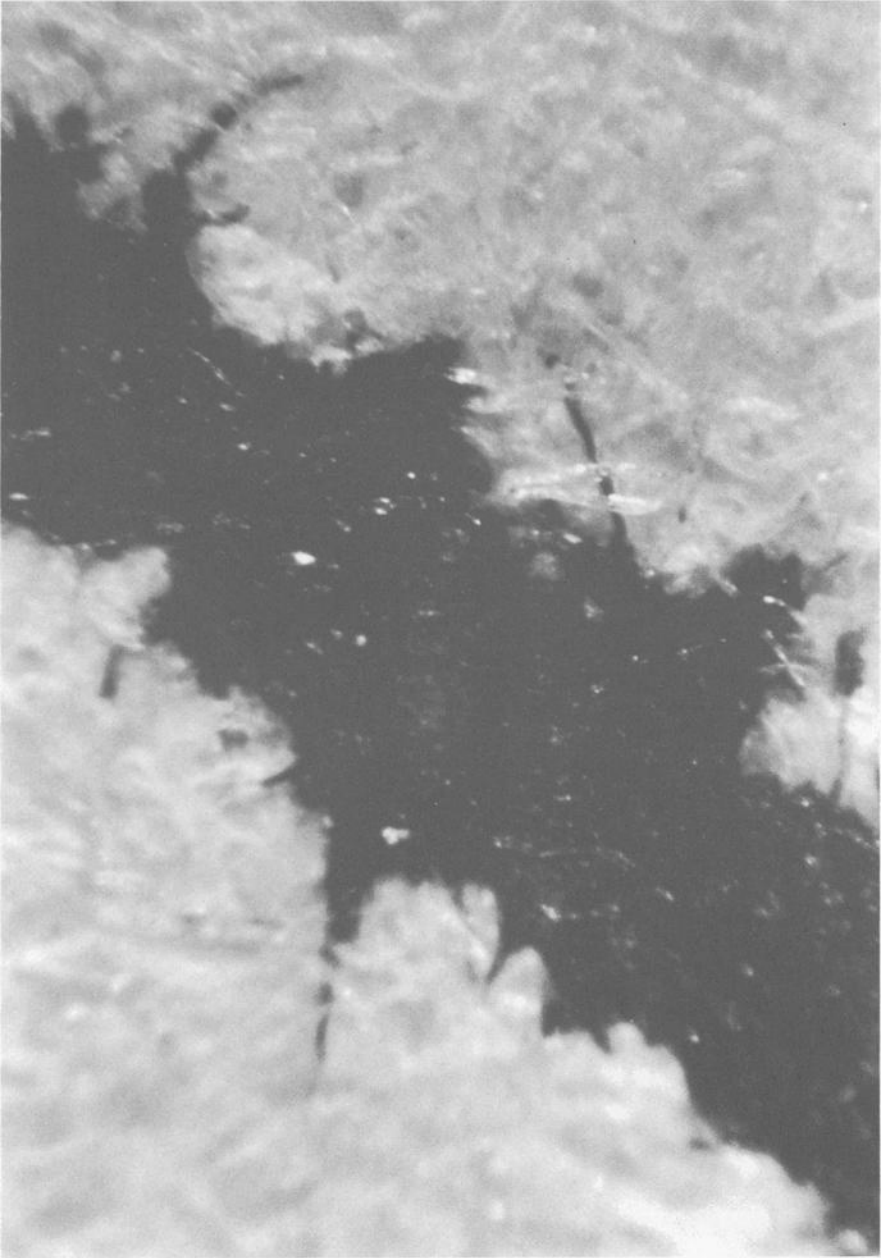


FIG. 4—*Ink drawing magnified shows the solid area of the stroke that has feathered edges.*

freshness of the paper, watermarks, subject, composition, and other technical information regarding the authentic works. They check the art to see if it is consistent with the provenance of the work. Provenance is the history of a work from its creation to current owner.

Obtaining and establishing known standards is the single most difficult factor in the



FIG. 5—*Lithograph magnified shows the flatness of the image area.*

examination of art. Standards can be found in museums, printshop archives, through dealers, and through collectors. But, here one must be careful. Occasionally, even in museums a work will be discovered a fake. Signatures also can be found in catalogue raisonnées, art books, and directories of signatures [3]. The best sources are other works of art in the same genre and during the same period as the questioned piece.



FIG. 6—*Photomechanical lithograph with an enlargement of the dot matrix represented in circle.*

### *Comparison*

Comparisons may involve the inks, paper, watermarks, or signatures. They can be made between questioned and established authentic works, questioned and established fakes, questioned and practice samples from a forger, as illustrated in Fig. 9, two different collections of the same artist, genre, and period or between questioned and reference



*FIG. 7—Intaglio magnified shows the shadow left of the image lines that are embossed on the paper opposite the light source from the right side.*

sources of papers or inks. The methods used in conventional document examinations can be used in comparing inks, papers, and watermarks. Infrared and laser technology to determine if the ink on the questioned print is different than on the standards or inconsistent with the ink ascribed to the period of the work; ultraviolet light to show variations

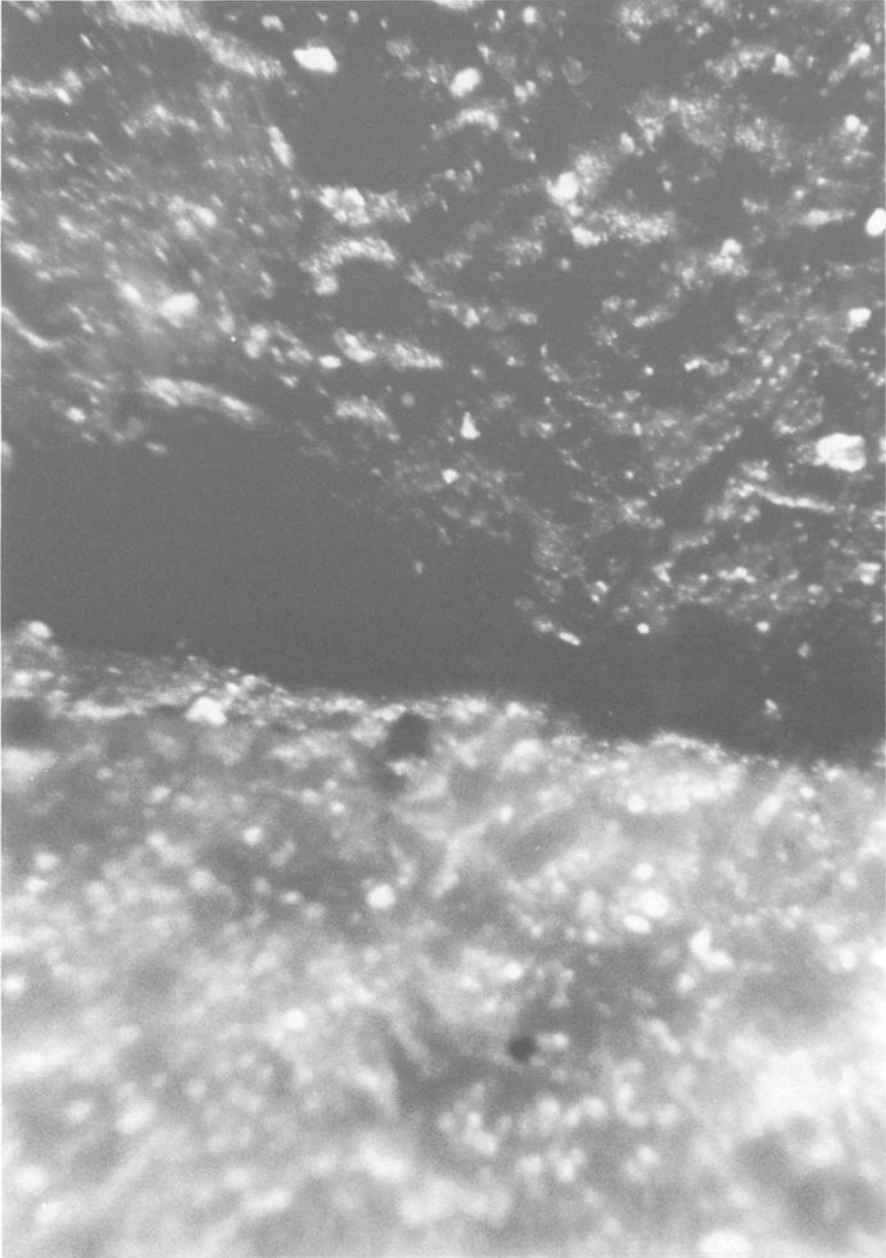


FIG. 8—Woodcut magnified shows the dark edge of the image area where the ink is squeezed to the edges and sinks lower than the paper surface.

in paper pattern, color or brightness; and, back lighting to reveal the watermark.<sup>10</sup> Comparisons of signatures and other writing involves a substantial number of known standards in many cases.

<sup>10</sup>Many of the current forgeries on the market are printed on paper made with a watermark produced subsequent to the original production of the print.

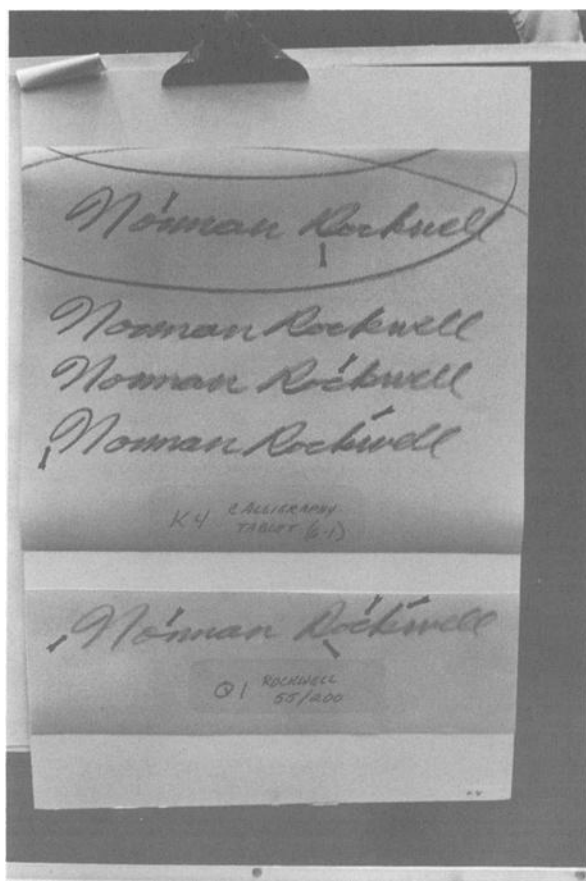


FIG. 9—The top four signatures are practice samples found in the alleged forger's home. The bottom signature is from the questioned print. The arrow represents subtle features that are the same between the known samples and the questioned samples, but different than the authentic signatures of Norman Rockwell.

In art fraud, the most common examination will involve the artist's signature. Standards for comparing the signatures on art are not always going to be readily available for side-by-side comparisons. The most valuable signatures of the artist will be on museum pieces or in library reference material that cannot be checked out. The questioned art may be too cumbersome to take to these locations. The examiner may have to make examinations of the standards at the locations making copious notes and if possible take photographs. These extenuating circumstances can make the examination process very difficult and at times impossible. The best approach is to make photographs of the questioned signatures and take them to the location of the standards to make the comparison.

A basic precept in comparing handwriting is to have like writings; signatures with signatures, formal signatures with formal signatures, numbers with numbers, the same period and the same medium. In art this is very important because the art may influence the style of signature. For example, in a single work the artist may be captured by the mood of the image and incorporate that into the signature. Whereas with an edition of 200 prints, the artist signs repetitively in one sitting.

Some other factors that must be taken into account during the examination process are the evolution of the artist's signature and how the artist signed in different periods;

the artist's habits in signing different types of art. For example, watercolors signed in pencil or pen and ink. Some artist have different style signatures for different types of art; how and by whom the edition numbers are written. For example, always in Roman or Arabic numerals, written by the artist, the printer or different people in each edition; similarities or differences in signatures written on documents compared with art during the same period; if the standards are known fakes, are they all signed by one person or more than one person.

Are there supporting documents such as certificates of authenticity and invoices. These records may shed light on a work's authenticity and should be treated as any other document problem.

### **Limits and Qualified Conclusions**

It is important that examiners convey to the party seeking an examination that a forensic document examiner cannot always determine authenticity of art. An examiner can apply forensic-science tests to determine authenticity of signatures, the type of print, the consistency of paper and printing process with known standards in the edition, and the physical properties with the history of the piece. These findings may or may not authenticate the work.

The most common type of fake in the print medium is an unauthorized reproduction of a genuine work bearing a nongenuine signature. An authentic signature will generally authenticate the art. One exception is when an artist customarily presigns paper. This is not a normal practice, but a rare possibility.

Just because a work is in a museum or in a famous collection does not mean that the signature is established as authentic. If the standards that are used in the comparison are those in museums or a particular collection, a qualified conclusion about the questioned signature should be that the questioned signature is or is not consistent with those on museum works or a particular collection. In Fig. 10 the standards were from an auction house catalogue representing authentic works over a period of years.

An examination may involve the comparison of signatures between two collections. When those collections are purported to have been produced in the same period, but there are fundamental differences between the signatures in each collection, the conclusion is that both cannot be authentic. The examination does not include the comparison of authentic signatures, therefore, cannot determine if either collection is genuine, but that both collections in question cannot be. This type of case is illustrated in Fig. 11.

Sometimes simulated signatures are more common than the authentic signatures. They are so prolific in fact that the art expert and examiner can become confused before a thorough examination is complete. The source of the simulation may be traced to a particular work or period. Simulations can be of the artist's signature as well as simulations of simulations of the artist's signature. It is more difficult to make a comparison on a single signature than multiple samples.

### **Discussion**

There are many reasons why art fraud, especially in printmaking, has become so prolific. There are no set practices or standards in the art world regarding the production and commercial activity of prints. Reproductions can be produced inexpensively, there is a high consumer interest in affordable art and many sales are solicited for the investment value. It makes good sense to the average wage earner who has a few hundred dollars deposited in a savings account making five percent interest to transfer that money to an investment that claims a considerably higher return while at the same time adorn his home or office with an authentic work of art.



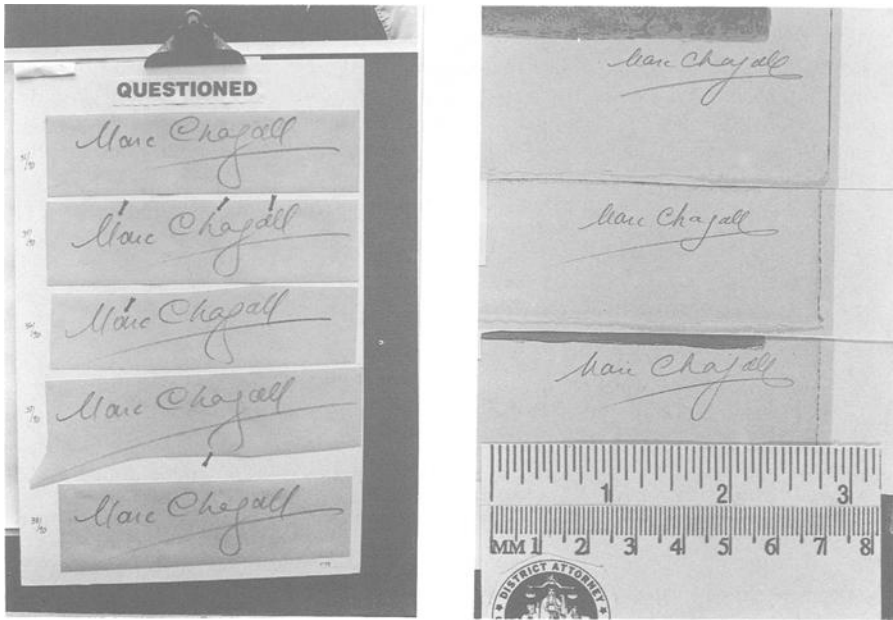


FIG. 10—Photographic enlargement of the signatures in question (a) signature samples on prints in a catalog represented as authentic Chagall signatures (b). Both samples represent randomly picked prints from different editions produced over several years during the same period. A comparison between the two samples clearly shows that they have a different combination of writing features, therefore, were written by two different people.

There is nothing wrong with an imitation as long as the consumer knows that it is an imitation. But, imitations do not command the higher prices that authentic pieces get. Often the prices are artificially assigned and raised by the seller. Some believe that the imitation is incomplete if the artist's signature is not included. But, the sole purpose of a signature is to confirm and authenticate what it is affixed to. An imitated signature on a work of art misrepresents this means of authentication.

The first step in deciding whether to accept an art case is to determine the type of art. Some mediums will have too many variables or too many obstacles to make thorough comparisons that will stand up to scientific scrutiny. If standards are too difficult to obtain or establish, examination of signatures may prove impossible. This is more likely to occur with the examination of single works where the questioned piece will involve only one signature. The collection process alone may require a substantial amount of time and resources. The second step is to make a preliminary examination of the physical properties of the art to determine if it is consistent with that claimed. There are several books that can assist the document examiner in understanding the process of printmaking [4] and comprehensive guides to identify printed images [5] and fakes [6]. The findings may significantly aid the investigator, but more often than not it will lack sufficient scientific information to determine conclusively the authenticity of a work. Thirdly, the examiner must decide if he has sufficient resources and time to invest in research, collection of standards and the examination.

#### *Acknowledgments*

Much of the research for this study involved interviews over a two year period with curators, appraisers, printmakers, art experts, and investigators in art frauds. Their con-



FIG. 11—Three collections in the same period, each containing several different prints. The combination of writing habits (for example, length, curvature, angles, and overlaps of "M" strokes, accent mark, underscore, and "o" closure) within each collection are fundamentally the same, but different from the signatures in the other two collections. The differences show three different writers rather than one, which proves that at least two of the collections are not genuine.

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