NORTH CAROLINA
STATE BUREAU OF INVESTIGATION

CRIME LABORATORY DIVISION

QUESTIONED DOCUMENTS SECTION

TECHNICAL PROCEDURES MANUAL

Table of Contents

Volume II

THE PROCEDURE FOR THE EXAMINATION OF HANDWRITING, HAND PRINTING, NUMERALS AND OTHER WRITINGS:

GENUINENESS: (1)

The analysis of writing begins with the examination of the questioned writing

under natural light with the aide of a microscope and magnifier. This examination is made

to determine if it is a genuine writing and has not been produced by a machine such as a

copier or printer (refer to section on machine writing).

NATURAL WRITINGS: (2)

Once the writing has been ascertained to be genuine handwriting, it is examined for

naturalness. The majority of all comparisons are predicated on the side by side evaluation of

natural writings to known writing samples submitted for comparison. Therefore the

questioned writing is carefully scrutinized for tracings, indentions and attempts to simulate

by studying line quality, hesitations, retouches , tremors, direction of pen movements, pen

pressures, speed of movements, slant, size , beginning strokes, ending strokes as well as

connectors.

UNNATURAL WRITINGS: (3)

The presence of unnatural writing may limit or even prevent an Examiner from making any

further comparison . More standards may be requested if of value to the case . A report

is written stating that the author of the Known writing can not be identified or eliminated

as the author of the Questioned writing(s). A statement of explaination as to why this

conclusion was reached may also be appropriate.

HANDWRITING, HAND PRINTING , NUMERALS AND OTHER WRITINGS.

EVALUATION OF THE QUESTIONED WRITING(S): (4)

If the Examiner is satisfied that a genuine and natural writing exists , a determination is then

made as to whether or not this particular questioned writing demonstrates sufficient quantity

and quality of writing features and unique characteristics upon which an expert conclusion

can be supported.

EVALUATION OT HE KNOWN WRITING(S): (5)

The known writing sample are next evaluated for naturalness , quantity, quality of writing and

sufficiency in features and characteristics. In some cases the known writing will be taken from

a individual alleged in a crime and an attempt to disguise their own natural writing

will be demonstrated in the Known specimen. This adds greatly to the complexity of the

evaluation as the Examiner must now study this writing in detail and determine the degree

of natural features present. More standards may be required at this point before an analysis

is continued.

COMPARISON OF QUESTIONED TO KNOWN WRITING: (6)

The Document Examiner, once satisfied as to the known and questioned writing as described

above, will now carefully study both writings to determine the habits , baseline characteristics,

spacing, format, line quality, letter formation, writing skill, pen pressures,

range of variations, uniqness of style, flourishes, and accidentals . When a detailed analysis

of the features has been accomplished then a side by side comparison is made by the Examiner

(Questioned to Known writing) and a conclusion is reached which can be demonstrated and supported by various combinations of these features and characteristics.

CONCLUSIONS : (7)

Numerous conclusions (or combinations of conclusions) can be reported from analysis of writing as follows: (A) An Identification , in which the Examiner has identified an indiviual(s) as the author of the Questioned writing(s) ; (B) A High Probable, where the Examiner is virtually certain that the an indivdual(s) is the author of a Questioned writing(s); (C) A Probable is rendered when the evidence supports that it is" likely" that an indiviual(s) is the author of the Questioned writing(s) ; (D) A Can Not Be Identified or Eliminated is self explanatory and reported in cases where class characteristics are prevalent ; (E) A Can Not Be Identified is rendered when there exists prominent writing disimilaites between the Question and the Known ; and (F) An Elimination in which the Document Examiner is certain the indiviual(s) could not have produced the Questioned writing.

INSTRUMENTATION:

The observation of these characteristics in handwriting routinely requires a microscope, a 10 x maginfying glass , and the use of infrared , oblique , ultraviolet lighting techniques, IBIS Imaging System and Crimescope monochromator, and photographic techniques which are refered to in this manual, each under its own respective section.

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                   No. 1, Jan 65.

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        of Handwriting.

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McCarthy, J. F., <u>Some Aspects of Normal Behavior: Their Use in Understanding Problems Encountered by Document Examiners</u>, Journal of Forensic Sciences, Vol 21, No. 1, Jan 76.

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          53.

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          Forensic Sciences, Vol 23, No. 1, Jan 78.

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        Recovery of Carbon Outlines, unpublished technical
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        paper.

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NUMERALS

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Alford, E. A., Identification Through Comparison of Numbers,
          Identification News, Vol 15, No. 7, Jul 65.

ARTICLE#[205] REQUIRED (YES-or-NO)[
TOPIC[Paper Fiber Impression evidence left on Carbon Tape Ribbons

] TTL[Paper Fiber Impressions on Carbon Tape Ribbons
(JFS, V 19, N 1, January, 1974, pp N/A)
] AUTHOR[George H. Hahn

] AGENCY[Los Angeles Police Department
Los Angeles, California
] LOCATION[N/A
] DATE[January 1974
] KEY[Paper Fiber Impressions, Carbon Tape Ribbons, Typewriters, Identify

] ABS[The standard method of identifying a typewriter as having typed a
document has been to examine the document for impressions left by
the typewriter. The new method of identifying a specific
typewriter, whereby the document has left its impression on the
typewriter, was discussed. A positive identification was made by
examining as little as one character on the document, and matching
the paper fiber with the impressions left by the fiber on ribbon.
-------------------------------END OF RECORD-----------------------------------

ARTICLE#[426   ] REQUIRED (YES-or-NO)[
TOPIC[Typewriter Ribbons

] TTL[The Examination of Typewriter Correctable Carbon Film Ribbons: A
            Preliminary Study (FSI, V 25, 1984, pp 71-80)
] AUTHOR[Jacques Mathyer
            Roman Pfister
] AGENCY[University of Lausanne
            Switzerland
] LOCATION[ASQDE, Boston, Massachusetts
] DATE[1982
] KEY[Typewriter Ribbon, Correctable, Carbon, Film, Examination, SEM
] ABS[The Scanning Electron Microscope method of examination of
            typewritten strokes produced by single element typewriters working
            with "Lift-off" correctable carbon ribbons is successful. The group
            identification and differentiation of such ribbons is possible but
            needs a well trained and experienced examiner, familiar with the SEM
            images. The authors intend to carry on their research into the
            different brand marks of carbon film ribbons.
------------------------------END OF RECORD-------------------------------

ARTICLE#[131   ] REQUIRED (YES-or-NO)[
TOPIC[Typewriter Analysis

] TTL[Chemical Reaction from Typewritings (JCLCPS, V 33, N 2, July-August,
            1942, pp 188-192)
] AUTHOR[H.E. Cassidy

] AGENCY[Examiner of Questioned Documents, Richmond, Virginia

] LOCATION[N/A
] DATE[N/A
] KEY[Inks, Ribbons, Chemical Analysis
] ABS[As the use of writing machines has grown, fradulent documents have
            increased until now they are everyday occurrences. Some of the
            questions arising are: what makes of machine was the document
            written; was it written on this particular machine; did this
            particular person write it; is the writing as old as it purports to
            be; were all the writings done continously at the same writing; were
            all the writings done with the same kind of ribbon?
------------------------------END OF RECORD---------------------------------

ARTICLE#[671   WPL] REQUIRED (YES-or-NO)[
TOPIC[Typewriter Ribbons

] TTL[Methods of Associating Typewriter Ribbons and Correcting Tapes with a
            Questioned Text (JFS, V 34, N 5, September 1989, pp 1183-1195)
] AUTHOR[F. James Gerhart

] AGENCY[FBI Laboratory

] LOCATION[ASQDE, Denver, Colorado
] DATE[September 10-14, 1988
] KEY[Typwriter Ribbon, Association, Correcting Tape
] ABS[Modern electronic typewriters are difficult to associate with a
            questioned text because they do not develop the defects through use
the
            typewriter ribbon system, which is the most abundant source of
            characteristics whereby a typewriter could be associated with a
            particular questioned typewritten text. The distinctive characterist
            ics found on the ribbon do not depend upon developed defects.
-------------------------------END OF RECORD----------------------------------

ARTICLE#[1384   ] REQUIRED (YES-or-NO)[
TOPIC[Typewriting

] TTL[The Differentiation of Pica Monotone Typewriting
             (JPSA, V 4, N 2, 1976, pp 134-178)
] AUTHOR[David A. Crown

] AGENCY[U.S. DEPARTMENT OF STATE

] LOCATION[N/A
] DATE[N/A
] KEY[ribbon, semi-gothic, italic, serifs, microtype, primer
] ABS[In the questioned document laboratory there are basically three
             different types of examinations requested which relate to type-
             writing: (1) the identification or elimination of a specific
             typewriter as the machine used to prepare a document; (2) the deter-
             mination of "make and model" of typewriter used to prepare a document
             and (3) the determination if a document was prepared at one sitting.

-------------------------------END OF RECORD---------------------------------

ARTICLE#[1409 LAT] REQUIRED (YES-or-NO)[
TOPIC[Typewriter Ribbon Comparison

] TTL[Comparison of Typewriter Ribbon Inks By Thin Layer Chromatography
             (JFS, V 22, N 4, October 1977, pp 807-814)
] AUTHOR[Richard L. Brunelle, John F. Negri, Antonio A. Cantu, Albert H.
             Lyter
] AGENCY[Bureau of Alcohol, Tobacco, and Firearms and The George Washington
             University
] LOCATION[N/A
] DATE[N/A
] KEY[Tholl, FBI Law Enforcement Bulletin, Somerford, Brown, Kirk, UV
] ABS[This paper desccribes a thin layer chromotographic procedure for
             comparison and differentiation of typewriter ribbon inks. Pre-
             coated silica gel glass Merck plates utilizing two different solvent
             systems were used 1) ethyl acetate, ethanol, wter 70:35:30 and 2)
             n-butanol, ethanol, water 50:10:15. Excellent separation and resolu-
             tion of dye components were achieved. Over 150 typewriter ribbon
             inks from 7 major manufacturers were analyzed and compared.
-------------------------------END OF RECORD-------------------------------

ARTICLE#[604   MPH] REQUIRED (YES-or-NO)[
TOPIC[Microspectrophotometer Examination of Typewriter Inks

] TTL[The Use of the Microspectrophotometer for the Non-Destructive
          Differentiation of Typewriter Ribbon Inks
] AUTHOR[James E. Behrendt

] AGENCY[N/A

] LOCATION[ASQDE, North Lake Tahoe, Nevada
] DATE[1983
] KEY[Microspectrophotometer, Non-Destructive, Examination, Inks, Ribbons
] ABS[Procedures for the use of the microspectrophotometer for the
          differentiation of writing inks have already been established. this
          paper will deal with the use of the microspectrophotometer for the
          non-destructive diferentiation of typewriter ribbon inks by
          transmitted light. There are several advantages to this technique:
          it's nondestructive, a high degree of sensitivity, the time required
          ranges from fifteen to thirty minutes depending on rate of scan.
------------------------------------END OF RECORD------------------------------------

ARTICLE#[619   MPH] REQUIRED (YES-or-NO)[
TOPIC[Typewriter Ribbon Transcription

] TTL[The Application of a Magnaprint (Micrographic) Reader/Printer to the
            Examination of Carbon Film Ribbons
] AUTHOR[Fary L. Lee

] AGENCY[United States Army CID
            Fort Gillem, Georgia
] LOCATION[ASQDE, Nashville, Tennessee, SAFS, Gulf Shores, Alabama
] DATE[May, 1984
] KEY[Application, Magnaprint, Reader, Ribbon, Carbon Film, Typewriter
] ABS[Using a micrographic reader/reader-printer allows an examiner to scan
            and read a carbon ribbon effectively and rapidly. The results can be
            printed by the reader/printer or photographed from the screen
            providing a hard copy for illustration. The development and
            application of this technique is the subject of this paper. Certain
            products are named only as examples of types of equipment available
            on the commercial market.
-----------------------------END OF RECORD-----------------------------------

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ARTICLE#[   870   WPL] REQUIRED (YES-or-NO)[
TOPIC[      Typewriter Ribbons

] TTL[      Film and Fabric Ribbons: Characteristics Applications Ribbon Demands
            Advantages Disadvantages Market Information
] AUTHOR[   Bernie Mazzurana

] AGENCY[   Pelikan Inc.
            Marketing Department
] LOCATION[ N/A
] DATE[     N/A
] KEY[      Typewriter, Wordprocessing, Dataprocessing, Document Examiner
] ABS[      The author discusses three print technologies: 1) Typewriters; 2)
            Wordprocessing; 3) Dataprocessing.  In addition, there is a brief
            overview of the print systems to show the reader how many different
            parameters influence the design of different ribbon technologies.
            The ribbons available for different applications are: 1) Fabric
            Ribbons; 2) Film Ribbons; 3) Silk; 4) Cotton.  The author discusses
            the various inks for fabric ribbons, correctable, singlestrike, etc.
-------------------------------END OF RECORD-------------------------------------
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<u>TECHNICAL PROCEDURES MANUAL AUTHORITY ENDORSEMENT</u>

SECTION 1

I HAVE REVIEWED THE TECHNICAL PROCEDURES FOR <u>HANDWRITING, HAND</u>
<u>PRINTING, NUMERALS AND OTHER WRITINGS</u> AND APPROVE THESE
PROCEDURES FOR USE BY THE NORTH CAROLINA STATE BUREAU
OF INVESTIGATION FORENSIC ANALYST UNDER MY SUPERVISION.

SIGNED _____   DATED _7-1-96____

DAVID C. DUNN
SUPERVISING AGENT IN CHARGE
NCSBI QUESTIONED DOCUMENTS SECTION

_____

_____

<u>TECHNICAL PROCEDURE TERMINATION AND ARCHIVE</u>:

EFFECTIVE THIS_____DAY OF_____OF THE YEAR_____, THE
USE OF THIS PROCEDURE IS HEREBY DISCONTINUED BY MY AUTHORITY AND
BEING PLACED IN THE HISTORICAL AND ARCHIVAL SECTION OF THIS
MANUAL FOR REFERENCE.(REFER TO SECTION K)

SIGNED:_____TITLE:_____.

PROCEDURE FOR THE EXAMINATION AND COMPARISON OF TYPEWRITTEN DOCUMENTS AND TYPEWRITERS

Original Documents: (1)

The typewritten document to be examined must be determined to be the original. The Examiner should ascertain that the Document in Question is not another form of production or reproduction.

Type of Mechanism: (2)

The document is studied in an attempt to decide the type of mechanism used to produce the Questioned typing. This includes type bar, single element ball, or single element printwheel. Determine if the typescript is based upon metric or standard measure . If based upon the metric, then careful attention should be given to the alignment and pitch. Notations are made of horizontal spacing(s) to determine if pica , elite or proportional . The typestyle used such as modern, letter gothic, courier, or prestige may also be noted.The size and uniqueness of the characters, bold type, and justified margins are observed. A determination of the type of ribbon(acetate / non-acetate) or lift off correctable is made when possible. If the ribbon is fabric(seldom seen any more with the arrival of the acetate ribbons) then the typescript is examined for the presence of fabric thread impressions.

Consistency of Typewriting: (3)

The consistency of typewriting throughout the document is determined noting any interlineation.

Reference sources:(4)

A search is then made of reference sources to determine, make and models of typewriters using that typestyle. (See section on ASK SAM data base)

EXAMINATION OF TYPEWRITTEN DOCUMENTS:

An examination is conducted of each document for the characteristics of typestyle design, escapement, interlineation, alignment, size, margin justification flaws and presence of any other unique characteristics.The typescript is examined microscopically for occasional and consistent defects. Defects are characterized as to if they are sporadic (transient), constant (fixed) or progressive. A typewriter grid is used to recognize horizontal alignment (pitch, interlineation, escapement) and misalignment. Character abnormalities as well as defects and typestyle are determined by this method also.

[Features in typewriting examination can be both class and individual depending upon the particular make and model of typewriter and the nature of the misalignment or defect. This can be due to manufacturing flaws. Although in theory, each machine from one assembly line should type the same; the final step in production of type bar typewriters is to adjust the typeface alignment and spacing. Each typeface is typically soldered (some riveted) and an adjustment is often needed. Individualities can result because of this and other manufacturing factors]

EXAMINATION OF TYPEWRITER:

Record the make, model, serial number and manufacturer of the typewriter. Remove and examine the ribbon and the lift off correction tape, if present . These should be replaced with a new ribbon and tape. With the use of special light sources, examine the platen to determine the condition and note any impressions from the typefaces or defects that could affect the typescript. Microscopically study the typefaces noting any defects. (Printwheels or ball elements are removed to facilitate analysis).

EXEMPLARS:

Upon completion of the above examination reassemble the machine using a new ribbon and correction ribbon of the same type. Type several documents that exactly repeat the Questioned typescript and several strike-ups of the entire keyboard. Initial samples should be taken using the settings on the typewriter as received and changed for additional standards as needed. Typewriters can be multi-pitch (10 pitch, 12 pitch, 15 pitch or proportional) and standards are taken to comply with the Questioned typescript. In addition,these standards are taken with consideration as to the thickness of the paper (or paper as backing) used to produce the original document as this can affect alignment. Note any mechanical defects or problems with the operation of the machine.

COMPARISON :

With knowledge of the preceding examination, the questioned text can now be compared with the typewritten exemplars for class and individual characters of typeface, alignment,

misalignment, interlineation, escapement, pitch and defects.

Evaluation:

The preceding procedure is designed to be used in part or in whole at the discretions of the examiner as needed to conclude the examination. Documents can have obvious features that can make them unique and preclude the need for step by step procedural analysis

Conclusion:

The conclusions rendered are: (A) That the typewriter can be identified as having produced the Questioned Document; (B) That the typewriter could have produced the Questioned document but not to the exclusion of other similar machines; © That the typewriter can be eliminated as having produced the Questioned document.

INSTRUMENTATION:

Any individual characteristics found on the typeface that can be proven by the Questioned typescript should be photographed or digitized, enhanced and printed (if possible).   The crimescope, microscope and oblique lighting techniques and the Ibis Image System may be needed to complete these examinations. Refer to later sections of this manual for each of these respective procedure.

PROCEDURE

VALIDATION REFERENCES

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TECHNICAL PROCEDURES MANUAL AUTHORITY ENDORSEMENT

SECTION 2

I HAVE REVIEWED THE TECHNICAL PROCEDURES FOR TYPE WRITTEN
DOCUMENTS AND TYPEWRITERS AND APPROVE THESE
PROCEDURES FOR USE BY THE NORTH CAROLINA STATE BUREAU
OF INVESTIGATION FORENSIC ANALYST UNDER MY SUPERVISION.

SIGNED _David C. Dunn_   DATED _7-1-96_
DAVID C. DUNN
SUPERVISING AGENT IN CHARGE
NCSBI QUESTIONED DOCUMENTS SECTION

TECHNICAL PROCEDURE TERMINATION AND ARCHIVE:

EFFECTIVE THIS_____DAY OF_____OF THE YEAR_____, THE
USE OF THIS PROCEDURE IS HEREBY DISCONTINUED BY MY AUTHORITY AND
BEING PLACED IN THE HISTORICAL AND ARCHIVAL SECTION OF THIS
MANUAL FOR REFERENCE.(REFER TO SECTION K)

SIGNED:_____TITLE:_____.

PROCEDURE FOR THE EXAMINATION OF TYPEWRITER RIBBONS,

CORRECTION TAPES AND FIBER IMPRESSIONS;

Ribbons: (1)

The ribbon and lift off correction tape (when present) are removed from the machine.

The ribbon is studied using natural light or a light box initially. The text on the ribbon is

examined microscopically to learn the typestlye design, size, and to note the appearance of

any flaws. The type of ribbon is determined by visual observation (acetate / non-acetate)

or if necessary by infrared analysis (refer to appropriate section of this manual). If the text

is consistent with the Questioned typescript then the area of the ribbon containing the

Questioned typing is located and read. This is then compared with the Questioned text to

see if it was or could have been produced using this ribbon.

Fiber Impression: (2)

Non-fabric ribbons, when striking the paper can be impressed with indentations of the

fibers that comprise the paper. Therefore, the Questioned area of the ribbon is examined

microscopically for paper fiber impressions that can be compared to the typescript (and

paper) on the Questioned document. This requires a meticulous microscopic examination

and a comparison microscope is used for a side by side analysis of any possible fiber

matches. If located, micrographs using light photograpy or digital enhancements are made

and photographic overlays prepared as needed.

Correction Tape: (3)

The ribbon can contain the text as found on the correction tape. Accordingly. The two are compared and each corresponding correction is located on the typewriter ribbon. This will justify the readable text on the ribbon and further substantiate that use of the machine in the production of the Questioned document. The tape is read using natural light, special side light, a light box or microcope as required.

Instrumentation:

The above procedures require standard light photography and micrography methods, infrared analysis, Ibis Imaging Enhancement, oblique lighting, the use of a light box, a stereo microscope and a comparison microscope with a camera. (Refer to the appropriate section for equipment procedures)

PROCEDURE
SECTION 3
PAGE 3

VALIDATION REFERENCE:

TECHNICAL PROCEDURES MANUAL AUTHORITY ENDORSEMENT

SECTION 3

I HAVE REVIEWED THE TECHNICAL PROCEDURES FOR TYPEWRITER RIBBONS,
CORRECTION TAPES AND FIBER IMPRESSIONS AND APPROVE THESE
PROCEDURES FOR USE BY THE NORTH CAROLINA STATE BUREAU
OF INVESTIGATION FORENSIC ANALYST UNDER MY SUPERVISION.

SIGNED David C. Dunn   DATED 7-1-96
DAVID C. DUNN
SUPERVISING AGENT IN CHARGE
NCSBI QUESTIONED DOCUMENTS SECTION

TECHNICAL PROCEDURE TERMINATION AND ARCHIVE:

EFFECTIVE THIS_____DAY OF_____OF THE YEAR_____, THE
USE OF THIS PROCEDURE IS HEREBY DISCONTINUED BY MY AUTHORITY AND
BEING PLACED IN THE HISTORICAL AND ARCHIVAL SECTION OF THIS
MANUAL FOR REFERENCE.(REFER TO SECTION K)

SIGNED:_____TITLE:_____.

CONTROL STANDARD FOR TLC / INK ANALYSIS

1.REMOVE KNOWN SAMPLE OF FISHER SPACE PEN INK AND PLACE IN VIAL

2.ADD 5 MICROLITERS OF PYRIDINE TO EXTRACT STANDARD SAMPLE FROM PAPER

3.PIPETTE STANDARD SOLUTION (FISHER SPACE PEN INK) ONTO MERCK TLC PLATE AS A CIRCULAR SPOT

4. ALLOW SPOT SAMPLE TO DRY (OVEN OR AIR DRY)

5.PLACE SAMPLE PLATE INTO SOLVENT SYSTEM I TANK CONSISTING OF ETHYL ACETATE, ETHANOL AND DISTILLED WATER FOR FIFTEEN MINUTES

6.NOTE SEPARATION OF INK COMPONENTS AND COMPARE WITH OTHER KNOWN STANDARDS IF WARRANTED

7.SEPARATION OF INK COMPONENTS INTO A KNOWN REPRODUCIBLE PATTERN IS INDICATIVE OF ACTIVE SOLVENT SYSTEM AND EXTRACTOR CHEMICALS

8. PROCEED WITH TLC INK ANALYSIS OF EVIDENCE (QUESTIONED AND/OR KNOWN INK ENTRIES).

PROCEDURE FOR THE ANALYSIS OF INKS AND THE IDENTIFICATION OF CERTAIN TYPES OF WRITING INSTRUMENTS:

Physical Examination: (1)

The physical examination of inks is a non-destructive method which consists of a visual examination to determine the color , type of ink and instrument used to produce the Questioned document. It is be possible in certain cases to differentiate inks on this basis alone. Ball- point inks normally contain glycol or an oil base which are observed microscopically. The effect of the roller ball on the writing surface is noted to the extent that it may be observed as a trough or fiber disturbed path along the surface of the paper coated by or filled with the oil based ink. Certain areas may be observed along this path where a consistent few of ink was not imparted to the paper (unlike a tracing ,however). The non ball-point inks are water based (fountain pens, roller markers, fiber or felt tip pens, extruded plastic pens) or solvent-based (broad markers, laundry markers and other porous surface markers). The instruments normally associated with the non ball-point inks (with the exception of the rollermarkers) are generally less destructive to the writing surface and the inks can absorb more into the writing surface, if the writing surface is in fact paper. These characteristics should all be discerned visually or with the aide of a microscope and noted where possible.

The Question ink(s) is placed under ultraviolet light to learn if it fluoresces and the results noted. This procedure is also carried out under infrared light to observe any luminescence or reflectance. The opacity or transparency of the ink(s) may also be learn under infrared

light examination. Two ink(s) which appear the same type and color may differ in their degree

of transparency or fluorescence under ultraviolet or infrared light and differentiated.

Chemical Examination:(2)

A solubility test is conducted by removing a small quantity of ink from the writing line.

This is accomplished by using a scalpel to cut discrete slivers of ink absorbed paper

approximately ½ inch in length from area(s) of the write line giving as much consideration to

maintaining the integrity of the evidence as possible. The cuttings are placed in a one dram

vial.The areas from which the cuttings are taken should be noted for possible court

explanation.

Another method for removal of the ink(s) from the writing line is to use a blunt hypodermic

needle and to carefully punch out eight micro plugs , using a rubber pad as a support backing

pad under the document. The Plugs are placed in a one dram vial. This method provides a

cleaner sampling when limited amount of ink is available.

A third method used when non porous surfaces such as glass or metal are involved

is direct extraction and spotting. Six microliter of extracting solvent are placed on the ink(s),

the allowed to dissolve and the solution pipetted from the surface.

The pipette can then be used to spot the Silica gel plate.

The extracting solvents used for the above methods are as follows: for ball point pens use

pyridine; for water based inks, use a 1:1 mixture of ethanol and water; for solvent based inks

use pyridine.

Draw approximately six microliter of the extracting solvent into a ten microliter pipette .

Place the solvent into the one dram vial containing the ink sample and allow it to dissolve

the ink.

Thin layer chromatography development: (3)

Pipette the ink solution from the vial(s) using a ten microliter pipette and spot the TLC

plate [E. Merck Silica Gel 60 Glass Plate]. The plates are dried for fifteen minutes at 150

degrees centigrade and developed in a Solvent System I [ethyl acetate:ethanol]: distilled

water (70:35: 30) for approximately 15 minutes to allow migration and separation of visible

dye constituents, infrared luminescent components and ultraviolet fluorescent components.

] . The TLC plates are allowed to air dry and then compared.

This method can be used to identify formula as to its manufacturer and formula code

based on known standards retained on file in the Ink Library at he Bureau of Alcohol,

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different ink was used to make additions to the original writing.

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          61.

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          the Identification of Forged Notes, Journal of
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          Characterization of Paper, Journal of the
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Lyter, A. H. and Brunelle, R. L., <u>A Systematic Approach for the Comparison of Paper Samples,</u> Identification News, July 1977.

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TECHNICAL PROCEDURES MANUAL AUTHORITY ENDORSEMENT

SECTION 4

I HAVE REVIEWED THE TECHNICAL PROCEDURES FOR THE ANALYST OF INKS
AND IDENTIFICATION OF CERTAIN WRITING INSTURMENTS AND APPROVE
THESE PROCEDURES FOR USE BY THE NORTH CAROLINA STATE BUREAU
OF INVESTIGATION FORENSIC ANALYST UNDER MY SUPERVISION.

SIGNED _David C. Dunn_____   DATED _7-1-96_____
DAVID C. DUNN
SUPERVISING AGENT IN CHARGE
NCSBI QUESTIONED DOCUMENTS SECTION

_____

TECHNICAL PROCEDURE TERMINATION AND ARCHIVE:

EFFECTIVE THIS_____DAY OF_____OF THE YEAR_____, THE
USE OF THIS PROCEDURE IS HEREBY DISCONTINUED BY MY AUTHORITY AND
BEING PLACED IN THE HISTORICAL AND ARCHIVAL SECTION OF THIS
MANUAL FOR REFERENCE.(REFER TO SECTION K)

SIGNED:_____TITLE:_____.

EXAMINATION OF CHARRED DOCUMENTS:

Preliminary Examination:

The charred debris should be carefully handled due to its delicate nature using blount insturments. The ashes should be throughly examined to separate the ligible from the illegible char. The legible debris should be placed in containers to help insure their integrety and labeled for future reference. The Examiner will develope a numbering system specifically designed to aide him in later retrieving specific ashes which need to be examined.

Examination:

The ash is visually observed using a microscope and placed under infrared light using the Crimescope. The infrared camera, and the Ibis Imaging System is used in connection with the infrared light to visualize any ligible script and capture the image which is then printed out on the Lazer Techniques Printer.

Instrumentation:

The Crimescope, infrared camera , Ibis Imaging System and Lazer Techniques Printer procedures are listed in later sections of this manual under each respective heading.

ARTICLE#[1704 MPH] REQUIRED (YES-or-NO)[
TOPIC[

] TTL[Questioned Documents: Collection and Examination of Charred and
            Watersoaked Documents (FSD, V 4, N 8, February 1978, pp 178-188)
] AUTHOR[Michael P. McConnell

] AGENCY[

] LOCATION[N/A
] DATE[N/A
] KEY[Damaged, Burned, Decipherment, Photography, Infrared, Ultraviolet,
] ABS[Filters, Lens

-------------------------------END OF RECORD------------------------------------

ARTICLE#[1582 MPH] REQUIRED (YES-or-NO)[
TOPIC[

] TTL[Burned Loot Helps Convict Attempted Murderer

] AUTHOR[Richard L. Shipp

] AGENCY[

] LOCATION[N/A
] DATE[N/A
] KEY[Charred Documents, Registered Mail, Fragments, Photograph, Decipher,
] ABS[Reconstruction, Books, Court Charts, Demonstrative Evidence

-----------------------------END OF RECORD------------------------------------

ARTICLE#[1580 MPH] REQUIRED (YES-or-NO)[
TOPIC[

] TTL[The Examination and Preservation of Burned Documents: Part 2
            (ICPR, N 177, April 1964,pp 109-117)
] AUTHOR[Enrique Calderon Garcia

] AGENCY[

] LOCATION[N/A
] DATE[N/A
] KEY[Charred, Paper, Chemical, Testing, Ink Composition, Handling
] ABS[Special Investigations, Preservation, Reading, Conclusion,
            Bibliography

-------------------------------END OF RECORD-----------------------------------

ARTICLE#[1470 LAT] REQUIRED (YES-or-NO)[
TOPIC[

] TTL[Charred Documents: Their Handling and Decipherment: A Summary of
            Avaiable Methods for Treating Burnt Papers (JCLCPS, V 43, N 6,
            March-April, 1953, pp 812-826)
] AUTHOR[Donald Doud

] AGENCY[

] LOCATION[AAFS, Atlanta, Georgia
] DATE[March 6-8, 1952
] KEY[History, Development, Techniques, Photographic, Visual, Damaged
] ABS[

----------------------------END OF RECORD----------------------------------

ARTICLE#[795   WPL] REQUIRED (YES-or-NO)[
TOPIC[Questioned Documents

] TTL[Recent Developments Reflected in the European Literature

] AUTHOR[Jan Beck

] AGENCY[Private Examiner

] LOCATION[ASQDE, Lexington, Kentucky
] DATE[August 1968
] KEY[Questioned Document Examination, Document Examiner, Foreign Journals
] ABS[The author reviews significant articles published in the German
            journals during a five year period. Mr. Beck reviews articles
            written about the following topics: 1) Criticism of Handwriting
            Expertise; 2) Training Document Examiners; 3) Handwriting
            Identification; 4) Paper Analysis; 5) Ink Analysis; 6) Stroke
            Sequence Analysis; 7) Charred Documents; 8) Alcohol and Handwriting;
            9) Typewriting Identification.
----------------------------END OF RECORD----------------------------------

ARTICLE#[796   WPL] REQUIRED (YES-or-NO)[
TOPIC[Photography

] TTL[Investigating Documents With Photography

] AUTHOR[John Tyrrell

] AGENCY[Document Examiner
            Milwaukee, Wisconsin
] LOCATION[N/A
] DATE[N/A
] KEY[Document Examiner, Erasure, Indented Handwriting
] ABS[According to the author, document photography substantiates
            investigation evidence. The author has used his photography to give
            important information in many legal cases - among them the Leopold
            Loeb case, the Magnussen bomb matter, the Lindbergh kidnapping, the
            Allis Chalmers C.I.O. Election Fraud hearing. Mr Tyrrell covers
            photo examination through high magnification, decipherment of
            charred documents, and tells of several interesting cases.
----------------------------END OF RECORD----------------------------------

ARTICLE#[2606   MPH] REQUIRED (YES-or-NO)[
TOPIC[

] TTL[Bibliography of Articles Pertaining to the Examination,
           Reconstruction, and Preservation of Burned and Charred Documents
] AUTHOR[N/A

] AGENCY[

] LOCATION[N/A
] DATE[Circa. 1979
] KEY[Decipherment, Reference List, Sources, Technical Papers, Readings
] ABS[

-------------------------------END OF RECORD------------------------------------

ARTICLE#[3371 MPH] REQUIRED (YES-or-NO)[
TOPIC[

] TTL[Evidence or Ashes? (FBI Law Enforcement Bulletin, June, 1964, pp 7-9,
           23)
] AUTHOR[Federal Bureau of Investigation
           Law Enforcement Bulletin
] AGENCY[

] LOCATION[
] DATE[
] KEY[Charred, Destroyed Documents, Decipherment, Examination, Paper
] ABS[

----------------------------END OF RECORD----------------------------------

ARTICLE#[3044 MPH] REQUIRED (YES-or-NO)[
TOPIC[

] TTL[Restoration and Preservation of Typewriting and Printing on Charred
            Documents
] AUTHOR[A. Bartha

] AGENCY[

] LOCATION[
] DATE[
] KEY[
] ABS[

-------------------------------END OF RECORD-------------------------------------

TECHNICAL PROCEDURES MANUAL AUTHORITY ENDORSEMENT

SECTION 5

I HAVE REVIEWED THE TECHNICAL PROCEDURES FOR CHARRED DOCUMENTS
AND APPROVE THESE PROCEDURES FOR USE BY THE NORTH CAROLINA
STATE BUREAU
OF INVESTIGATION FORENSIC ANALYST UNDER MY SUPERVISION.

SIGNED _David C. Dunn_____   DATED _7-1-96_____
DAVID C. DUNN
SUPERVISING AGENT IN CHARGE
NCSBI QUESTIONED DOCUMENTS SECTION

TECHNICAL PROCEDURE TERMINATION AND ARCHIVE:

EFFECTIVE THIS_____DAY OF_____OF THE YEAR_____, THE
USE OF THIS PROCEDURE IS HEREBY DISCONTINUED BY MY AUTHORITY AND
BEING PLACED IN THE HISTORICAL AND ARCHIVAL SECTION OF THIS
MANUAL FOR REFERENCE.(REFER TO SECTION K)

SIGNED:_____TITLE:_____.

THE EXAMINATION OF INDENTED WRITING:

The document is first examined visually using oblique lighting for the presence of any indentions. These indentions if decipherable may then be recorded and photographed. If the indentions can not   be discerned, the document can be placed under vary wavelengths of light using the Crime Scope monochromator and viewed on the IBIS System. Contrasting and gating adjustments can enhance the indentions before being printed on the Lazer Techniques thus preserving them.

Another method most often used, is to subject the indented writing to the Electro Static Detection Apparatus (ESDA). This is a nondestructive method which allows a static charge to be imparted to a film covering the writing . Toner (as used in a copy machine) is applied and the indentions can often be enhanced and discerned. Again, the IBIS System can be used to capture the writing for printing or the writing maybe photographed directly. The ESDA methodology also allows for the removal of the toner formed impressions of the indented writing for presevation.

The examination of indented writings may require one or a combination of the above methods.

The procedures for the IBIS System, ESDA and Photography are contained in this manual and each can be located under its respective section.

Safety:

Procedures for the ESDA present hazards of electric (static) shock as well as the liberation

of ozone. Do not tocuh the elements on the bottom of the wand. The ESDA should be placed

near a hood allowing a draft to be created across the surface as to draw air (and the ozone)

up the hood or used in a place with appropriate ventilation.

The use of the crimescope monochromator requires precations inclding the use of UV block

glasses. Refer to Section 1, page 4 for proper instruction.

inks
205

ESDA

ESDA & Laboratory Noise
Joyce A. Lauterbach
SAFDE, Atlanta, GA.   May 1995
ESDA
196

ESDA & Laboratory Noise

ESDA & Laboratory Noise
Joyce A. Lauterbach
Southeastern Association of Forensic Document Examiners   1995 Annual
Meeting
noise, ESDA, decibel levels
209

ESDA secondary impressions of writing

Secondary Impressions of Writing Detected by ESDA
Steven J. Strach, Graeme M. McCormack, Robert W. Radley, Paul D.
Westwood
Forensic Science International 74(1995) 193-204
Impressions, writing, ESDA, Secondary impressions, Questioned Documents
206

ESDA, Traced Forgeries

Application of the ESDA in Demonstrating Traced Forgeries
O. M. Prakash Jasuja, Atul K. Singla
Forensic Science International 75 (1995) 25-28
indented impressions, inked strokes, traced forgery, Electrostatic
Detection Apparatus (ESDA), Handwriting identification
204

Electrostatic Document Device

Modification of the Indentation Materializer Electrostatic Document
Device (IMEDD) For Superior Results
Brian B. Carney
SAFDE Conference, May, 1995
ESDA, EDIE, IMEDD, Polymer Film
179

Handwiritng
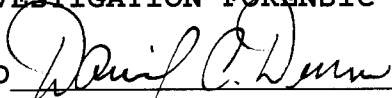
TECHNICAL PROCEDURES MANUAL AUTHORITY ENDORSEMENT

SECTION 6

I HAVE REVIEWED THE TECHNICAL PROCEDURES FOR THE EXAMINATION OF
INDENTED WRITING AND APPROVE THESE PROCEDURES FOR USE BY THE
NORTH CAROLINA STATE BUREAU
OF INVESTIGATION FORENSIC ANALYST UNDER MY SUPERVISION.

SIGNED _____   DATED _7-1-96_____
DAVID C. DUNN
SUPERVISING AGENT IN CHARGE
NCSBI QUESTIONED DOCUMENTS SECTION

_____

_____

TECHNICAL PROCEDURE TERMINATION AND ARCHIVE:

EFFECTIVE THIS_____DAY OF_____OF THE YEAR_____, THE
USE OF THIS PROCEDURE IS HEREBY DISCONTINUED BY MY AUTHORITY AND
BEING PLACED IN THE HISTORICAL AND ARCHIVAL SECTION OF THIS
MANUAL FOR REFERENCE.(REFER TO SECTION K)

SIGNED:_____TITLE:_____.

THE PROCEDURE FOR THE EXAMINATION OF HAND STAMPS AND STAMPED

IMPRESSIONs

Acquisition of stamp, stamp pad and ink impression: (1)

The examination involves a direct comparison of the inked impression to the stamp and the

examiner must have both before proceeding.

In addition, The stamp pad and the ink used on the pad should also be acquired for

examination when possible .

Examination of the ink pad: (2)

The ink pad is visually and microscopically examined for foreign matter (debris) or any

agent on the pad which may cause a change in the inked impression. An ink sample is

removed from the pad and analyzed (see section on ink analysis) if needed.

Examination of the Stamp: (3)

The stamp is visually and microscopically examined to determine if the stamp is : (A) a

fixed die, glued to a mount (used for signatures, names , words, etc.) (B) a moveable type

die (used for date and numbering stamps) (C) an individual rubber die(which are hand

mounted to a holder). The material which is used for the die is also visually examined to

determine if the die is composed of rubber, plastic, metal , wood or other material.

The manufacturer is determined, contacted (if warranted by the Examiner) and

information is obtained as to how the stamp was manufactured and manufacturing flaws

which did or could have occurred during production.

The stamp is then examined in microscopic detail for the presence of any defects, flaws, cuttings, nicks, alterations or debris which could affect the stamped impression .

When possible and if warranted these characteristics are classified as intentional, accidental, or due to wear. Photographs or Ibis images should be made of identifying class and unique features present .

The Examiner should also determine how the impression was made with regard to the direction and pressure of the stamp as it impacted the surface (uneven pressure, angle of pressure other than perpendicular; rolling or twisting motion, excessive pressure). The surface under the stamped document can also effect the impression and consideration should be given to this fact and noted if observable.

Comparison of stamp to ink impression: (4)

Sufficient inked impressions should be made using the suspect stamp(ink pad and type of ink when possible) and the characteristics noted. These features are compared to the ink impression(s) in question to see if they can be duplicated and if the stamp produced the impression in question.

Instrumentation: (5)

The procedures for the use of the Ibis imaging system, light photography and ink analysis are referenced in this manual, each under it's own respective section.

Safety Equipment:

Ink analysis involving solvent usage mandates the use of a hood(positive air flow) and safety glasses.

REFERENCES FOR LESSON 45; MECHANICAL IMPRESSIONS

BOOKS:

Harrison, W. R., Suspect Documents, Chapter 2 (p 12).

Hilton, O., Scientific Examination of Documents, Chapter 3 (pp 63, 66-73, and 84-85) and Chapter 12 (pp 202-203).

TECHNICAL ARTICLES:

Patel, P. H., Rubber Stamp Impressions, Identification News, Vol 29, No. 10, Oct 79.

Herring, H. H., An Interesting and Unusual Document Case, Identification News, Vol 28, No. 6, Jun 78.

Winchester, J., The Computer Challenges the Document Examiner, unpublished technical paper.

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Harrington, F., Plastic Police, Soldiers, Nov 76.

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Purtell, D. J., The Identification of Checkwriters, Journal of Criminal Law, Criminology, and Police Science, Vol 45, No. 2, Jul 54.

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Hargett, J. W. and Dusak, R. A., Classification and Identification of Checkwriters, Journal of Police Science and Administration, Vol 4, No. 4, 1976.

Casey, M. A., The Individuality of Rubber Stamps, unpublished technical paper.
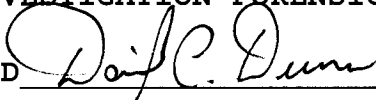
Foley, B. G., An Unusual Stamp Cancellation Problem, unpublished technical paper.

Vastrick, T. W., Checkwriter Identification, unpublished technical paper.

Miller, J. T., Checkprotector Identification - Exemplar and Comparison Problems, unpublished technical paper.

Black, D. A., Identifying Addressograph Imprints, unpublished technical paper.

Casey, M. A. and Paholke, A. R., A Dual View to Identifying Metal Stamped Impressions, Journal of Police Science and Administration, Vol 3, No. 2, Jun 75.

Purtell, D. J., The Identification of Rubber Stamps, Royal Canadian Mounted Police, Seminar #4, May 1956.

TECHNICAL PROCEDURES MANUAL AUTHORITY ENDORSEMENT

SECTION 7

I HAVE REVIEWED THE TECHNICAL PROCEDURES FOR THE EXAMINATION OF
HAND STAMPED IMPRESSIONS AND APPROVE THESE PROCEDURES FOR USE
BY THE NORTH CAROLINA STATE BUREAU
OF INVESTIGATION FORENSIC ANALYST UNDER MY SUPERVISION.

SIGNED _____   DATED _7-1-9L____
DAVID C. DUNN
SUPERVISING AGENT IN CHARGE
NCSBI QUESTIONED DOCUMENTS SECTION

TECHNICAL PROCEDURE TERMINATION AND ARCHIVE:

EFFECTIVE THIS_____ DAY OF_____OF THE YEAR_____, THE
USE OF THIS PROCEDURE IS HEREBY DISCONTINUED BY MY AUTHORITY AND
BEING PLACED IN THE HISTORICAL AND ARCHIVAL SECTION OF THIS
MANUAL FOR REFERENCE.(REFER TO SECTION K)

SIGNED:_____ TITLE:_____.

THE EXAMINATION OF PHOTOCOPIED DOCUMENTS:

The examination of documents which have been photocopied requires the comparison of the features on the photocopy produced by a copy machine that can be identified as having originated from that machine or features found on another subsequent photocopy produced by the same machine. Although photocopies can be compared (one to the other) they can be altered and the suspect machine should be examined when possible.

Examinations for copy machine flaws: (1)

The questioned photocopy is first examined macroscopically and microscopically for alterations in the copied document and for flaws occurring during the copy process. This examination is accomplished using a microscope and typewriter alignment plates (grids). The document is inspected using the typewriter alignment plates to measure the horizontal and vertical alignment of the typed text portion.

The document is next examined visually and microscopically for any machine produced indentations, gripper marks or " trash marks" denoting class and individual characteristics of the copy machine. These characteristics should then be noted , identified and photocopied or photographed as needed.

Examination of the copy machine: (2)

If sufficient characteristics are found for comparison, the copy machine should be examined to conclude that it can produce these characteristics and the cause.

Procedure

Photocopies are made for comparison and examined to determine of any of the identifying characteristics are transitional or accidental.

Comparison: (3)

The photocopies are compared as to the above procedure to determine if the questioned document was produced by a specific machine or if two photocopies were generated on the same machine.

Instrumentation: (4)

The use of the microscope and camera are referred to in other sections of this manual, each under its own heading.

Safety :

The copy machine should be unplugged before examination and the Examiner should be aware of the danger of further shock due to high voltage capacitor discharge.

REFERENCES FOR LESSON 47:   COPYING PROCESSES AND COPY MACHINE
IDENTIFICATION

BOOKS:

Hilton, O.,   Scientific Examination of Documents, Chapter 3 (pp
                   64-66).

Scott, C. C.,   Photographic Evidence Vol II,   Chapter 27.

TECHNICAL ARTICLES:

Hilton, O.,   Detecting Fraudulent Photocopies, Forensic Science
                   International, Vol 13, 1979.

Kelly, J. H.,   Identifying the Copying Machine Used in
                   Preparation of Simulated Forgeries, Journal of
                   Forensic Sciences, Vol 18, No. 4, Oct 73.

Lile, J. E. and Blair, A. R.,   Classification and Identification
                   of Photocopiers: A Progress Report, Journal of
                   Forensic Sciences, Vol 21, No. 4, Oct 76.

Purdy, D. C.,   The Xerox 6500 Colour Copier, Canadian Society of
                   Forensic Science Journal, Vol 9; No. 3, 1976.

Kelly, J. H.,   Copying Processes, unpublished technical paper.

Mantle, R. L.,   Forgery by Facsimile Transfer, unpublished
                   technical paper.

Anonymous,   Office Copying Machines; How They Work, New
                   Developments, Their Effect on Forensic Documents
                   Examinations, unpublished technical paper.

Nemecek, J.,   Copier Copies Can Tell, unpublished technical
                   paper.

VanStratt, W.,   Who's Who on the Welfare Rolls, unpublished
                   technical paper.

Doud, D.,   Some Characteristics of Xerox Color Reproductions,
                   unpublished technical paper.

Conlon, J. A.,   Xerox Color Copier and its Potential for
                   Unauthorized Duplication of Documents of Value,
                   unpublished technical paper.

Hilton, O. and Cromwell, D., _Fraud by Photocopy_, Case and
Comment, Vol 82, No. 2, 1977.

TECHNICAL PROCEDURES MANUAL AUTHORITY ENDORSEMENT

SECTION 8

I HAVE REVIEWED THE TECHNICAL PROCEDURES FOR THE EXAMINATION OF
PHOTOCOPIED DOCUMENDTS AND APPROVE THESE PROCEDURES FOR USE BY
THE NORTH CAROLINA STATE BUREAU
OF INVESTIGATION FORENSIC ANALYST UNDER MY SUPERVISION.

SIGNED David C. Dunn   DATED 7-1-96

DAVID C. DUNN
SUPERVISING AGENT IN CHARGE
NCSBI QUESTIONED DOCUMENTS SECTION

TECHNICAL PROCEDURE TERMINATION AND ARCHIVE:

EFFECTIVE THIS_____DAY OF_____OF THE YEAR_____, THE
USE OF THIS PROCEDURE IS HEREBY DISCONTINUED BY MY AUTHORITY AND
BEING PLACED IN THE HISTORICAL AND ARCHIVAL SECTION OF THIS
MANUAL FOR REFERENCE.(REFER TO SECTION K)

SIGNED:_____TITLE:_____.

Analysis of Photocopier Toners by
Fourier Transform Infrared Spectroscopy

Introduction:

Identification and comparison of photocopier toners can be easily conducted using a small amount of sample and a fourier transform infrared spectrometer equipped with and infrared microscope.

Sample Preparation:

The sample can be easily collected using a stereo microscope, fine point tweezers, sharp #11 scalpel, and glass slides that have been cleaned of oils and contaminates. A SpectroTech sample roller, single edge razor blade, a sample holder and a KBr pellet of the proper size and thickness will also be needed for the mounting and analysis of the samples.

The examiner will want to collect toner from more than one area on the document. Using the stereo microscope, select several areas on the document where the toner is thickest. Carefully shave some toner off the paper at the first area, being careful not to collect any paper fibers. Transfer the collected toner to a clean glass slide and label or number the slide so as to have a record of where the sample was collected. Repeat the process until the examiner has collected toner samples from several areas of the document.

Using the SpectroTech sample roller, flatten the sample and make the it as thin as possible. Clean the surface of the roller and repeat the process until all collected samples have flattened as thin as much as possible. Use the single edge razor blade to remove the flattened samples from the glass slide, and transfer them to the KBr pellet. (At this point it will be necessary to make a diagram of the surface of the KBr pellet so as to indicate where each sample is located on KBr pellet.)

The toner samples are ready for analysis.

Revision Date: _____ **Approved By:** _____

Instrument:

Perkin Elmer Fourier Transform Infrared Spectrometer
1700 series located in the Trace Evidence Section

FTIR Calibration Procedures

Calibration of the FTIR Spectrometer will be done a minimum of once per month. However, calibration is not limited to once per month and can be performed as needed.

-Turn on the computer. When computer has booted up the c:\> prompt will appear. Type in WIN and press ENTER. This will open the PROGRAM MANAGER and the PE APPLICATIONS window will be in the center of the screen.

IRDM Software

-Move cursor to the MS DOS IRDM icon and double click.

-Move cursor to INSTRUMENT and click. Pull down to COMMUNICATIONS and click. Instrument Communications window will open. Click on RS232ON and then click on OK.

-Move cursor back to INSTRUMENT and click. Pull down to INST...
And click. The instrument will initialize and the Instrument Accessories window will appear. Make sure TGS is highlighted and click on OK.

-Move cursor back to INSTRUMENT and click. Pull down to SCAN MODE and click. The scan mode window will appear. Make sure GAIN is on one and click on OK.

-Move cursor to INSTRUMENT and click. Pull down to MONITOR and click. When Monitor window appears click on ENERGY and then click on OK. Read the maximum value of the energy and record it in the calibration log. Click on EXIT.

-Move cursor to INSTRUMENT and click. Pull down to SCAN and click. The scan window will appear. Move cursor to BACKGROUND and click. Hit Backspace on the keyboard to delete the word scan that is already in the title window. Type in CB followed by the date in numbers without dashes or slashes. CB will designate calibration spectra and the date will show when the spectra was run. For example if the date is December 17, 1996 and I was running a calibration spectra I would type in CB121796. Make sure the number of scans is at least 30 and the range is from 4000 to 450 reciprocal centimeters. Click on OK when the parameters are correct. The instrument will begin scanning the background.

A:\toners.wpd

-When the background is complete, raise the hood on the bench of the FTIR and place an IR spectrophotometer polystyrene calibration film in the sample holder. Record "polystyrene" on the calibration log under STANDARD.

-Move cursor to INSTRUMENT and click. Pull down to scan and click. The scan window will appear.

-Move cursor to SAMPLE and click. Click on OK. The computer will ask if you wish to overwrite the data region which already exists. Click on OVERWRITE. The instrument will begin scanning the sample.

-When scanning is complete click on DATA and pull down to PEAK and click. Peak parameters should appear. Set the threshold at 2.00, highlight PEAK, set Range at 4000.00-450.00 and hit OK. The peak table should appear.

-Look for the reference band that corresponds to the highest wavenumber peak for polystyrene (3082.18 1/cm) and record it in the calibration log. If the recorded value is less than ±0.3 1/cm away from 3082.18 1/cm then the instrument is calibrated and needs no further adjustments. If the instrument should need adjusting, refer to FTIR user manuals.

-Produce and store a hard copy. Save spectrum.

Spectrum for Windows Software

-Move cursor to SPECTRUM FOR WINDOWS icon and double click.

-Login

-Move cursor to SET UP and click. Pull down to INSTRUMENT and click. Click on BEAM icon and make sure that the internal beam TGS is selected. Click on UPDATE. Make sure that the scan mode GAIN is 1.0 and click on UPDATE.

-Move cursor to INSTRUMENT and click. Pull down to MONITOR and click. Make sure ENERGY is selected and click on OK. Read the maximum value of the energy and record it in the calibration log. Click on HALT.

-Move cursor to INSTRUMENT and click. Pull down to SCAN BACKGROUND and click. The SCAN BACKGROUND window will appear. Name the FILENAME according to the instructions for the IRDM software. Set the range from 4000 to 450 reciprocal centimeters and the number of scans to at least 30. When the parameters are correct, click on OK. The instrument will begin scanning the background.

-When the background is complete, raise the hood on the bench of the FTIR and place an IR

spectrophotometer polystyrene calibration film in the sample holder. Record "polystyrene" on the calibration log under STANDARD.

-Move cursor to INSTRUMENT and click. Pull down to SCAN SAMPLE and click. The SCAN SAMPLE window will appear. Name the FILENAME the same way as before when naming the background. Set the parameters the same as well. When the parameters are correct click on OK. The instrument will scan the sample and upon completion the computer will ask if you wish to overwrite the background. Click on OVERWRITE twice.

-Move the cursor to PROCESS and click. Pull down to PEAK TABLE and click. Set the THRESHOLD at 2.00 %T, START at 4000 1/cm, end at 450 1/cm, and select FIND PEAKS. Click on OK.

-Look for the reference band that corresponds to the highest wavenumber peak for polystyrene (3082.18 1/cm) and record it in the calibration log. If the recorded value is less than +/- 0.3 1/cm away from 3082.18 1/cm then the instrument is calibrated and needs no further adjustments. If the instrument should need adjusting, refer to the FTIR user manuals.

FTIR Safety Concerns

-The instrument must be disconnected from all voltage sources before it is opened for any adjustment, replacement, maintenance or repair.

-Any adjustment, maintenance and/or repair of the opened operating instrument shall be carried out only by a skilled person who is aware of the hazard involved.

-Liquid Nitrogen can burn skin and eyes. Safety glasses, lab coats, and gloves should be worn when transporting or handling liquid nitrogen.

-The FTIR utilizes a helium-neon laser which produces laser radiation. See the next two pages for information and warnings concerning laser radiation.

Other Information

FTIR manuals can be located in the FTIR room as well as in the Trace Evidence Library.

FTIR CALIBRATION LOG

A:\toners.wpd

DATE	INTERNAL ENERGY	STANDARD	REFERENCE BAND	INITIALS

FTIR Operating Procedures
Start Up

-Fill dewar with liquid nitrogen until you see overflow. Allow the dewar to "burp" and then fill it until it overflows again and cap it off.

-Turn on the microscope and turn up the light source. Insert a KBr disc on the microscope stage and focus on the top of the disc.

-Move one side of the lower aperture over into the viewing area and focus on it using the condenser. Then move the lower aperture back out of the way. Remove the adjustable apertures from the microscope and replace them with the fixed apertures. Switch the microscope from view to IR.

-Turn on the computer. When computer has booted up the c:\> prompt will appear. Type in WIN and press ENTER. This will open the PROGRAM MANAGER and the PE APPLICATIONS window will be in the center of the screen.

IRDM Software

-Move cursor to the MS DOS IRDM icon and double click.

-Move cursor to INSTRUMENT and click. Pull down to COMMUNICATIONS and click. Instrument Communications window will open. Click on RS232ON and then click on OK.

-Move cursor back to INSTRUMENT and click. Pull down to INST...
And click. The instrument will initialize and the Instrument Accessories window will appear. Make sure TGS is highlighted and click on OK.

-Move cursor back to INSTRUMENT and click. Pull down to SCAN MODE and click. The scan mode window will appear. Make sure GAIN is on one and click on OK.

-Move cursor to INSTRUMENT and click. Pull down to MONITOR and click. When Monitor window appears click on ENERGY and then click on OK. Read the maximum value of the energy and record it in the user log under internal energy. Click on EXIT.

-Click on INSTRUMENT. Pull down to INST... and click. Click on INT MCT to switch to the external detector. Click on OK.

-Click on INSTRUMENT and pull down to MONITOR and click. Click on ENERGY and then click on OK. Read the maximum value of the energy and record it in the user log under external energy. Click on EXIT.

-Remove the fixed apertures from the microscope and replace them with the adjustable apertures. Switch the microscope back to view. Data can now be collected.

Spectrum for Windows Software

-Move the cursor to SPECTRUM FOR WINDOWS icon and double click

-Login

-Move cursor to SETUP and click. Pull down to INSTRUMENT and click. The INSTRUMENT SETUP window will appear. Click on the BEAM icon and make sure that the internal beam TGS detector is selected. Click on UPDATE. Make sure that the SCAN MODE GAIN is one and click on UPDATE.

-Move cursor to INSTRUMENT and click. Pull down to MONITOR and click. Select ENERGY and click on OK. Record the maximum value in the user log under internal energy. Click on HALT>

-Move the cursor to SETUP and click. Pull down to INSTRUMENT and click. Click on the BEAM icon. Select INTERNAL MCT detector for the external beam and click on UPDATE. Click on UPDATE to remove the INSTRUMENT SETUP window.

-Move cursor to INSTRUMENT and click. Pull down to MONITOR and click. Select ENERGY and click on OK. Record the maximum value in the user log under external energy and click on Halt.

-Remove the fixed apertures and replace them with the adjustable apertures.Switch the microscope back to view. Data can now be collected.

Collection and Storage of Data

-Adjust the stage so that the sample can be viewed under the microscope. Adjust the apertures as dictated by the sample.

-Adjust the stage so that the sample moves out of the aperture window to expose only the KBr disc. Then switch the microscope from view to IR.

IRDM Software

-Move cursor to INSTRUMENT and click. Pull down to SCAN and click. Scan window will appear. Click on BACKGROUND. Press backspace on the keyboard to delete the title window and type in your own title. The other parameters may be set to the operator's choosing. Click on OK and the instrument will begin scanning the background.

-When background is complete switch the microscope from IR to view and adjust the stage so that the exact area of the sample to be analyzed is under the view window. Then switch the microscope back to IR.

-Move cursor to INSTRUMENT and click. Pull down to SCAN and click. The scan window will appear. Click on SAMPLE and then on OK. The computer will ask if you wish to overwrite the data region which already exists. Click on OVERWRITE. The instrument will begin scanning the sample.

-When scanning is complete several data commands can be used to improve the quality of the spectrum. For information concerning the data commands, see the IR Data Manager User's Manual located in the FTIR room.

-The spectrum can be plotted by clicking on FILE. Pull down to and click on PLOT. Load paper in the plotter and click on OK.

-To store the spectrum, click on the bow tie symbol in the upper left hand corner of the spectrum. This will minimize the spectrum to the data region. Double click on the data region and find the file inside the data region that you want to save. Click on that file and hold. Drag it to the DRIVE A: icon and release it. Press OK if the title is acceptable and the spectrum will be saved on the A: DRIVE. (Note that a disc must be in the A: DRIVE)

Spectrum For Windows software

-Move cursor to INSTRUMENT and click. Pull down to SCAN BACKGROUND and click to make the SCAN BACKGROUND window appear. The operator can determine the filename and parameters as dictated by each sample. When the filename and parameters are correct click on OK. The background will be scanned.

-When the background is complete switch the microscope from IR to view. Move the stage such that the exact area of the sample to be analyzed is in the aperture window. Switch the microscope back to IR.

-Move the cusor to INSTRUMENT and click. Pull down to SCAN SAMPLE and click. The SCAN SAMPLE window will appear. When the filename and parameters are set (at the

operator's choice) click on OK. The sample will be scanned.

-Sample spectra can be processed in several ways. See the <u>Spectrum for Windows User's Manual</u> for details on data processing.

-Spectra can be printed by clicking on the PRINT icon.

-Spectra can be saved by clicking on the SAVE icon. Choose the appropriate filename and directory and click on OK.

Shut Down

-Save all necessary data.

-Select the instruments internal beam TGS detector and ensure that the scan mode gain is one before shutting down.

-If you are in IRDM, click on FILE. Pull down to QUIT TO DOS and click. The computer will ask you if you want to quit. Answer yes. This will take you back to the program manager

-If you are in Spectrum for Windows, double click on the uppermost left hand corner. This will take you back to the program manager.

-You should now be at the program manager. Double click on the uppermost left hand corner. The computer will ask if you are sure that you want to quit, click on OK. The computer will quit to DOS. You may now turn off the computer and the microscope.

Subject [Photocopiers, Toners, Facsimile
Title [The Classification of Office Copy Machines from Physical
Characteristics
Author [E.L. James
Publication [J. Foren. Sci., vol. 32, no. 5, Sept. 1987, pp. 1293-1304.
Keywords [copy machines, photocopier, photocopy, toner
Number [108

Subject [Photocopiers, Toners, Facsimile
Title [Classification and Identification of Photocopying Toners By
        Diffuse Reflectance Infrared Fourier Transform Spectroscopy
        (DRIFTS): II. Final Report
Author [W.D. Mazzella, C.J. Lennard, P.A. Margot
Publication [J. Foren. Sci., vol. 36, no. 3, May 1991, pp. 820-837
Keywords [photocopier, photocopy, infrared
Number [114

Subject [Photocopiers, Toners, Facsimile
Title [Analysis of Photocopying Toners by Infrared Spectroscopy
Author [R.L. Williams
Publication [Foren. Sci. International, 22(1983) 85-95.
Keywords [photocopier, toner, infrared
Number [99

Subject [Photocopiers, Toners, Facsimile
Title [The Differentiation of Toners Used in Photocopy Processes by
Infrared Spectroscopy
Author [G.S. Kemp, R.N. Totty
Publication [Foren. Sci. International,22(1983)75-83.
Keywords [photocopier, toner, photocopy
Number [106

Analysis of Photocopier Toners by Fourier Transform Infrared Spectroscopy

Introduction:

Identification and comparison of photocopier toners can be easily conducted using a small amount of sample and a fourier transform infrared spectrometer equipped with and infrared microscope.

Sample Preparation:

The sample can be easily collected using a stereo microscope, fine point tweezers, sharp #11 scalpel, and glass slides that have been cleaned of oils and contaminates. A SpectroTech sample roller, single edge razor blade, a sample holder and a KBr pellet of the proper size and thickness will also be needed for the mounting and analysis of the samples.

The examiner will want to collect toner from more than one area on the document. Using the stereo microscope, select several areas on the document where the toner is thickest. Carefully shave some toner off the paper at the first area, being careful not to collect any paper fibers. Transfer the collected toner to a clean glass slide and label or number the slide so as to have a record of where the sample was collected. Repeat the process until the examiner has collected toner samples from several areas of the document.

Using the SpectroTech sample roller, flatten the sample and make the it as thin as possible. Clean the surface of the roller and repeat the process until all collected samples have flattened as thin as much as possible. Use the single edge razor blade to remove the flattened samples from the glass slide, and transfer them to the KBr pellet. (At this point it will be necessary to make a diagram of the surface of the KBr pellet so as to indicate where each sample is located on KBr pellet.)

The toner samples are ready for analysis.

Revision Date: 5-1-98   **Approved By:** D.C. Dunn

NCSBI QUESTIONED DOCUMENTS SECTION

I.1. INFRARED REFLECTANCE IMAGING

This type of imaging is used by the Questioned Documents Section to remove obscuring matter such as bank stamps, white out, obliterated writing of any sort, when the ink is transparent to infrared light. By exposing the questioned document to infrared radiation (quartz lights, photo floods, crimescope CS-16) we can remove this obscuring matter.

In infrared imaging, use is made of the invisible infrared rays as distinguished from the visible rays of the spectrum. A special filter (780nm or a Kodak Wratten #87) is placed in front of the DAGE-MTI infrared video camera lens to exclude the visible rays and allow only the infrared rays to reach the camera
tube. This leaves a clear reproduction of the obscured matter.

This type of imaging must be carried out in an area designed for this activity where one can control the type and intensity of lighting.

The following steps are used to produce infrared reflected images:

1.1.   PLACE THE QUESTIONED DOCUMENT ON THE COPY
        STAND UNDER THE DAGE-MTI 81 IR VIDEO CAMERA.
        1.1.1. BELOW IS THE
TYPICAL COPYSTAND
AND LIGHTING
        SETUP.

        DAGE-MTI
        #81 IR-VIDEO
        CAMERA WITH
        CRIMESCOPE
        #CS-16 LIGHT
        SOURCE

DAGE-MTI INFRARED VIDEO CAMERA

780nm FILTER ABSORBS VISIBLE RADIATION: TRANSMITS I.R.

CRIMESCOPE CS-16

INFRARED AND VISIBLE RADIATION

SUBJECT

INFRARED FIBER OPTIC BUNDLE

COPYING INFRARED REFLECTANCE
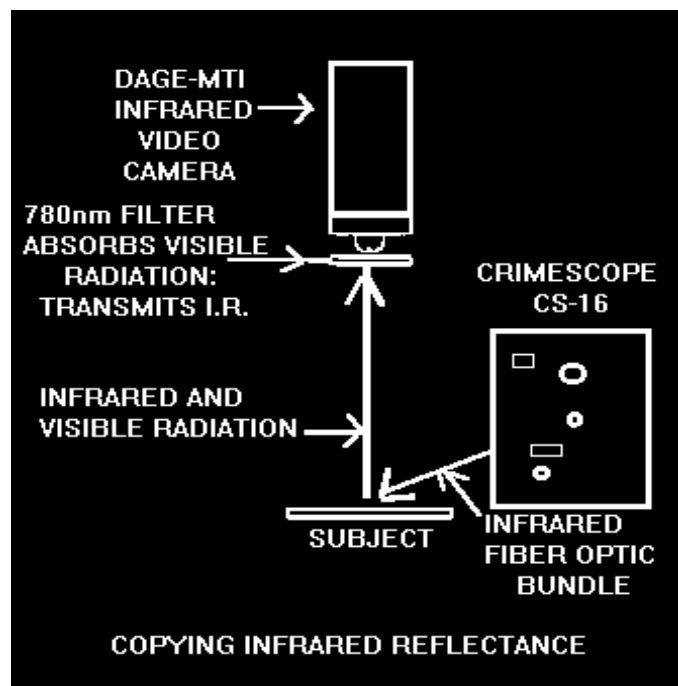
1.2. PLACE A #780mn FILTER IN THE CAMERA'S FILTER HOLDER. OTHER FILTERS TO TRY ARE: #665nm, #695nm, #780nm, #850nm, AND #1000nm OR A KODAK WRATTEN #87.

1.3. TURN ON THE COPY LIGHTS OR USE THE INFRARED LIGHT GUIDE FROM THE CRIMESCOPE CS-16 LIGHT SOURCE.

1.4. USING THE IBIS SOFTWARE PACKAGE ON A 486 COMPUTER WITH AT LEAST 16 MB OF RAM, ACQUIRE THIS IMAGE DIGITALLY ON CONTINUOUS ACQUIRE;
ADJUST THE LENS OPENING IN ORDER TO ACHIEVE GOOD DENSITY. USE A NIKON 35MM, 55MM OR A 105MM MACRO LENS.

    1.4.1. LENS SELECTIONS RELATES TO THE SIZE OF THE QUESTIONED DOCUMENT:
        35MM--81/2 INCHES X 11 INCHES OR A CHECK
        55MM--AN ENDORSEMENT OR SIGNATURE
        105MM---JUST ONE NAME OR SEVERAL LETTERS

1.5. BELOW IS THE ACQUIRE MENU FROM THE IBIS PROGRAM. CLICK ON CONTINUOUS ACQUIRE.

MANY TIMES IF THE IMAGE IS FAINT THE GATE VIDEO INPUT OPTION IS USED (SET AT #2 OR #3 TO START WITH). THIS PROCEDURE WILL INCREASE THE DENSITY OF THE IMAGE.

```
Acquire

        Continuous Acquire
             Single Acquire
      Select Camera
           Gate Video Input
      Clear Screen
          Acquire with Filter
```

```
Contrast

Slide and Stretch
     Auto-Fit
Inverse
     Equalization
Binarize
```
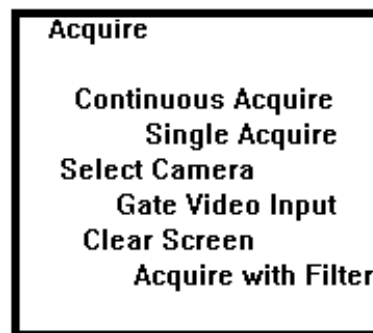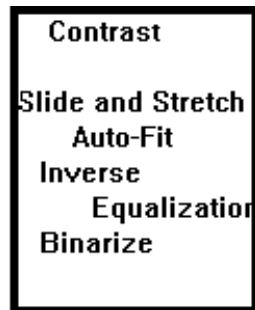
1.6.   NEXT USE THE CONTRAST MENU TO CHANGE THE CONTRAST OR BRIGHTNESS IN THE IMAGE:

1.6.1. <u>SLIDE AND STRETCH</u>: WITH THIS SELECTION A SLIDER BAR IS ACTIVATED DISPLAYING VALUES OF 0.5 TO 3.0 UNITS OF DENSITY. BY MOVING THE MOUSE; THE DENSITY CAN BE PROPERLY ADJUSTED TO THE LEVEL NECESSARY TO DEPICT THE QUESTIONED WRITING, THAT IS UNDER THE OBSCURING MATTER. YOU THEN CLICK ON THE LEFT MOUSE BUTTON.

1.6.2. <u>AUTO-FIT</u>: AUTOMATICALLY SELECTS WHAT THE COMPUTER FEELS IS THE CORRECT CONTRAST

1.6.3. <u>INVERSE</u>: PRODUCES AN IMAGE WHICH IS A NEGATIVE IMAGE.

1.7.   NEXT SELECT THE SHARPEN OPTION; NORMALLY JUST ONE CLICK ON SHARPEN WILL DO.

FILTERING CAN BE USED TO SHARPEN OR BLUR AN IMAGE, TO ENHANCE HIGH FREQUENCY DETAILS, TO DETECT EDGES, OR TO LIGHTEN OR DARKEN AN OVERALL
IMAGE **BY EXPANDING LIGHT OR DARK AREAS.**

1.7.1. **TO SHARPEN AN IMAGE USE THE <u>HI-PASS</u> OR <u>SHARPEN</u> FILTERING OPTIONS.**

1.7.2. **TO BLUR AN IMAGE, USE THE <u>LO-PASS</u> OR MEDIAN FILTERING   OPTIONS.**

1.7.3. **TO DETECT OR ENHANCE EDGES IN AN IMAGE, SELECT THE SOBEL, PHASE, OR HORIZONTAL,VERTICAL, LAPLACIAN, AND ROBERS FILTERS AS SUBMENU CHOICES.**

```
            Sharpen
       Hi-Pass Filter
          Edge Detect
       Median
          Lo-Pass Filter
        Erode
   Dilate
       Select Convolved Kernel
   Kernel Parameters
```

1.8.   NEXT WE SELECT THE ANNOTATE OPTION:

```
File Functions

        Restore Image File
Save Image File
    Delete Image File
Image Directory
        Printrak Save
```
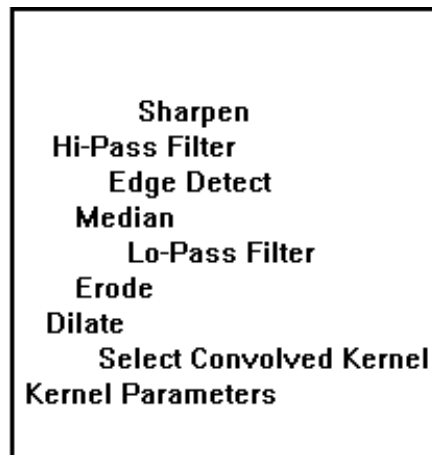
WITH THIS YOU CAN ENTER TEXT AND CASE NO. ON YOUR IMAGE.

1.9. NEXT WE SAVE THE IMAGE TO A COMPUTER FILE BY SELECTING FILE FUNCTION.
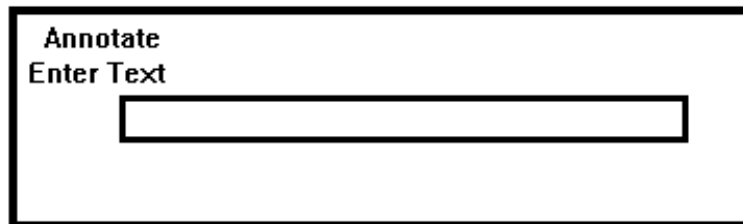
```
Annotate
Enter Text

    [                                    ]
```

1.9.1. FROM THIS MENU ALL FILE FUNCTIONS CAN BE RUN USING: :

SAVE A FILE

PULL UP A FILE FROM MEMORY,

OR DELETE AN IMAGE FILE.

1.10. PRINT THE IMAGE BY SELECTING THE PRINT OPTION:

REFERENCES:

Barnes, David, " Document Processing System User's Manual", IBIS Imaging Systems

Hilton, Ordway, "New Dimensions in Infrared Luminescence Photography", Journal of Forensics Sciences, JFSCA, Vol. 26, No 2, April 1981, pp 319-324.

Kodak's "Applied Infrared Photography", Publication #M-28, 1972 edition. pp. 51-57.

Kodak's "Kodak Infrared Films", Publication #N-17, 1981 edition, pp. 2-7.

Print Parameters

Number of Prints   1
  Size of Prints   Medium
  Orientation   Portrait
  Text Size: Small

Comment

Sanders, Robert C., "Questioned Documents Photography Techniques" The Evidence Photographer's International Council's Workshop (Atlanta, Ga. April 13 thru 15, 1980), pp. 1-29.

Young, W. Arthur, Thomas A. Benson, George T. Eaton, Kodak's "Copying and Duplication in Black-and-White and Color", Publication #M-1, 1984, pp. 50-53.

c:\document\ir2.wpd

TECHNICAL PROCEDURES MANUAL AUTHORITY ENDORSEMENT

SECTION I.1

I HAVE REVIEWED THE TECHNICAL PROCEDURES FOR <u>INFRARED REFLECTANCE IMAGING</u> AND APPROVE THESE PROCEDURES FOR USE BY THE NORTH CAROLINA STATE BUREAU OF INVESTIGATION FORENSIC ANALYST UNDER MY SUPERVISION.

SIGNED_____   DATED_____
DAVID C. DUNN
SUPERVISING AGENT IN CHARGE
NCSBI QUESTIONED DOCUMENTS SECTION

_____

    _____

TECHNICAL PROCEDURE TERMINATION AND ARCHIVE:

**EFFECTIVE THIS_____DAY OF_____OF THE YEAR_____,
THE USE OF THIS PROCEDURE IS HEREBY DISCONTINUED BY MY
AUTHORITY AND BEING PLACED IN THE HISTORICAL AND
ARCHIVAL SECTION OF THIS MANUAL FOR REFERENCE.(REFER
TO SECTION K)**

SIGNED:_____TITLE:_____.

NCSBI QUESTIONED DOCUMENTS SECTION

I.2. INFRARED LUMINESCENCE IMAGING
Revised: January 2002

This type of imaging is used by the Questioned Documents Section to show the differences in inks which normally appear the same.   The exposing of the questioned document to ultraviolet radiation (400nm to 600nm) from the crimescope CS-16 will cause the specimen (many times) to emit radiation in the red and infrared (600nm to 1200nm) part of the spectrum. One of four basic phenomena can be observed occurring with the document using this technique. The document may be observed reflecting the energy (lighten); absorbing the energy (darken); transmitting the energy (disappear); or converting the energy to a longer wavelength (luminesce).

As in infrared imaging, use is made of the invisible infrared rays as distinguished from the visible rays of the spectrum. A special filter (780nm or a Kodak Wratten #87) is placed in front of the DAGE-MTI infrared video camera lens to exclude the visible rays and allow only the infrared rays to reach the camera tube. This leaves a clear reproduction of the inks luminescence in the red and infrared part of the spectrum.

This type of imaging must be carried out in an area designed for this activity where one can control the type and intensity of lighting and have complete darkness.

The following steps are used to produce infrared luminescence images:

> **2.1. PLACE THE QUESTIONED DOCUMENT ON THE COPY STAND UNDER THE DAGE-MTI 81 IR VIDEO CAMERA.**

> **2.2. PLACE A #780mn FILTER IN THE CAMERA'S FILTER HOLDER. OTHER FILTERS TO TRY ARE: #665nm, #695nm, #780nm, #850nm, AND #1000nm OR A KODAK WRATTEN #87. TURN OFF THE ROOM LIGHTS.**

> **2.3. TURN ON THE LIGHT GUIDE FROM THE CRIMESCOPE CS-16 LIGHT SOURCE . TUNE THE LIGHT GUIDE TO**

BETWEEN 400nm and 600nm.

2.4. **USING THE IBIS COMPUTER ACQUIRE THIS IMAGE DIGITALLY USING THE LATENT-PRO SOFTWARE PACKAGE ON CONTINUOUS ACQUIRE; ADJUST THE LENS OPENING IN ORDER TO ACHIEVE GOOD DENSITY. USE A NIKON 35MM, 55MM OR A 105MM MACRO LENS.**

> **2.4.1. LENS SELECTIONS RELATES TO THE SIZE OF THE QUESTIONED DOCUMENT:**
> **35MM--81/2 INCHES X 11 INCHES OR A CHECK**
> **55MM--AN ENDORSEMENT OR SIGNATURE**
> **105MM---JUST ONE NAME OR SEVERAL LETTERS**
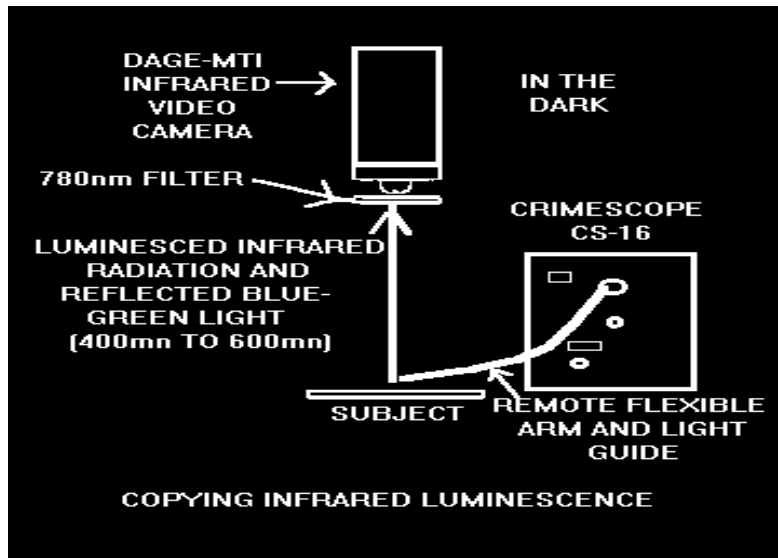
2.5. **In order to acquire this image into the computer data base the following equipment must be turn on in the following order.**

> **2.5.1. Turn on the DAGE MTI Camera.**

> **2.5.2. Turn on the MTI-TEC-1 (Cooler).**

2.5.3. Turn on the Dage DPS 2000.

2.5.4. Turn on the Sony Monitor-Input A.

2.5.5. Turn on the Personal Computer.

2.6 Use the Latent-Pro 2.2 software package under the Continuous Acquire setting.

2.6.1. Double click on the Latent-Pro Graphic User Interface.

2.6.2. Click on File/ Acquire/ Camera

2.6.3. Click on Configure/ Customize/ Imascan configuration (Triggered Grab/Setup)

2.6.4. Select Channel/ Association NTSC(CV1)/ Enter OK

2.6.5. Reset path/ OK Imascan configuration

2.6.6. To bring in the Video feed use the forward button (▶).

2.6.7. To acquire or Freeze the image use the Red (▣) button.

2.6.8. Save this image (File\Save) as a Tiff file in the New Images Directory.

2.7. Then import this Tiff file into Adobe Photo-Shop 5.5 soft ware.

2.7.1. Click on the Photo-Shop graphics user interface.

2.7.2. Open the Tiff file under the "New Images directory".

2.7.3. Click on the Image toolbar/Adjust/Brightness and Contrast/and Color Balance.

2.7.4. Click on the Filter toolbar/Sharpen/Unsharp mask.

2.7.5. Click on the Image toolbar/Size-to adjust the print size.

2.7.6. Save this final image under the File toolbar.

2.7.7. In order to print this image go to the File toolbar/Print/Setup

2.8.1. Select the Kodak DS 8650PS color printer.

2.8.2. Select either a Portrait or Landscape shaped print.

2.8.3. Be sure that the Postscript Color Management box is checked.

2.8.4. Print the image.

REFERENCES:

Barnes, David, " Document Processing System User's Manual", IBIS Imaging   Systems

Hilton, Ordway, "New Dimensions in Infrared Luminescence Photography",   Journal of Forensics Sciences, JFSCA, Vol. 26, No 2, April 1981, pp 319-   324.

Kodak's "Applied Infrared Photography", Publication #M-28, 1972 edition.   pp. 51-57.

Kodak's "Kodak Infrared Films", Publication #N-17, 1981 edition, pp. 2-7.

Sanders, Robert C., "Questioned Documents Photography Techniques" The   Evidence Photographer's International Council's Workshop (Atlanta,   Ga. April 13 thru 15, 1980), pp. 1-29.

Young, W. Arthur, Thomas A. Benson, George T. Eaton, Kodak's "Copying   and Duplication in Black-and-White and Color", Publication #M-1,   1984, pp. 50-53.

TECHNICAL PROCEDURES MANUAL AUTHORITY ENDORSEMENT

SECTION I.2

I HAVE REVIEWED THE TECHNICAL PROCEDURES FOR <u>INFRARED LUMENESCENCE IMAGING</u> AND APPROVE THESE PROCEDURES FOR USE BY THE NORTH CAROLINA STATE BUREAU OF INVESTIGATION FORENSIC ANALYST UNDER MY SUPERVISION.

SIGNED_____ DATED_____
DAVID C. DUNN
SUPERVISING AGENT IN CHARGE
NCSBI QUESTIONED DOCUMENTS SECTION

_____

_____

TECHNICAL PROCEDURE TERMINATION AND ARCHIVE:

EFFECTIVE THIS_____DAY OF_____OF THE YEAR_____, THE USE OF THIS PROCEDURE IS HEREBY DISCONTINUED BY MY AUTHORITY AND BEING PLACED IN THE HISTORICAL AND ARCHIVAL SECTION OF THIS MANUAL FOR REFERENCE.(REFER TO SECTION K)

SIGNED:_____TITLE:_____.

NCSBI QUESTIONED DOCUMENTS SECTION

I.3. CHARRED DOCUMENTS IMAGING
Revised: January 2002

This type of imaging is used by the Questioned Documents Section to visually decipher the information which remains after documents have been burned. Depending on the degree of burning, there is often a great deal of information still on the damage document. During burning, paper will shrink and curl and become fragile. It becomes necessary to handle charred documents with a great deal of care. This takes a lot of time using tweezers, and small model paint brushes to remove the ash and to move the document under the camera. By using the DAGE-MTI infrared video camera with the Ibis computer soft ware package good results can be obtained.

This type of imaging must be carried out in an area designed for this activity where one can control the type and intensity of lighting. Normal copy lighting works well, with the quartz lights set at a 45 degree angle to the document.

The following steps are used to produce charred document images:

3.1. PLACE THE QUESTIONED DOCUMENT ON THE COPY STAND UNDER THE DAGE-MTI 81 IR VIDEO CAMERA.

3.1.1. BELOW IS THE TYPICAL COPYSTAND AND LIGHTING SETUP.

DAGE-MTI
#81 IR-VIDEO
CAMERA WITH
QUARTZ LIGHTS
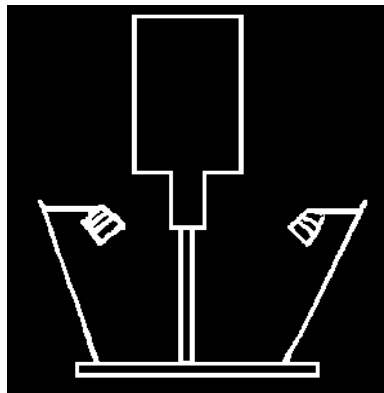
3.2. TURN OFF THE OVERHEAD LIGHTS AND TURN ON THE COPY STAND LIGHTS. ADJUST THE THE LENS OPENING IN ORDER TO ACHIEVE GOOD DENSITY.

3.3. USING THE IBIS SOFTWARE PACKAGE ON A 486 COMPUTER WITH AT LEAST 16 MB OF RAM, ACQUIRE THIS IMAGE DIGITALLY ON CONTINUOUS ACQUIRE. USE A NIKON 35MM, 55MM OR A 105MM MACRO LENS.

    3.3.1. LENS SELECTIONS RELATES TO THE SIZE OF THE QUESTIONED DOCUMENT:
    35MM--81/2 INCHES X 11 INCHES OR A CHECK
    55MM--AN ENDORSEMENT OR SIGNATURE
    105MM---JUST ONE NAME OR SEVERAL LETTERS

3.4. In order to acquire this image into the computer data base the following equipment must be turn on in the following order.

    3.4.1. Turn on the DAGE MTI Camera.

    3.4.2. Turn on the MTI-TEC-1 (Cooler).

    3.4.3. Turn on the Dage DPS 2000.

    3.4.4. Turn on the Sony Monitor-Input A.

    3.4.5. Turn on the Personal Computer.

3.5 Use the Latent-Pro 2.2 software package under the Continuous Acquire setting.

    3.5.1. Double click on the Latent-Pro Graphic User Interface.

    3.5.2. Click on File/ Acquire/ Camera

3.5.3. Click on Configure/ Customize/ Imascan configuration (Triggered Grab/Setup)

3.5.4. Select Channel/ Association NTSC(CV1)/ Enter OK

3.5.5. Reset path/ OK Imascan configuration

3.5.6. To bring in the Video feed use the forward button (▶).

3.5.7. To acquire or Freeze the image use the Red (▣) button.

3.5.8. Save this image (File\Save) as a Tiff file in the New Images Directory.

3.6. Then import this Tiff file into Adobe Photo-Shop 5.5 soft ware.

3.6.1. Click on the Photo-Shop graphics user interface.

3.6.2. Open the Tiff file under the "New Images directory".

3.6.3. Click on the Image toolbar/Adjust/Brightness and Contrast/and Color Balance.

3.6.4. Click on the Filter toolbar/Sharpen/Unsharp mask.

3.6.5. Click on the Image toolbar/Size-to adjust the print size.

3.6.7. Save this final image under the File toolbar.

3.7 In order to print this image go to the File toolbar/Print/Setup

3.7.1. Select the Kodak DS 8650PS color printer.

3.7.2. Select either a Portrait or Landscape shaped print.

3.7.3.   **Be sure that the Postscript Color Management box is checked.**

3.7.4.   **Print the image.**

REFERENCES:

Barnes, David, " <u>Document Processing System User's Manual</u>", IBIS Imaging Systems

Kodak's "<u>Applied Infrared Photography</u>", Publication #M-28, 1972 edition. pp. 51-57.

Hilton, Ordway, "<u>Scientific Examination of Documents</u>", (Callaghan & Company 1956), p. 117.

Harrison, Wilson, "<u>Suspect Documents - Their Scientific Examination</u>", (London: Sweet & Maxwell Limited 1966), p. 112.

c:\myfiles\project1-2002\ircharred.wpd

TECHNICAL PROCEDURES MANUAL AUTHORITY ENDORSEMENT

SECTION I.3

I HAVE REVIEWED THE TECHNICAL PROCEDURES FOR <u>CHARRED DOCUMENTS IMAGING</u> AND APPROVE THESE PROCEDURES FOR USE BY THE NORTH CAROLINA STATE BUREAU OF INVESTIGATION FORENSIC ANALYST UNDER MY SUPERVISION.

SIGNED_____   DATED_____
DAVID C. DUNN
SUPERVISING AGENT IN CHARGE
NCSBI QUESTIONED DOCUMENTS SECTION

_____

_____

TECHNICAL PROCEDURE TERMINATION AND ARCHIVE:

EFFECTIVE THIS_____DAY OF_____OF THE YEAR_____, THE USE OF THIS PROCEDURE IS HEREBY DISCONTINUED BY MY AUTHORITY AND BEING PLACED IN THE HISTORICAL AND ARCHIVAL SECTION OF THIS MANUAL FOR REFERENCE.(REFER TO SECTION K)

SIGNED:_____TITLE:_____.

NCSBI QUESTIONED DOCUMENTS SECTION

I.4. TYPEWRITER RIBBON IMAGING

This type of imaging is used by the Questioned Documents Section to show the information which is left on a typewriter ribbon after a document has been typed. These ribbons may have several rows of typed characters and they may be <u>written left to right or right to left inverted and up or down,</u> depending on the machine.

This type of imaging must be carried out in an area designed for this activity where one can control the type and intensity of lighting. Transmitted light form a light box works well with this type of imaging.

The following steps are used to produce typewriter ribbon images::

4.1.   PLACE THE QUESTIONED RIBBON ON TOP OF THE A LIGHT BOX WHICH IS ON THE COPY STAND UNDER THE DAGE-MTI 81 IR VIDEO CAMERA.

    4.1.1. BELOW IS THE TYPICAL COPYSTAND AND LIGHTING SETUP.

DAGE-MTI #81 IR-VIDEO CAMERA WITH LIGHT BOX
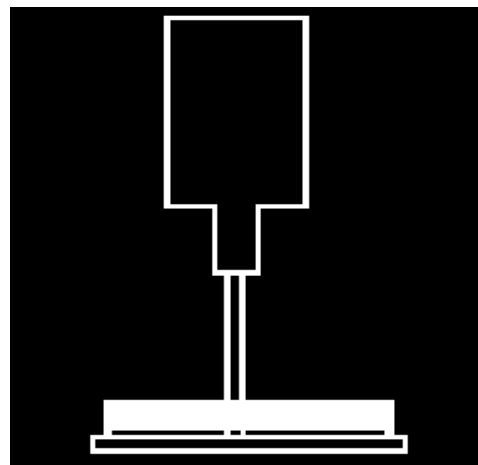
4.2.   TURN OFF THE OVERHEAD   LIGHTS AND TURN ON THE LIGHT BOX LIGHTS.   ADJUST THE LENS OPENING IN ORDER TO ACHIEVE GOOD   DENSITY.

4.3. **USING THE IBIS SOFTWARE PACKAGE ON A 486 COMPUTER WITH AT LEAST 16 MB OF RAM, ACQUIRE THIS IMAGE DIGITALLY ON CONTINUOUS ACQUIRE. USE A NIKON 35MM, MACRO LENS ON THE VIEDO CAMERA.**

4.4. **BELOW IS THE ACQUIRE MENU FROM THE IBIS PROGRAM. CLICK ON CONTINUOUS ACQUIRE.**

```
Acquire

        Continuous Acquire
             Single Acquire
      Select Camera
           Gate Video Input
      Clear Screen
          Acquire with Filter
```

4.5. **USE THE CONTRAST MENU TO CHANGE THE CONTRAST OR BRIGHTNESS IN THE IMAGE:**
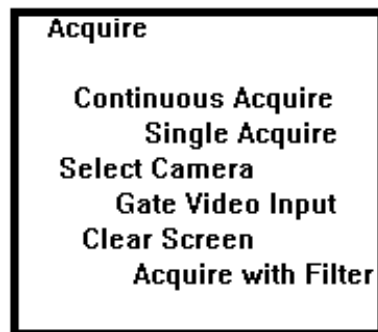
```
Contrast

Slide and Stretch
      Auto-Fit
Inverse
        Equalization
Binarize
```
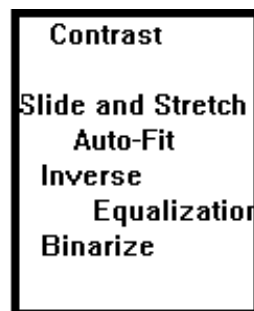
4.5.1. **SLIDE AND STRETCH: WITH THIS SELECTION A SLIDER BAR IS ACTIVATED DISPLAYING VALUES OF 0.5 TO 3.0 UNITS OF DENSITY. BY MOVING THE MOUSE; CLICK ON THE LEFT MOUSE BUTTON WHEN PROPER DENSITY IS OBTAINED.**

4.5.2. <u>AUTO-FIT</u>**: AUTOMATICALLY SELECTED WHAT THE COMPUTER FEELS IS THE CORRECT CONTRAST**

4.5.3. <u>INVERSE</u>**: PRODUCES AN IMAGE WHICH IS A NEGATIVE IMAGE.**

4.6.   SELECT THE SHARPEN OPTION; NORMALLY JUST ONE CLICK ON SHARPEN IS APPROPRIATE.
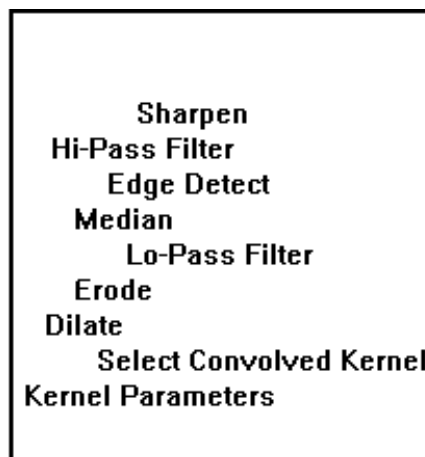
```
        Sharpen
    Hi-Pass Filter
        Edge Detect
    Median
        Lo-Pass Filter
      Erode
  Dilate
        Select Convolved Kernel
Kernel Parameters
```

FILTERING CAN BE USED TO SHARPEN OR BLUR AN IMAGE, TO ENHANCE HIGH FREQUENCY DETAILS, TO DETECT EDGES, OR TO LIGHTEN OR DARKEN AN OVERALL IMAGE   BY EXPANDING LIGHT OR DARK AREAS.

4.6.1.   TO SHARPEN AN IMAGE USE THE <u>HI-PASS </u>OR <u>SHARPEN</u> FILTERING OPTIONS.

4.6.2.   TO BLUR AN IMAGE, USE THE <u>LO-PASS</u> OR MEDIAN FILTERING   OPTIONS.

4.6.3.   TO DETECT OR ENHANCE EDGES IN AN IMAGE, SELECT THE SOBEL, PHASE, OR HORIZONTAL,VERTICAL, LAPLACIAN, AND ROBERS FILTERS AS SUBMENU CHOICES.

4.7.   SELECT THE ANNOTATE OPTION:

```
Annotate
Enter Text

┌─────────────────────────────────┐
│                                 │
└─────────────────────────────────┘
```
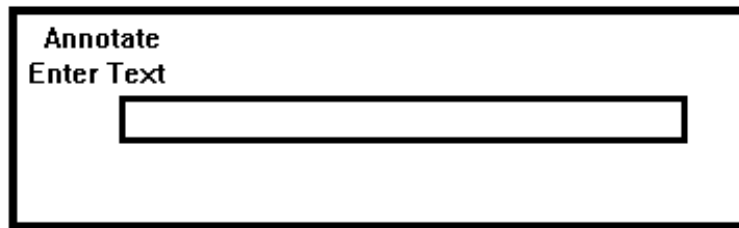
WITH THIS YOU CAN ENTER TEXT AND CASE NO.
ON YOUR IMAGE.

4.8.   NEXT WE SAVE THE IMAGE TO A COMPUTER FILE BY SELECTING FILE FUNCTION.

```
        File Functions

        Restore Image File
   Save Image File
      Delete Image File
   Image Directory
         Printrak Save
```

4.8.1. FROM THIS MENU PERFORM ALL YOUR FILE FUNCTIONS:

SAVE A FILE

PULL UP A FILE FROM MEMORY,

OR DELETE AN IMAGE FILE.

4.9.   USING THIS METHOD ONE CAN USUALLY RECORD

**ABOUT EIGHT INCHES OF RIBBON. IN ORDER TO
RECORD THE REMAINDER OF THE RIBBON YOU MOVE THE
RIBBON TO THE LEFT LEAVING ENOUGH LETTERS
OVERLAPPING TO DETERMINE THE SEQUENCE OF THE
RIBBON TEXT.**

**4.9.1. RETURN TO PROCURER #4.1 AND REPEAT THE
STEPS TROUGH 4.9.1., UNTIL THE EXAMINATION OF THE
RIBBON IS COMPLETED.**

4.10. PRINT THE IMAGE BY SELECTING THE PRINT OPTION:

**4.10.1   PULL UP SEVERAL (USUALLY FOUR FILES ON THE
SCREEN AT THE TIME), IN ORDER TO SAVE PAPER.**

Print Parameters

Number of Prints   1
 Size of Prints   Medium
 Orientation   Portrait
  Text Size: Small

Comment

REFERENCES:

Barnes, David, " <u>**Document Processing System User's Manual**</u>**", IBIS Imaging**
Systems

c:\document\TYPE.wpd

TECHNICAL PROCEDURES MANUAL AUTHORITY ENDORSEMENT

SECTION I.4

I HAVE REVIEWED THE TECHNICAL PROCEDURES FOR TYPEWRITER RIBBON IMAGING AND APPROVE THESE PROCEDURES FOR USE BY THE NORTH CAROLINA STATE BUREAU OF INVESTIGATION FORENSIC ANALYST UNDER MY SUPERVISION.

SIGNED_____ DATED_____
DAVID C. DUNN
SUPERVISING AGENT IN CHARGE
NCSBI QUESTIONED DOCUMENTS SECTION

_____

_____

TECHNICAL PROCEDURE TERMINATION AND ARCHIVE:

**EFFECTIVE THIS_____DAY OF_____OF THE YEAR_____,
THE USE OF THIS PROCEDURE IS HEREBY DISCONTINUED BY MY
AUTHORITY AND BEING PLACED IN THE HISTORICAL AND
ARCHIVAL SECTION OF THIS MANUAL FOR REFERENCE.(REFER
TO SECTION K)**

SIGNED:_____TITLE:_____.

NCSBI QUESTIONED DOCUMENTS SECTION

<u>I.5. VIDEO CASSETTE IMAGING USING LATENT PRO SOFTWARE</u>

Note: See the <u>Video Forensics Discipline Technical Procedures Manual</u>, **Feburary 1, 2002.**

NCSBI QUESTIONED DOCUMENTS SECTION

I.6. PHOTOGRAPHY USING THE VISUAL GRAPHICS CORP.
TOTAL CAMERA III

The VGC Total Camera III is an important large graphic arts type of camera which we use to photographically preserve evidence. Photographs are helpful in nearly all questioned document cases, and it is effective and convincing to use displays made from photographs in court.

Many times these photographs are enlarged (up to 300%) to make comparison charts for court. This way similarities or differences in a handwriting case can be shown enlarged and side by side, therefore, showing whether two or more
writings are the same or different.

This type of imaging must be carried out in an area designed for this activity where one can control the type and intensity of lighting. Also due the photo-chemicals used; good ventilation is needed as well as running water for cleaning the equipment.

The following steps are used to produce photographs using this camera:

6.1.   TURN THE CAMERA ON AT THE KEY SWITCH, IT NORMALLY TAKES ABOUT THIRTY MINUTES FOR THE CHEMICALS TO COME UP TO TEMPERATURE (95 DEGREES FAHRENHEIT +-2 DEGREES).

6.1.1. PLACE THE DOCUMENT ON THE CENTER OF THE COPY BOARD OF THE CAMERA; THE GLASS COVER OF THE COPY BOARD IS CLOSED TO HOLD THE DOCUMENT IN PLACE; THE COPY BOARD IS TURNED UP TO POSITION IT IN FRONT OF THE CAMERA LENS.

6.1.2. BELOW IS A DRAWING OF THE TOTAL CAMERA III:

VISUAL GRAPHICS'S TOTAL CAMERA III
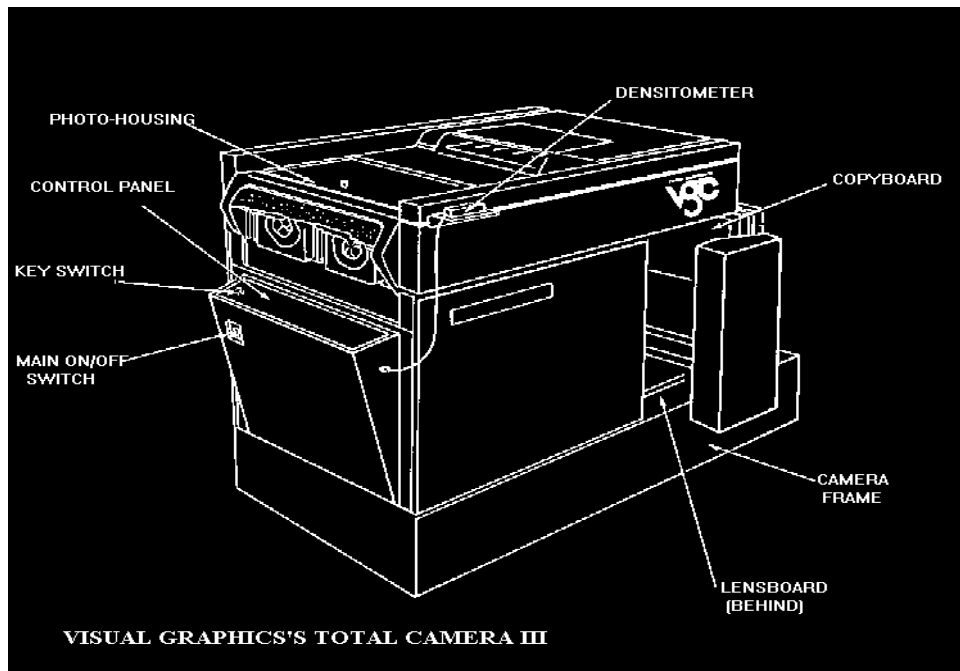
6.2. **IN ORDER TO MAKE A 1:1 PHOTOGRAPH SET THE KEY PAD WHICH IS FOUND ON THE LEFT SIDE OF THE CONTROL PANEL TO 100%. PRESS THE % ENLARGEMENT KEY AND THEN THE START KEY . YOU CAN ALSO REDUCE DOWN TO 33% AND ENLARGE UP TO 300% WITH THIS CAMERA.**

6.3. **NEXT SET THE LENS APERTURE ON F-22 AND ENTER 10 SECONDS ON THE TIMER KEY PAD. AFTER MAKING ONE TEST PHOTOGRAPH, YOU MAY WANT TO DARKEN THE NEXT PRINT BY SHORTENING THE EXPOSURE TIME OR LIGHTEN THE PRINT WITH A LONGER EXPOSURE TIME.**

6.4. **THE NEXT STEP IS TO LOAD THE PAPER OR FILM. INSIDE THE CAMERA (PHOTO-HOUSING) IS A FORMATTED PLASTIC SCREEN BEARING INDICATORS FOR VARIOUS SIZES OF PAPER AND FILM. THE PLASTIC SCREEN IS DIVIDED IN HALF. USING THE ARM ACCESS HOLES, GRASP THE TOP OF**

THE FRONT HALF OF THE SCREEN AND FOLD IT OVER.

6.4.1.   **REMOVE THE APPROPRIATE SIZE OF PAPER FROM THE PAPER SAFE WHICH IS IN THE BACK OF THE CAMERA CHAMBER. ALIGN THE PAPER USING THE PLACEMENT INDICATORS AND FOLD THE PLASTIC SCREEN DOWN.**

6.4.2.   **TURN ON THE VACUUM FAN. WHICH IS ON THE LEFT SIDE OF THE CONTROL PANEL.**

6.5.   **PRESS THE EXPOSURE BUTTON WHICH OPENS THE CAMERA SHUTTER AND TURNS ON THE COPY LIGHTS FOR THE AMOUNT OF TIME SET ON THE TIMER.**

6.6.   **AFTER THE PAPER HAS BEEN EXPOSED, TURN OFF THE VACUUM FAN, AND REMOVE THE PAPER FROM UNDER THE PLASTIC SCREEN.**

6.7.   **THE PAPER IS NOW READY TO BE PROCESSED. PLACE THE PAPER IN THE REAR PORTION OF THE CAMERA CHAMBER. THE ROTATING PROCESSOR ROLLERS WILL PICK UP THE PAPER AND CHANNEL IT THROUGH THE DEVELOPING TANKS (DEVELOPER, FIX, RINSE WASH TANKS) PRODUCING A DRY FINISHED PHOTOGRAPHIC. THE FINISHED PRINT WILL EXIT THE MACHINE ON THE EXTERIOR TOP.**

REFERENCES:

Visual Graphics Corporation's "Operation and Maintenance Manual Total Camera III".

Visual Graphics Corporation's "How to Produce Halftones, Line Conversions and Other Special Effects With Your VGC Camera".

Sanders, Robert C., "Questioned Documents Photography Techniques" The Evidence Photographer's International Council's Workshop (Atlanta, Ga. April 13 thru 15, 1980), pp. 1-29.

Young, W. Arthur, Thomas A. Benson, George T. Eaton, Kodak's "Copying and Duplication in Black-and-White and Color", Publication #M-1, 1984.

TECHNICAL PROCEDURES MANUAL AUTHORITY ENDORSEMENT

SECTION I.6

I HAVE REVIEWED THE TECHNICAL PROCEDURES FOR USING THE VISUAL GRAPHICS CORP TOTAL CAMERA III AND APPROVE THESE PROCEDURES FOR USE BY THE NORTH CAROLINA STATE BUREAU OF INVESTIGATION FORENSIC ANALYST UNDER MY SUPERVISION.

SIGNED_____ **DATED**_____
DAVID C. DUNN
SUPERVISING AGENT IN CHARGE
NCSBI QUESTIONED DOCUMENTS SECTION

_____

_____

TECHNICAL PROCEDURE TERMINATION AND ARCHIVE:

EFFECTIVE THIS_____**DAY OF**_____**OF THE YEAR**_____,
THE USE OF THIS PROCEDURE IS HEREBY DISCONTINUED BY MY AUTHORITY AND BEING PLACED IN THE HISTORICAL AND ARCHIVAL SECTION OF THIS MANUAL FOR REFERENCE.(REFER TO SECTION K)

SIGNED:_____**TITLE:**_____.

I.7. USING THE WILD MZ8 STEREO MICROSCOPE FOR IMAGING

This type of imaging is used by the Questioned Documents Section to see magnification of the details on documents not visible to the eye. This allows the examiner to see toner beads from photocopying, indentions from indented writing and if paper fibers have been disturbed. The Wild MZ8 is a modern steromicroscope which through innovation in design and technology allows the examiner to see many of the details not visible to the naked eye.

Imaging is accomplished by attaching a color Panasonic Digital 5000 video camera to the Wild MZ8 and acquiring the image digitized with our Ibis software and the Ibis 486 computer system.

This type of imaging must be carried out in an area designed for this activity where one can control the type and intensity of lighting. The type of lighting normally used is a ring light or fiber optics light tubes.

The following steps are used to produce images from the Wild MZ8.

7.1. PLACE THE QUESTIONED DOCUMENT UNDER THE MICROSCOPE STAGE.

7.2. TURN ON THE PANASONIC DIGITAL 5000 VIDEO CAMERA

7.3. TURN ON THE RING LIGHT OR THE FIBER OPTICS LIGHTS

7.4. ADJUST THE MICROSCOPE

7.4.1. BELOW IS A PHOTOGRAPH SHOWING THE DIFFERENT CONTROLS OF THE WILD MZ8:
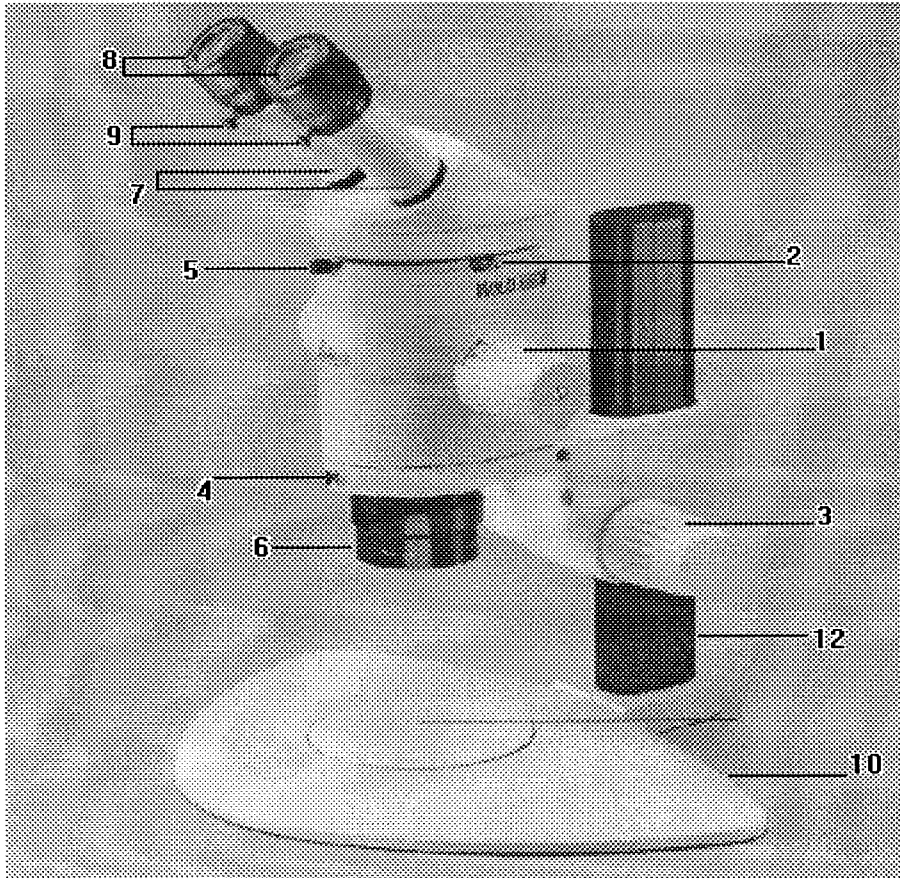
#1- MAGNIFICATION CHANGER 8:1 ZOOM

#2-KNURLED RING ENGAGES THE 8 MAGNIFICATION STEPS.

#3-FOCUSING DRIVE: LARGER KNOB IS COARSE FOCUSING SMALLER KNOB IS THE FINE FOCUSING.

#4-SECURING SCREW: HOLDS THE OPTICS CARRIER IN MICROSCOPE CARRIER.

#5-SECURING SCREW: HOLDS THE BINOCULAR TUBE TO THE OPTICS CARRIER.

#6-1.0X PLANO OBJECTIVE

#7-ADJUSTABLE EYEPIECE TUBES: INTERPUPILLARY
     DISTANCE   IS ADJUSTABLE

#8-WIDE ANGLE EYEPIECES FOR SPECTACLE WEARERS

#9-SECURING SCREWS WHICH HOLD THE EYEPIECES IN
     THE BINOCULAR TUBE

#10-INCIDENT-LIGHT BASE

#11-STAGE PLATE

#12-SIDE-FACED COLUMN WITH FOCUSING DRIVE HOUSING

7.4.2.   ZOOM IN ON THE SUBJECT USING #1.

7.4.3.   FOCUS ON THE SUBJECT USING #3.

7.5. USING THE IBIS SOFTWARE PACKAGE ON A 486 COMPUTER
      WITH AT LEAST 16 MB OF RAM, ACQUIRE THIS IMAGE
      DIGITALLY ON CONTINUOUS ACQUIRE.

      7.5.1 UNDER THE SELECT CAMERA OPTION SELECT
            THE RS-170.

7.6. BELOW IS THE ACQUIRE MENU   FROM THE IBIS
      PROGRAM. CLICK ON CONTINUOUS ACQUIRE.

MANY TIMES IF THE IMAGE
IS FAINT THE GATE VIDEO
INPUT OPTION IS USED (SET
AT #2 OR #3 TO START WITH).
THIS PROCEDURE WILL
INCREASE THE DENSITY OF
THE IMAGE.

```
Acquire

Continuous Acquire
      Single Acquire
Select Camera
   Gate Video Input
Clear Screen
      Acquire with Filter
```

7.7. USE THE CONTRAST MENU TO CHANGE THE CONTRAST OR BRIGHTNESS IN THE IMAGE:

```
Contrast

Slide and Stretch
    Auto-Fit
   Inverse
        Equalization
   Binarize
```
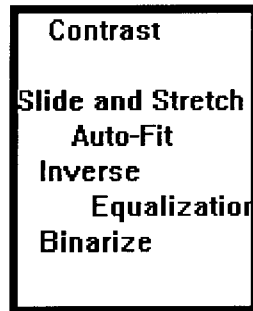
7.7.1. SLIDE AND STRETCH: WITH THIS SELECTION A SLIDER BAR IS ACTIVATED DISPLAYING VALUES OF 0.5 TO 3.0 UNITS OF DENSITY. BY MOVING THE MOUSE; CLICK ON THE LEFT MOUSE BUTTON WHEN OPTIMUM DENSITY IS OBTAINED.

7.7.2. AUTO-FIT: AUTOMATICALLY SELECTED WHAT THE COMPUTER FEELS IS THE CORRECT CONTRAST

7.7.3. INVERSE: PRODUCES AN IMAGE WHICH IS A NEGATIVE IMAGE.

7.8. SELECT THE SHARPEN OPTION AND CLICK ONCE USING THE LEFT BUTTON ON THE MOUSE.
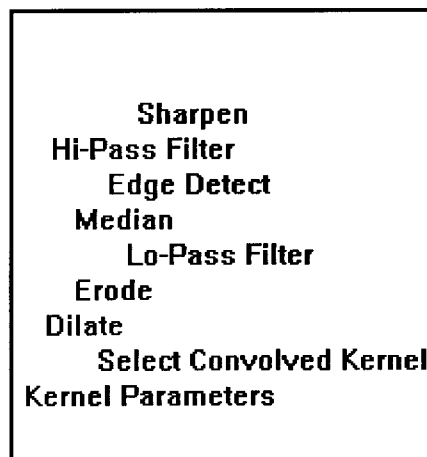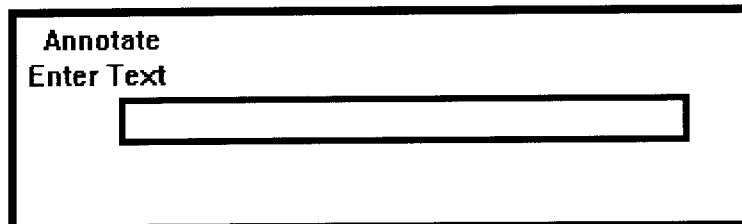
```
        Sharpen
  Hi-Pass Filter
        Edge Detect
     Median
         Lo-Pass Filter
     Erode
  Dilate
        Select Convolved Kernel
  Kernel Parameters
```

FILTERING CAN BE USED TO SHARPEN OR BLUR AN IMAGE,
TO ENHANCE HIGH FREQUENCY DETAILS, TO DETECT
EDGES, OR TO LIGHTEN OR DARKEN AN OVERALL IMAGE
BY EXPANDING LIGHT OR DARK AREAS.

7.8.1. TO SHARPEN AN IMAGE USE THE <u>HI-PASS</u> OR <u>SHARPEN</u>
FILTERING OPTIONS.

7.8.2. TO BLUR AN IMAGE, USE THE <u>LO-PASS</u> OR MEDIAN
FILTERING   OPTIONS.

7.8.3. TO DETECT OR ENHANCE EDGES IN AN IMAGE,
SELECT THE SOBEL, PHASE, OR
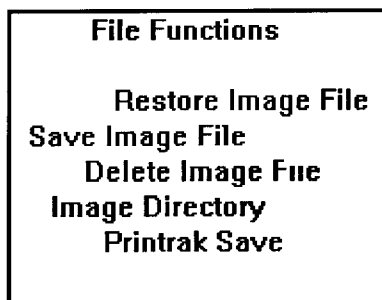HORIZONTAL,VERTICAL, LAPLACIAN,
AND ROBERS FILTERS AS SUBMENU CHOICES.

7.9. SELECT THE ANNOTATE OPTION:

Annotate
Enter Text

WITH THIS YOU CAN ENTER TEXT AND CASE NO.
ON YOUR IMAGE.

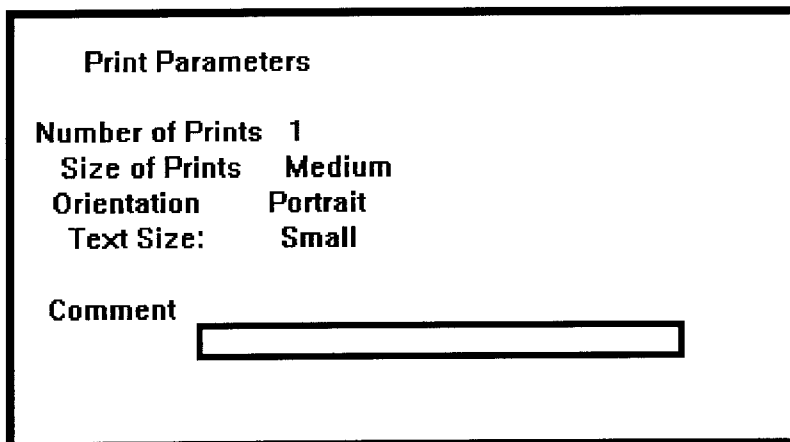**7.10. NEXT WE SAVE THE IMAGE TO A COMPUTER FILE BY SELECTING FILE FUNCTION.**

```
┌─────────────────────────┐
│      File Functions     │
│                         │
│        Restore Image File│
│   Save Image File       │
│        Delete Image File│
│   Image Directory       │
│        Printrak Save    │
│                         │
└─────────────────────────┘
```

7.10.1.   FROM THIS MENU PERFORM ALL FILE FUNCTIONS:

SAVE A FILE

PULL UP A FILE FROM MEMORY,

OR DELETE AN IMAGE FILE.

7.11. PRINT THE IMAGE BY SELECTING THE PRINT OPTION:

```
┌──────────────────────────────────┐
│                                  │
│     Print Parameters             │
│                                  │
│  Number of Prints   1            │
│     Size of Prints    Medium     │
│     Orientation       Portrait   │
│      Text Size:       Small      │
│                                  │
│  Comment  ┌────────────────────┐ │
│           │                    │ │
│           └────────────────────┘ │
│                                  │
│                                  │
└──────────────────────────────────┘
```

c:\document\mz8.wpd

REFERENCES:

Barnes, David, " Document Processing System User's Manual", IBIS Imaging
       Systems

Delly, John Grutav, "Photography Through the Microscope" Kodak
       publication No. P-2, 1980.

Wild/Leica's "Wild MZ 8 User Manual", Switzerland, 1994.

TECHNICAL PROCEDURES MANUAL AUTHORITY ENDORSEMENT

SECTION I.7

I HAVE REVIEWED THE TECHNICAL PROCEDURES FOR USING
THE WILD MZ8 STEREO MICROSCOPE FOR IMAGING AND
APPROVE THESE PROCEDURES FOR USE BY THE NORTH
CAROLINA STATE BUREAU OF INVESTIGATION FORENSIC
ANALYST UNDER MY SUPERVISION.

SIGNED _David C. Dunn_   DATED _7-1-96_
DAVID C. DUNN
SUPERVISING AGENT IN CHARGE
NCSBI QUESTIONED DOCUMENTS SECTION

TECHNICAL PROCEDURE TERMINATION AND ARCHIVE:

EFFECTIVE THIS_____DAY OF_____OF THE YEAR_____,
THE USE OF THIS PROCEDURE IS HEREBY DISCONTINUED BY MY
AUTHORITY AND BEING PLACED IN THE HISTORICAL AND
ARCHIVAL SECTION OF THIS MANUAL FOR REFERENCE.(REFER
) SECTION K)

SIGNED:_____TITLE:_____.

NCSBI QUESTIONED DOCUMENTS SECTION

I.8. USING THE LEITZ COMPARISON MACRO SCOPE FOR IMAGING

This type of imaging is used by the Questioned Documents Section to bring two separated images into the same field of view so that the magnified images may be compared for size, color, texture, composition, and shape.

Imaging is accomplished by attaching a color Panasonic Digital 5000 video camera to the Wild MZ8 and acquiring the image digitized with the Ibis software and the Ibis 486 computer system.

This type of imaging must be carried out in an area designed for this activity where one can control the type and intensity of lighting. The type of lighting normally used is fiber optics light tubes or small adjustable quartz lights.

The following steps are used to produce images from the Leitz Comparison MACRO SCOPE:

8.1.　PLACE THE QUESTIONED DOCUMENT ON TO THE OBJECT STAGE.

8.2.　TURN ON THE PANASONIC DIGITAL 5000 VIDEO CAMERA

8.3.　TURN ON THE ADJUSTABLE QUARTZ LIGHTS.

8.4.　ADJUST THE OBJECT STAGES WITH THE CONTROL KNOB (FIG. 8 & 9) SO THAT ABOUT HALF THE SETTING RANGE OF THE RACK-AND-PINION MOTION IS UTILIZED.

8.5.　PLACE FLAT IDENTICAL OBJECTS OF HIGH DIFFUSED REFLECTIONS (e.g. COINS) ON THE OBJECT STAGES.

8.5.1. SWITCH ON THE LIGHTS AND DIRECT THEM ROUGHLY AT THE CENTER OF THE STAGES.

8.6 FOCUS THE IMAGES.

8.7. BELOW IS A PHOTOGRAPH SHOWING THE DIFFERENT CONTROLS OF THE WILD MZ8:
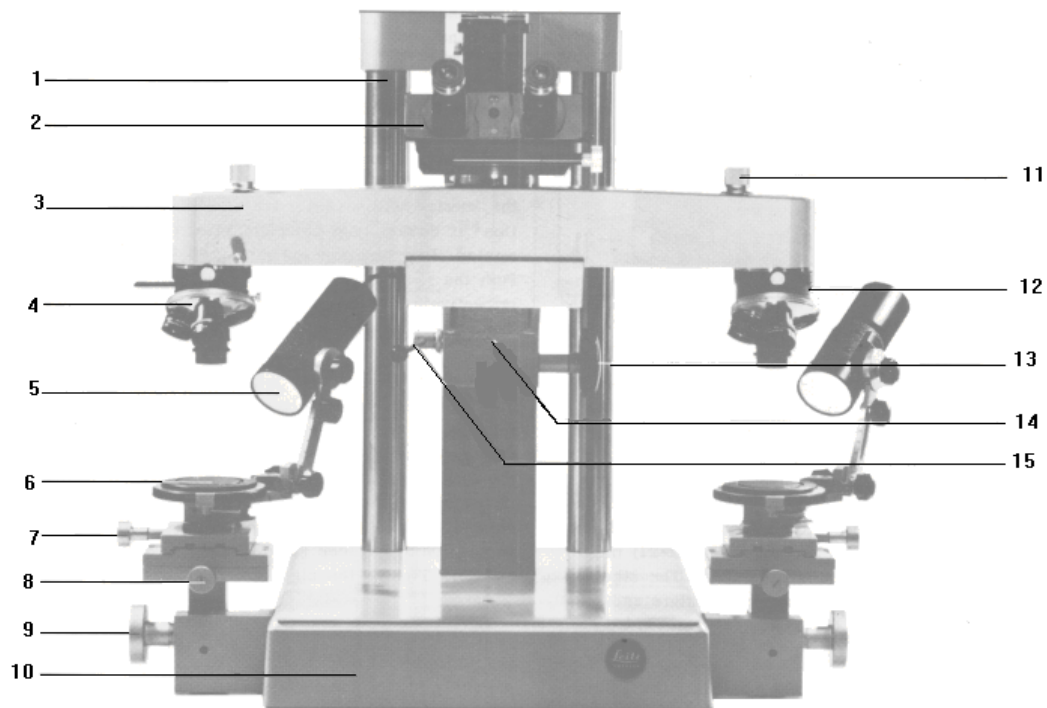
#1-TWIN COLUMN

#2-BINOCULAR PHOTO TUBE

#3-COMPARISON BRIDGE

#4-QUADRUPLE REVOLVING NOSEPIECE

#5-QUARTZ LAMP

#6-OBJECT STAGE

#7-KNURLED KNOB FOR ADJUSTMENT IN X-DIRECTION

#8-KNURLED KNOB FOR THE ADJUSTMENT IN Y-DIRECTION

#9-KNURLED KNOB FOR THE VERTICAL ADJUSTMENT OF THE OBJECT STAGE

#10-BASEPLATE

#11-KNURLED KNOB FOR TURNING IN THE HALF-STOPS

#14-CARRIER RAIL WITH TUBE CARRIER

#15-ARRESTING LEVER FOR THE VERTICAL ADJUSTMENT OF THE COMPARISON BRIDGE

8.8.   USING THE IBIS SOFTWARE PACKAGE ON A 486 COMPUTER WITH AT LEAST 16 MB OF RAM, ACQUIRE THIS IMAGE DIGITALLY ON CONTINUOUS ACQUIRE.

8.8.1   UNDER THE SELECT CAMERA OPTION SELECT THE RS-170.

8.9.   BELOW IS THE ACQUIRE MENU FROM THE IBIS PROGRAM. CLICK ON CONTINUOUS ACQUIRE.
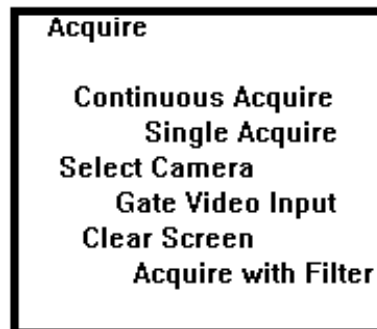
Acquire

Continuous Acquire
Single Acquire
Select Camera
Gate Video Input
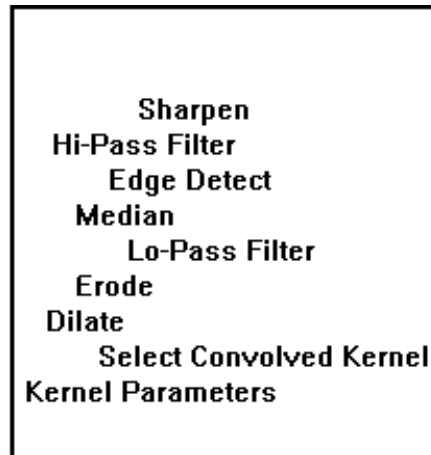Clear Screen
Acquire with Filter

MANY TIMES IF THE IMAGE IS FAINT THE <u>GATE VIDEO</u> INPUT OPTION IS USED (SET AT #2 OR #3 TO START WITH). THIS PROCEDURE WILL INCREASE THE DENSITY OF THE IMAGE.

8.10. USE THE CONTRAST MENU TO CHANGE THE CONTRAST OR BRIGHTNESS IN THE IMAGE:

Contrast

Slide and Stretch
Auto-Fit
Inverse
    Equalization
Binarize
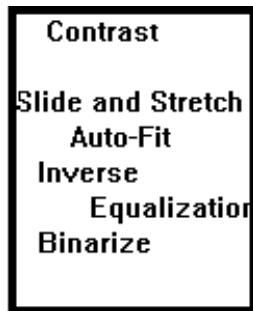
8.10.1. <u>SLIDE AND STRETCH</u>: WITH THIS SELECTION A SLIDER BAR IS ACTIVATED DISPLAYING VALUES OF 0.5 TO 3.0 UNITS OF DENSITY, BY MOVING THE MOUSE CLICK ON THE LEFT MOUSE BUTTON WHEN DESIRED DENSITY IS OBTAINED.

8.10.2. <u>AUTO-FIT</u>: AUTOMATICALLY SELECTED WHAT THE COMPUTER FEELS IS THE CORRECT CONTRAST

**8.10.3. <u>INVERSE</u>: PRODUCES AN IMAGE WHICH IS A NEGATIVE IMAGE.**

**8.11. SELECT THE SHARPEN OPTION; NORMALLY ONE
       CLICK ON SHARPEN IS SUFFICIENT.**

```
Sharpen
Hi-Pass Filter
      Edge Detect
   Median
         Lo-Pass Filter
      Erode
Dilate
         Select Convolved Kernel
Kernel Parameters
```

**FILTERING CAN BE USED TO SHARPEN OR BLUR AN IMAGE,
TO ENHANCE HIGH FREQUENCY DETAILS, TO DETECT
       EDGES, OR TO LIGHTEN OR DARKEN AN OVERALL IMAGE
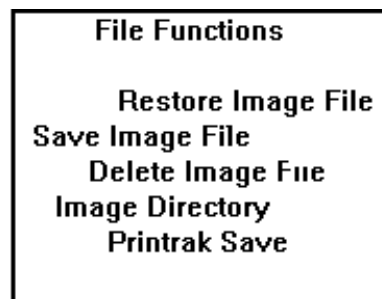   BY EXPANDING LIGHT OR DARK AREAS.**

**8.11.1.   TO SHARPEN AN IMAGE USE THE <u>HI-PASS</u> OR <u>SHARPEN</u>
              FILTERING OPTIONS.**

**8.11.2.   TO BLUR AN IMAGE, USE THE <u>LO-PASS</u> OR MEDIAN
              FILTERING   OPTIONS.**

**8.11.3.   TO DETECT OR ENHANCE EDGES IN AN IMAGE,
              SELECT THE SOBEL, PHASE, OR
              HORIZONTAL,VERTICAL, LAPLACIAN,
              AND   ROBERS FILTERS AS SUBMENU CHOICES.**

8.12. SELECT THE ANNOTATE OPTION:

```
Annotate
Enter Text
┌─────────────────────────┐
│                         │
└─────────────────────────┘
```
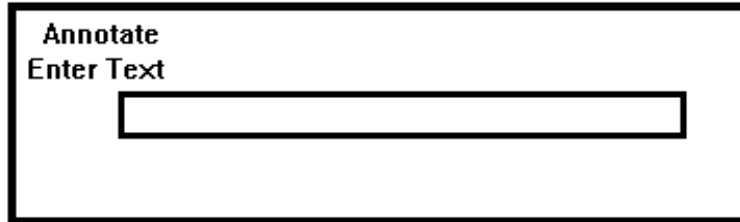
WITH THIS YOU CAN ENTER TEXT AND CASE NO.
ON YOUR IMAGE.

8.13. SAVE THE IMAGE TO A COMPUTER FILE BY
SELECTING FILE FUNCTION.

```
File Functions

        Restore Image File
Save Image File
     Delete Image File
Image Directory
      Printrak Save
```

8.14. FROM THIS MENU FILE FUNCTIONS INCLUDE:

SAVE A FILE

PULL UP A FILE FROM MEMORY,

OR DELETE AN IMAGE FILE.

8.15. PRINT THE IMAGE BY SELECTING THE PRINT OPTION:

Print Parameters

Number of Prints   1
  Size of Prints   Medium
  Orientation   Portrait
   Text Size: Small

Comment

REFERENCES:

Barnes, David, " <u>Document Processing System User's Manual</u>", IBIS Imaging Systems

Delly, John Grutav, "<u>Photography Through the Microscope</u>" Kodak publication No. P-2, 1980.

Leitz/Wetzlar, "<u>Comparison Macroscope (Bench Stand) Instructions</u>" W-Germany

c:\document\comp.wpd

TECHNICAL PROCEDURES MANUAL AUTHORITY ENDORSEMENT

SECTION I.8

I HAVE REVIEWED THE TECHNICAL PROCEDURES FOR USING THE LEITZ COMPARISON MACRO SCOPE FOR IMAGING AND APPROVE THESE PROCEDURES FOR USE BY THE NORTH CAROLINA STATE BUREAU OF INVESTIGATION FORENSIC ANALYST UNDER MY SUPERVISION.

SIGNED_____ DATED_____
DAVID C. DUNN
SUPERVISING AGENT IN CHARGE
NCSBI QUESTIONED DOCUMENTS SECTION

_____

_____

TECHNICAL PROCEDURE TERMINATION AND ARCHIVE:

EFFECTIVE THIS_____DAY OF_____OF THE YEAR_____, THE USE OF THIS PROCEDURE IS HEREBY DISCONTINUED BY MY AUTHORITY AND BEING PLACED IN THE HISTORICAL AND ARCHIVAL SECTION OF THIS MANUAL FOR REFERENCE.(REFER TO SECTION K)

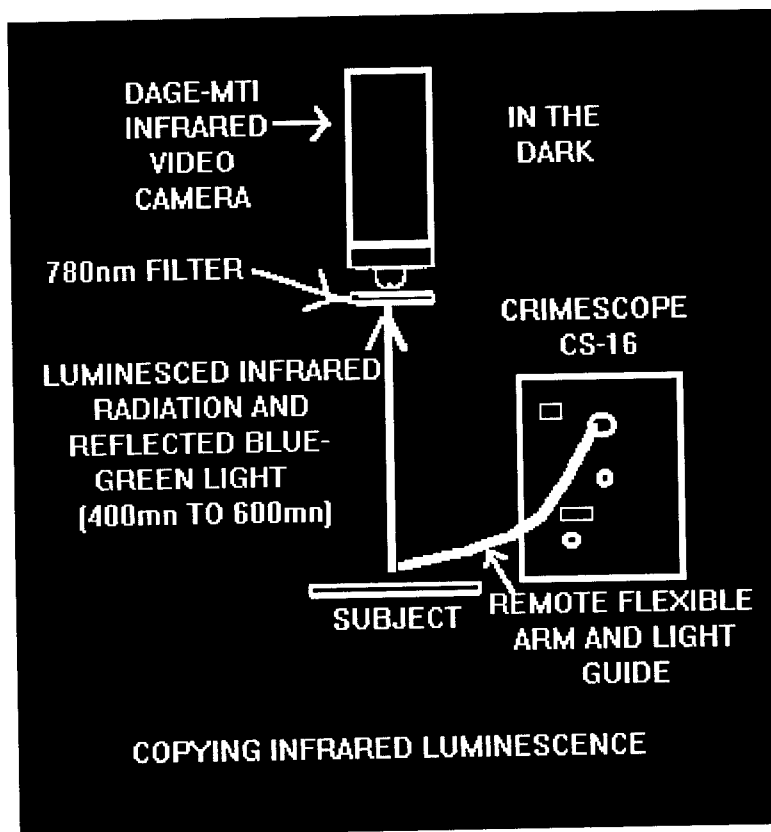**SIGNED:_____TITLE:_____.**

I.9.THE CRIMESCOPE CS-16

The Crimescope CS-16 is tunable forensic light source using a high intensity xenon lamp. This type of light source is used by the Questioned Documents Section for infrared reflectance, infrared luminescence and ultraviolet reflectance and fluorescent imaging.

In infrared reflectance, obscuring matter such as bank stamps, white out, or any other obliterating writing of any sort, is removed when the substance is transparent to infrared light.
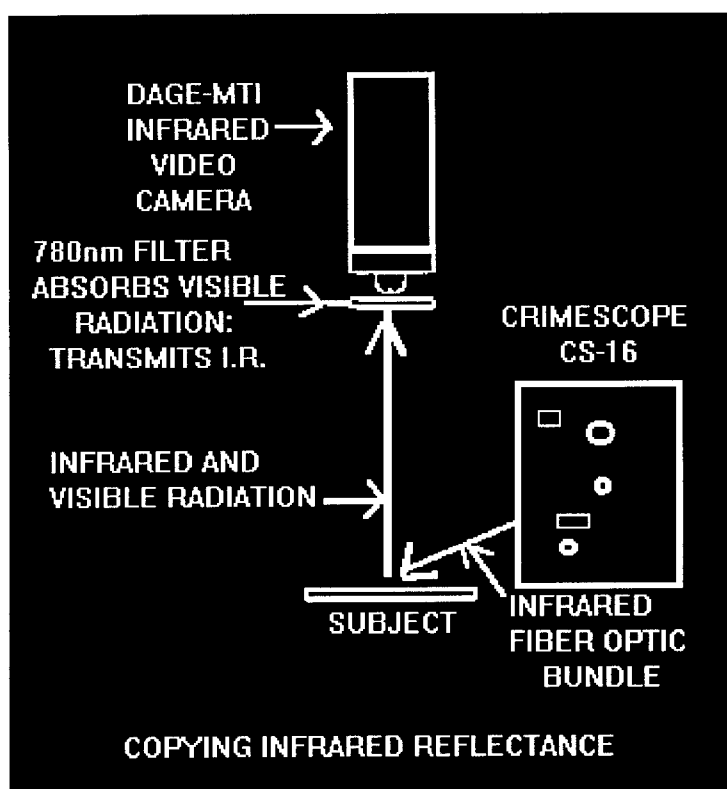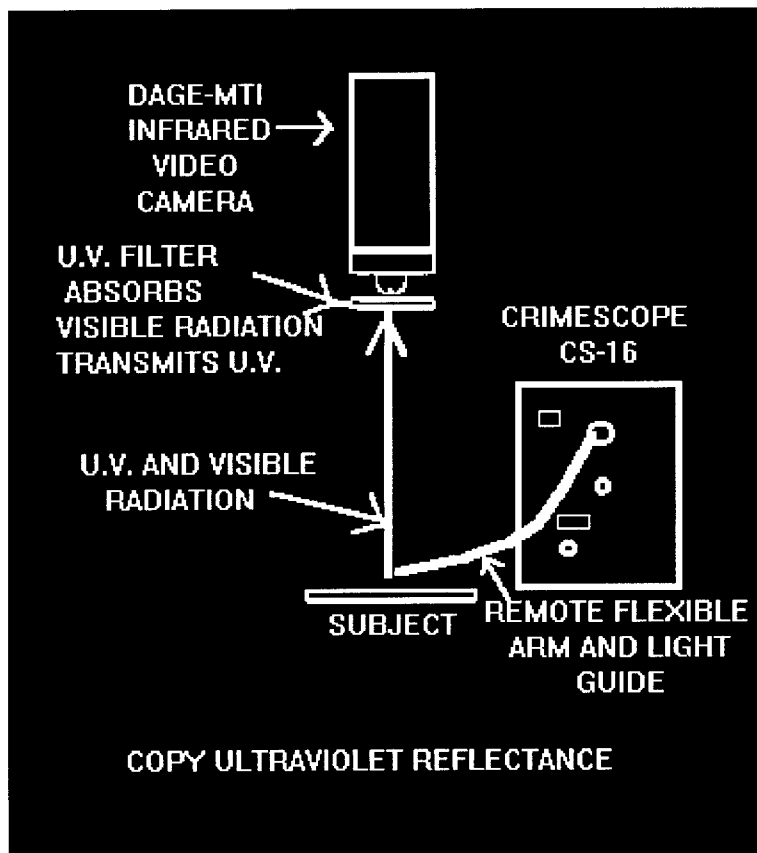

In infrared luminescence, it is necessary to show the differences in inks which normally appear the same to the naked eye. The exposing of the questioned document to ultraviolet radiation (400nm to 600nm) from the crimescope CS-16 will cause the specimen (many times) to emit radiation in the red and infrared (600nm to 1200nm) part of the spectrum. One of four basic phenomena can be observed occurring with the document using this technique. The document may be observed reflecting the energy (lighten); absorbing the

energy (darken); transmitting the energy (disappear); or converting the energy to a longer wavelength (luminesce).

DAGE-MTI INFRARED → VIDEO CAMERA

IN THE DARK

780nm FILTER

CRIMESCOPE CS-16

LUMINESCED INFRARED RADIATION AND REFLECTED BLUE-GREEN LIGHT (400mn TO 600mn)

SUBJECT   REMOTE FLEXIBLE ARM AND LIGHT GUIDE
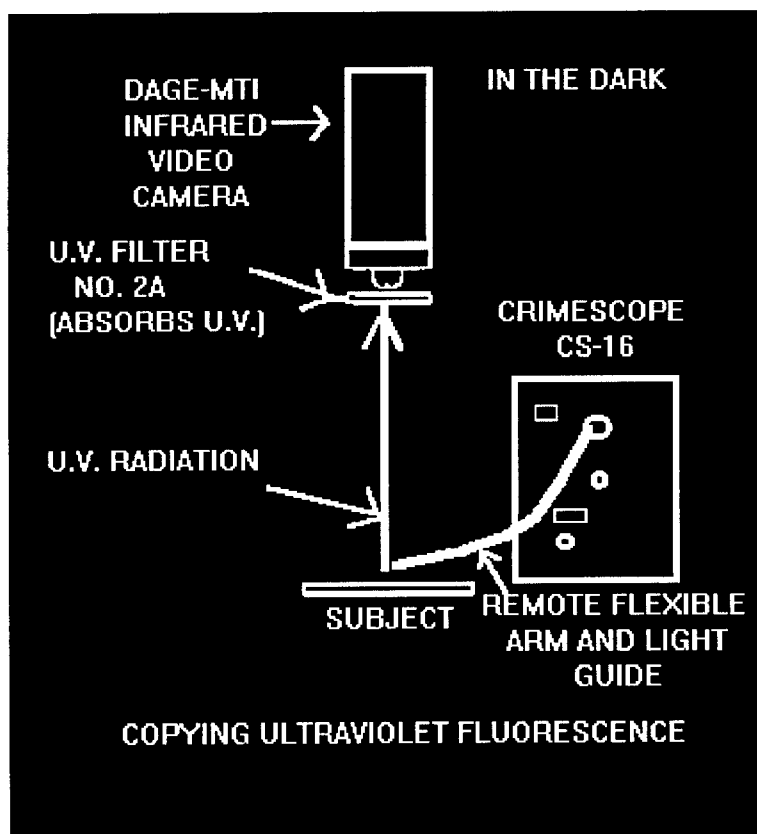
COPYING INFRARED LUMINESCENCE

In both infrared reflectance and luminescence, use is made of the invisible infrared rays as distinguished from the visible rays of the spectrum. A special filter (780nm or a Kodak Wratten #87) is placed in front of the DAGE-MTI infrared video camera lens to exclude the visible rays and allow only the infrared rays to reach the camera tube. This leaves a clear reproduction of the inks luminescence in the red and infrared part of the spectrum.

In ultraviolet reflectance the document is illuminated by the Crimescope CS-16 with ultraviolet radiation, and a filter is placed over the lens (UV filter) of the video camera that transmits only the ultraviolet radiation.

DAGE-MTI
INFRARED →
VIDEO
CAMERA

U.V. FILTER
ABSORBS
VISIBLE RADIATION
TRANSMITS U.V.

CRIMESCOPE
CS-16

U.V. AND VISIBLE
RADIATION

SUBJECT   REMOTE FLEXIBLE
ARM AND LIGHT
GUIDE

COPY ULTRAVIOLET REFLECTANCE

In ultraviolet fluorescence, certain materials absorb ultraviolet radiation and emit light they fluoresce. The document is illuminated by the Crinescope CS-16 with ultraviolet radiation and a filter (UV) is placed over the video camera's lens to absorb the ultraviolet radiation and allow only the florescence to be seen.

DAGE-MTI   IN THE DARK
INFRARED →
VIDEO
CAMERA

U.V. FILTER
NO. 2A
[ABSORBS U.V.]

CRIMESCOPE
CS-16

U.V. RADIATION

SUBJECT   REMOTE FLEXIBLE
ARM AND LIGHT
GUIDE

COPYING ULTRAVIOLET FLUORESCENCE

This type of imaging must be carried out in an area designed for this activity where one can control the type and intensity of lighting and have complete darkness.

Note: WARNING, Light emitted can result in blindness if pointed at the eyes. Use proper protective goggles!

The following steps are used needed when using the Crimescope CS-16.

9.1. TURN ON THE CRIMESCOPE CS-16 BY USING THE TWO SWITCHES (ONE FOR THE LAMP AND THE OTHER FOR THE FAN) ON THE BACK OF THE UNIT.

9.1.1. 1-3 SECONDS ARE NECESSARY FOR THE LAMP TO LIGHT. IF THE LAMP DOESN'T IGNITE, TURN OFF THE LAMP AND FAN AND TRY AGAIN AFTER 30 SECONDS.

9.2. AS SOON AS THE LAMP IS ON, THE UNIT WILL AUTOCALIBRATE ITSELF, AND WILL BRING UP THE CSS (CRIME SEAN SEARCH FILTER) YOU WILL NOW SEE A BRIGHT BLUE SPOT.

9.3. BELOW IS A DRAWING OF THE FRONT PANEL OF THE CRIMESCOPE CS-16.
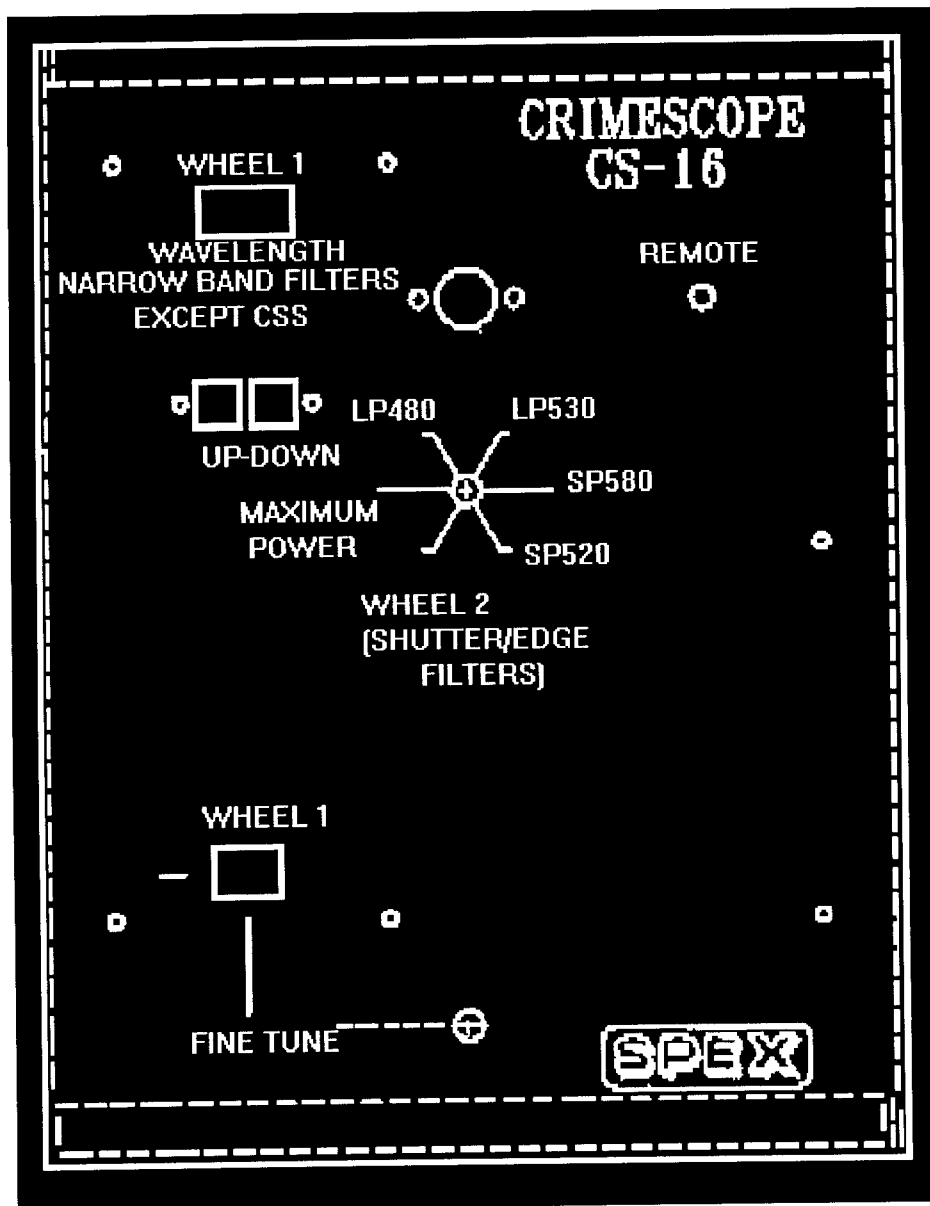
9.3.1 WHEEL 1 HAS 15 POSITIONS (14 WITH BANDPASS FILTERS) AND ONE FOR WHITE LIGHT.

THE CENTER WAVELENGTH IS INDICATED ON THE TOP DIGITAL DISPLAY. A FINE TUNE SHIFTS (NEGATIVE NUMBERS) IS INDICATED ON THE LOWER DISPLAY.

9.4. WHEEL 2 IS MANUAL AND CONTROLLED FROM THE MANUAL KNOB ON THE FRONT PANEL.

9.4.1 THIS WHEEL HAS 12 POSITIONS: LP480, S, LP530, S, LP580, S, LP520, S, MAXIMUM POWER, S, MAXIMUM POWER, AND S. THE S POSITIONS BETWEEN THE LABELED POSITIONS ARE SHUTTER POSITIONS WHICH ARE USED TO TEMPORARILY BLOCK OUT THE LIGHT OUTPUT.

SP-520:   SHORTPASS FILTER (TRANSMITS ALL THE WAVELENGTHS BELOW THE CUT-OFF VALUE OF 520nm)
TRANSMITS NUV(NEAR UV)-VIOLET-BLUE
BLOCKS GREEN-YELLOW-ORANGE-RED

SP-580:   SHORTPASS FILTER (TRANSMITS ALL THE WAVELENGTHS BELOW THE CUT-OFF VALUE 580nm)
TRANSMITS NUV-VIOLET-BLUE-GREEN-YELLOW
BLOCKS RED

LP-480   LONGPASS FILTER (TRANSMITS ALL THE WAVELENGTHS ABOVE THE CUT-ON VALUE OF 480nm.
TRANSMITS GREEN-YELLOW-ORANGE-RED(LOOKS YELLOW)
BLOCKS UV-VIOLET-BLUE

9.5. RULES FOR USING THE TWO WHEELS:

9.5.1.   WHEN YOU ONLY WANT TO USE WHEEL 1 SET WHEEL 2 TO ONE OF TWO MAX. POWER SETTING (YOU MAY THEN USE WHEEL 2 TO ADJUST THE INTENSITY BY ROTATING IT TOWARDS A SHUTTER POSITION.

9.5.2. WHEN YOU ONLY WANT TO USE WHEEL 2(EDGE SHORTPASS/LONGPASS/FILTER SET WHEEL 1 TO "000".

9.5.3. TO USE BOTH WHEELS, COMBINE A BROAD BANDPASS FILTER (FOR EXAMPLE: CSS OR 575)) WITH AN EDGE FILTER (FOR EXAMPLE: LP-480)

9.6. FOR DOCUMENTS APPLICATIONS, START WITH WHEEL 2 SET ON LP480 OR LP530.

9.6.1. GO THRU ALL THE SETTINGS ON WHEEL 1 UNTIL A DESIRABLE RESULT IS FOUND

9.6.2. NEXT FINE TUNE USING THE BOTTOM WHEEL 1 FINE TUNE KNOB

9.6.3. THE BEST ANGLE FOR THE FLEXIBLE LIGHT GUIDE IS USUALLY 45 DEGREES FROM THE QUESTIONED DOCUMENT UNLESS OBLIQUE SIDE LIGHTING IS NEEDED IN ORDER TO SEE INDENTIONS

9.6.4. AT THIS POINT CAPTURE THE IMAGE USING THE DAGE-MTI INFRARED VIDEO CAMERA AND THE IBIS DIGITAL COMPUTER SYSTEM.

9.7. LATERAL OUTPUT: THE TWO PORTS ON THE LEFT SIDE ARE ULTRAVIOLET AND INFRARED ILLUMINATIONS.

97.1. THE INFRARED BEAM (630mn -1100nm) IS CONNECTED TO A ONE METER FIBER OPTIC BUNDLE. SLIDING THE FIBER OPTIC BUNDLE
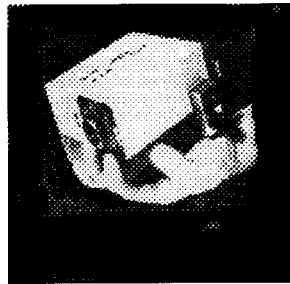
IN AND OUT ADJUSTED THE POWER.

9.7.2. THE UV OUTPUT PORT (280nm-380nm) IS RECOMMENDED FOR PHOTOGRAPHY WITH CONCENTRATED UV ILLUMINATION

SLIDE PUSHED-IN: <u>UV IS OFF</u>

SLIDE PUSHED-OUT: <u>UV IS ON</u>

9.8. <u>CS-IR-TUNE INSTRUCTIONS</u> (MONOCHROMATOR DEVICE):

THE CS-IR-TUNE IS A TUNABLE INFRARED ACCESSORY FOR THE CRIMESCOPE CS-16. THE PRIMARY APPLICATION IS FOR DISTINGUISHING BETWEEN THE SUBTLE DIFFERENCES IN INKS. THIS EXAM IS CONDUCTED IN COMPLETE DARKNESS, WITH THE INFRARED VIDEO CAMERA AND <u>NO FILTER</u> IN FRONT OF THE LENS.

9.8.1. INSTALL THE 1mm SLITS ON THE MAIN BOX (IN THE SLOTS).

9.8.2 CONNECT THE SHINY IR FIBER OPTIC BUNDLE TO THE IR PORT ON THE SIDE OF THE CS-16. MAXIMUM INTENSITY-PUSH IT ALL THE WAY

TO REDUCE INTENSITY-PULL THE BUNDLE OUT

9.8.3   THE CENTER WAVELENGTH IS CONTROLLED WITH THE MANUAL KNOB

> NOTE: WHEN THE COUNTER DISPLAYS A VALUE, THE ACTUAL WAVELENGTH IS TWICE THAT AMOUNT. FOR A VALUE OF 300 ON THE COUNTER, THE WAVELENGTH COMING OUT IS 600nm.

9.8.4   THE BEST WAVELENGTH RANGE FOR FORGED DOCUMENTS IS 560nm TO 1100mn, WHICH MEANS YOU SHOULD ALWAYS SCAN THE COUNTER FROM 280nm-450nm FOR EACH SAMPLE.

REFERENCES:

Barnes, David, " Document Processing System User's Manual", IBIS Imaging
Systems

Hilton, Ordway, "New Dimensions in Infrared Luminescence Photography",
Journal of Forensics Sciences, JFSCA, Vol. 26, No 2, April 1981, pp 319-
324.

Kodak's "Applied Infrared Photography", Publication #M-28, 1972 edition.
pp. 51-57.

Kodak's "Kodak Infrared Films", Publication #N-17, 1981 edition, pp. 2-7.

Sanders, Robert C., "Questioned Documents Photography Techniques" The
Evidence Photographer's International Council's Workshop (Atlanta,
Ga. April 13 thru 15, 1980), pp. 1-29.

Spex's "Crimescope CS-16 Tunable Forensic Light Source Operation &
Maintenance Instructions Application Manual", Edison, N.J.

Young, W. Arthur, Thomas A. Benson, George T. Eaton, Kodak's "Copying
and Duplication in Black-and-White and Color", Publication #M-1,
1984, pp. 50-53.

C:\DOCUMENT\SCOPE

TECHNICAL PROCEDURES MANUAL AUTHORITY ENDORSEMENT

SECTION I.9

I HAVE REVIEWED THE TECHNICAL PROCEDURES FOR THE
CRIMESCOPE CS-16 AND APPROVE THESE PROCEDURES FOR USE
BY THE NORTH CAROLINA STATE BUREAU OF INVESTIGATION
FORENSIC ANALYST UNDER MY SUPERVISION.

SIGNED _David C. Dunn_   DATED _7-1-96_
DAVID C. DUNN
SUPERVISING AGENT IN CHARGE
NCSBI QUESTIONED DOCUMENTS SECTION

_____

_____

TECHNICAL PROCEDURE TERMINATION AND ARCHIVE:

EFFECTIVE THIS_____DAY OF_____OF THE YEAR_____,
THE USE OF THIS PROCEDURE IS HEREBY DISCONTINUED BY MY
AUTHORITY AND BEING PLACED IN THE HISTORICAL AND
ARCHIVAL SECTION OF THIS MANUAL FOR REFERENCE.(REFER
TO SECTION K)

SIGNED:_____TITLE:_____.

## I.10.THE ELECTRO-STATIC INDENTED WRITING APPARATUS

The ESDA machine is an electro-static device that can detect and decipher indented writing better than any other method, including photography by oblique (side) lighting.

This type of imaging must be carried out in an area designed for this activity which has good ventilation.

Below is a photograph of the ESDA machine:
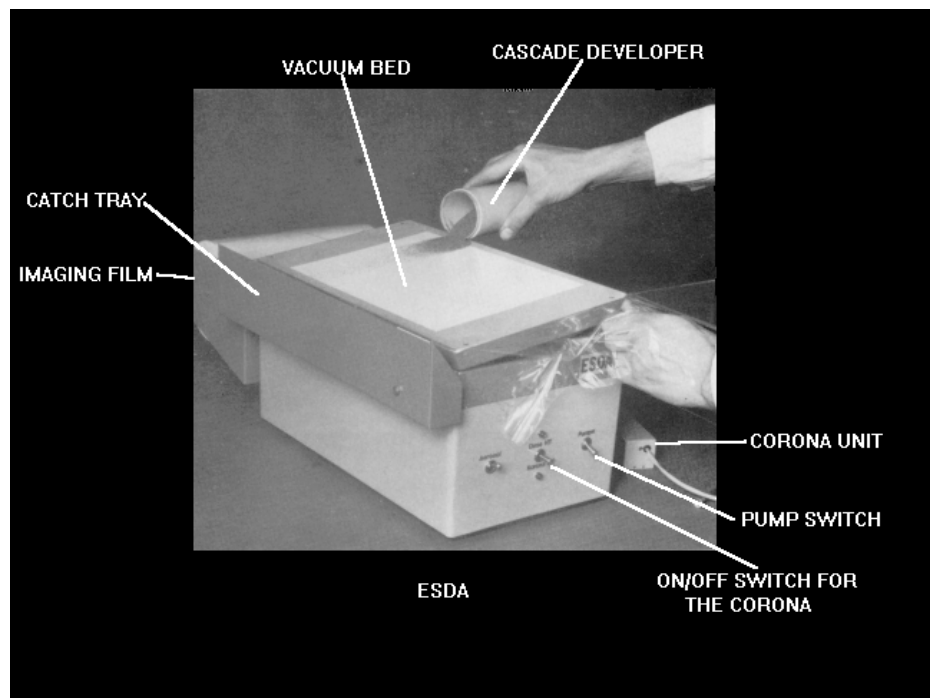
The following steps are used to detect and decipher indented writing with the ESDA machine:

10.1. TURN ON THE PUMP SWITCH

10.2. PLACE THE DOCUMENT ON THE VACUUM BED

10.2.1   GLOVES SHOULD BE USED AS THE ESDA DEVELOPS FRESH FINGERPRINTS AS WELL AS INDENTATIONS

10.3. DRAW A SUFFICIENT LENGTH OF THE IMAGING FILM FROM THE REEL TO COMPLETELY COVER THE WHOLE VACUUM BED.

10.3.1. LOWER THE FILM ONTO THE DOCUMENT TAKING CARE TO MINIMIZE CREASES IN THE FILM. ANY WRINKLES WHICH ARE FORM CAN USUALLY BE REMOVED BY GENTLY PULLING AT THE SIDE OF THE FILM.

10.3.2. THE SURFACE OF THE FILM ABOVE THE DOCUMENT SHOULD NOT BE TOUCHED AS THESE MARKS WILL ALSO BE DEVELOPED.

10.3.3. CUT THE FILM FROM THE REEL AT THE BACK OF THE VACUUM BED.

10.4. SWITCH THE CORONA SWITCH ON

10.4.1. PASS THE CORONA UNIT BACKWARDS AND FORWARDS ABOVE THE DOCUMENT FOR TWO OR THREE TIMES.

10.4.2. <u>CAUTION</u>: THE CORONA UNIT CONTAINS A HIGH VOLTAGE WIRE; HANDLE WITH CARE -DO NOT TOUCH THE CORONA WIRE.

10.4.3. TURN THE CORONA OFF

10.5. RAISE THE VACUUM BED TO A SLIGHT ANGLE

10.5.1. POUR THE CASCADE DEVELOPER ONTO THE SLOPING SURFACE SO THAT IT FLOWS OVER THE RELEVANT AREA OF THE DOCUMENT. CONTINUE UNTIL A SUITABLE IMAGE IS OBTAINED.

10.6. FIXING THE IMAGE:

10.6.1 PEEL THE BACKING FROM THE SHEET OF

TRANSPARENT ADHESIVE FILM AND CAREFULLY LAY THE FILM OVER THE DEVELOPED IMAGES.

10.6.2.   TAKE CARE TO AVOID THE INCLUSION OF AIR BUBBLES.

10.6.3.   RUB FIRMLY OVER THE SURFACE WITH A WAD OF COTTON WOOL OR TISSUE PAPER TO ENSURE GOOD ADHESION BETWEEN THE TWO FILMS.

10.6.4   PEEL THE FIXED TRANSPARENCY FORM THE ORIGINAL DOCUMENT.

10.7. THE CASCADE DEVELOPER IN THE CATCH TRAY CAN BE RECOVERED AND REUSED BY TILTING THE TRAY.

REFERENCES:

Foster & Freeman Ltd., "ESDA Operating Instructions"

Robert C. Sanders, "Questioned Documents Photography Techniques" The Evidence Photographer's International Council's Workshop (Atlanta, Ga. April 13 thru 15, 1980), pp. 7-8.

C:\DOCUMENT\ESDA.WPD

ESDA Certification Log

Date	Case Number	Test	Results	Certified by

TECHNICAL PROCEDURES MANUAL AUTHORITY ENDORSEMENT

SECTION I.10

I HAVE REVIEWED THE TECHNICAL PROCEDURES FOR THE ELECTRO-STATIC INDENTED WRITING APPARATUS AND APPROVE THESE PROCEDURES FOR USE BY THE NORTH CAROLINA STATE BUREAU OF INVESTIGATION FORENSIC ANALYST UNDER MY SUPERVISION.

SIGNED_____   DATED_____
DAVID C. DUNN
SUPERVISING AGENT IN CHARGE
NCSBI QUESTIONED DOCUMENTS SECTION

_____

_____

TECHNICAL PROCEDURE TERMINATION AND ARCHIVE:

EFFECTIVE THIS_____DAY OF_____OF THE YEAR_____, THE USE OF THIS PROCEDURE IS HEREBY DISCONTINUED BY MY AUTHORITY AND BEING PLACED IN THE HISTORICAL AND ARCHIVAL SECTION OF THIS MANUAL FOR REFERENCE.(REFER TO SECTION K)

SIGNED:_____TITLE:_____.

NCSBI QUESTIONED DOCUMENTS SECTION

I.11. ULTRAVIOLET REFLECTANCE IMAGING

This type of imaging is used by the Questioned Documents Section to penetrate obliterated writing, or view ink which has faded or is faint. By exposing the questioned document to ultraviolet radiation (U.V. lamps, or the CS-16 crimescope) the original text of the writing can be viewed.

In ultraviolet imaging, as in infrared imaging, use is made of invisible rays as distinguished from the visible rays of the spectrum. Ultraviolet rays are beyond the visible violet rays, and have the shortest wave lengths in the spectrum.   A special filter (U.V.) is placed in front of the DAGE-MTI infrared video camera lens that transmits only the ultraviolet radiation to the camera's tube. This leaves a clear reproduction of the obscuring matter.

This type of imaging must be carried out in an area designed for this activity where one can control the type and intensity of lighting.

The following steps are used to produce ultraviolet reflected images:

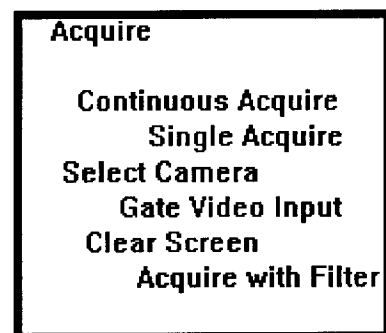**11.1. PLACE THE QUESTIONED DOCUMENT ON THE COPY STAND UNDER THE DAGE-MTI 81 IR VIDEO CAMERA.**
11.1.1.   BELOW IS THE TYPICAL COPYSTAND AND LIGHTING SETUP.

DAGE-MTI #81 IR-VIDEO CAMERA WITH CRIMESCOPE #CS-16 LIGHT SOURCE

DAGE-MTI INFRARED → VIDEO CAMERA

U.V. FILTER ABSORBS VISIBLE RADIATION TRANSMITS U.V.

CRIMESCOPE CS-16

U.V. AND VISIBLE RADIATION

SUBJECT   REMOTE FLEXIBLE ARM AND LIGHT GUIDE
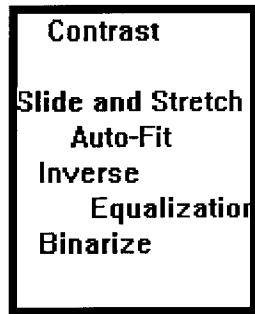
COPY ULTRAVIOLET REFLECTANCE
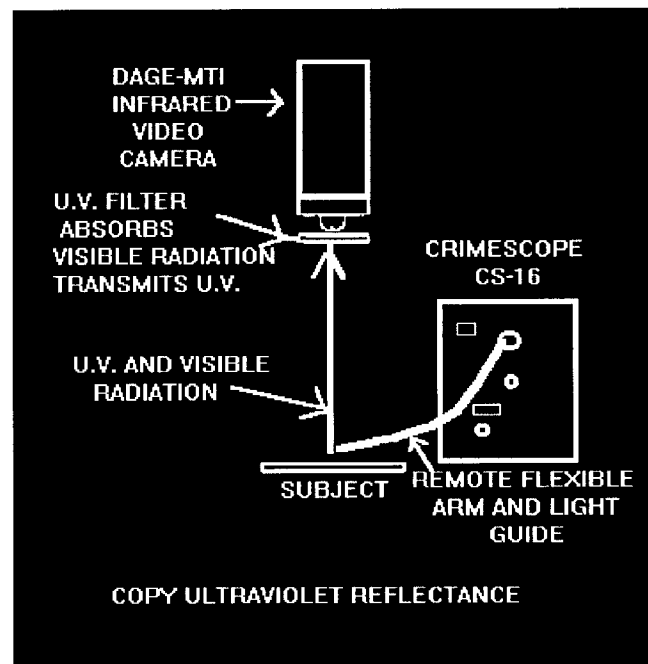
11.2. PLACE A U.V. FILTER IN THE CAMERA'S FILTER HOLDER.

11.3. TURN ON THE U.V. LIGHTS OR USE THE LIGHT GUIDE FROM THE CRIMESCOPE CS-16 LIGHT SOURCE.

11.4. USING THE IBIS SOFTWARE PACKAGE ON A 486 COMPUTER WITH AT LEAST 16 MB OF RAM, ACQUIRE THIS IMAGE DIGITALLY ON CONTINUOUS ACQUIRE; ADJUST THE LENS OPENING IN ORDER TO ACHIEVE GOOD DENSITY. USE A NIKON 35MM, 55MM OR A 105MM MACRO LENS.

    11.4.1. LENS SELECTIONS RELATES TO THE SIZE OF THE QUESTIONED DOCUMENT:
    35MM--81/2 INCHES X 11 INCHES OR A CHECK
    55MM--AN ENDORSEMENT OR SIGNATURE
    105MM---JUST ONE NAME OR SEVERAL LETTERS

11.5. BELOW IS THE ACQUIRE MENU FROM THE IBIS PROGRAM. CLICK ON CONTINUOUS ACQUIRE.

IF THE IMAGE
IS FAINT THE, GATE VIDEO
INPUT OPTION IS USED (SET
AT #2 OR #3 TO START WITH).
THIS PROCEDURE WILL
INCREASE THE DENSITY OF
THE IMAGE.

Acquire
Continuous Acquire
Single Acquire
Select Camera
Gate Video Input
Clear Screen
Acquire with Filter

11.6. USE THE CONTRAST MENU TO CHANGE THE CONTRAST OR BRIGHTNESS IN THE IMAGE:

```
Contrast

Slide and Stretch
     Auto-Fit
Inverse
      Equalization
Binarize
```
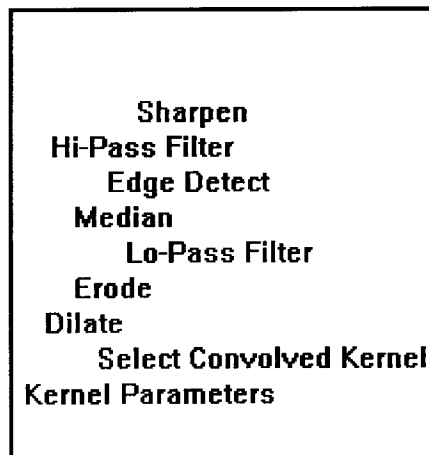
11.6.1.   <u>SLIDE AND STRETCH</u>: WITH THIS SELECTION A SLIDER BAR IS ACTIVATED DISPLAYING VALUES OF 0.5 TO 3.0 UNITS OF DENSITY BY MOVING THE MOUSE THEN CLICK ON THE LEFT MOUSE BUTTON WHEN MAXIMUM DENSITY IS OBTAINED.

11.6.2.   <u>AUTO-FIT</u>: AUTOMATICALLY SELECTED WHAT THE COMPUTER FEELS IS THE CORRECT CONTRAST

11.6.3.   <u>INVERSE</u>: PRODUCES AN IMAGE WHICH IS A NEGATIVE IMAGE.
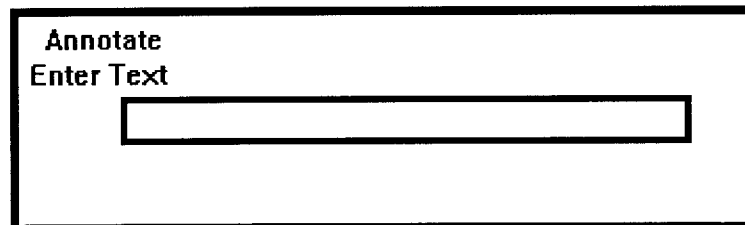
11.7. NEXT SELECT THE SHARPEN OPTION; JUST ONE CLICK ON SHARPEN IS SUFFICIENT.

```
          Sharpen
     Hi-Pass Filter
          Edge Detect
     Median
          Lo-Pass Filter
     Erode
Dilate
     Select Convolved Kernel
Kernel Parameters
```

FILTERING CAN BE USED TO SHARPEN OR BLUR AN IMAGE, TO ENHANCE HIGH FREQUENCY DETAILS, TO DETECT EDGES, OR TO LIGHTEN OR DARKEN AN OVERALL IMAGE BY EXPANDING LIGHT OR DARK AREAS.

11.7.1. **TO SHARPEN AN IMAGE USE THE <u>HI-PASS</u> OR <u>SHARPEN</u> FILTERING OPTIONS.**

11.7.2. **TO BLUR AN IMAGE, USE THE <u>LO-PASS</u> OR MEDIAN FILTERING   OPTIONS.**

11.7.3. **TO DETECT OR ENHANCE EDGES IN AN IMAGE, SELECT THE SOBEL, PHASE, OR HORIZONTAL,VERTICAL, LAPLACIAN, AND ROBERS FILTERS AS SUBMENU CHOICES.**

11.8. SELECT THE ANNOTATE OPTION:

```
 Annotate
 Enter Text
      ┌──────────────────────────────────┐
      │                                  │
      └──────────────────────────────────┘
```

WITH THIS YOU CAN ENTER TEXT AND CASE NO. ON YOUR IMAGE.

11.9. SAVE THE IMAGE TO A COMPUTER FILE BY SELECTING FILE FUNCTION.

```
┌─────────────────────────────────┐
│          File Functions         │
│                                 │
│         Restore Image File      │
│     Save Image File             │
│          Delete Image File      │
│     Image Directory             │
│          Printrak Save          │
│                                 │
│                                 │
└─────────────────────────────────┘
```
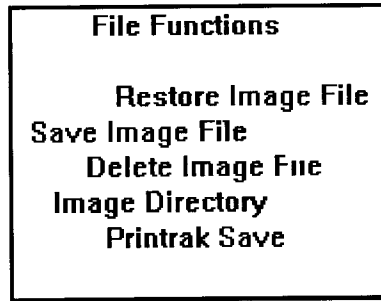
11.9.1.   FROM THIS MENU ALL YOUR FILE FUNCTIONS ARE ACCESSIBLE.

SAVE A FILE

PULL UP A FILE FROM MEMORY,

OR DELETE AN IMAGE FILE.

11.10.   PRINT THE IMAGE BY SELECTING THE PRINT OPTION:

```
┌──────────────────────────────────────────┐
│                                          │
│     Print Parameters                     │
│                                          │
│  Number of Prints   1                    │
│     Size of Prints     Medium            │
│     Orientation        Portrait          │
│     Text Size:         Small             │
│                                          │
│  Comment  ┌────────────────────────────┐ │
│           └────────────────────────────┘ │
│                                          │
└──────────────────────────────────────────┘
```

c:\document\uv.wpd

REFERENCES:

Barnes, David, " Document Processing System User's Manual", IBIS Imaging
Systems

Hilton, Ordway, "New Dimensions in Infrared Luminescence Photography",
Journal of Forensics Sciences, JFSCA, Vol. 26, No 2, April 1981, pp 319-
324.

Kodak's "Applied Infrared Photography", Publication #M-28, 1972 edition.
pp. 51-57.

Kodak's "Kodak Infrared Films", Publication #N-17, 1981 edition, pp. 2-7.

Media Cybernetics, "Image-Pro Plus Image Processing System Version 2.0",
1992.

Sanders, Robert C., "Questioned Documents Photography Techniques" The
Evidence Photographer's International Council's Workshop (Atlanta,
Ga. April 13 thru 15, 1980), pp. 1-29.

Young, W. Arthur, Thomas A. Benson, George T. Eaton, Kodak's "Copying
and Duplication in Black-and-White and Color", Publication #M-1,
1984, pp. 50-53.

TECHNICAL PROCEDURES MANUAL AUTHORITY ENDORSEMENT

SECTION I.11

I HAVE REVIEWED THE TECHNICAL PROCEDURES FOR <u>ULTRAVIOLET REFLECTANCE IMAGING</u> AND APPROVE THESE PROCEDURES FOR USE BY THE NORTH CAROLINA STATE BUREAU OF INVESTIGATION FORENSIC ANALYST UNDER MY SUPERVISION.

SIGNED_____   DATED_____
DAVID C. DUNN
SUPERVISING AGENT IN CHARGE
NCSBI QUESTIONED DOCUMENTS SECTION

_____

_____

TECHNICAL PROCEDURE TERMINATION AND ARCHIVE:

EFFECTIVE THIS_____DAY OF_____OF THE YEAR_____, THE USE OF THIS PROCEDURE IS HEREBY DISCONTINUED BY MY AUTHORITY AND BEING PLACED IN THE HISTORICAL AND ARCHIVAL SECTION OF THIS MANUAL FOR REFERENCE.(REFER TO SECTION K)

SIGNED:_____TITLE:_____.

I.12. ULTRAVIOLET LUMINESCENCE IMAGING

This type of imaging is used by the Questioned Documents Section to show the differences in inks which normally appear the same. The exposing of the questioned document to ultraviolet radiation (200nm to 600nm) from the crimescope CS-16 will cause the specimen (many times) to emit radiation in visible part of the spectrum. One of four basic phenomena can be observed occurring with the document using this technique. The document may be observed reflecting the energy (lighten); absorbing the energy (darken); transmitting the energy (disappear); or converting the energy to a different viable wavelength (luminesce).

As in infrared imaging, use is made of the invisible ultraviolet rays as distinguished from the visible rays of the spectrum. A special filter (U.V. #2A) is placed in front of the DAGE-MTI infrared video camera lens to adsorb the ultraviolet rays and allow the visible rays to reach the camera tube. This leaves a clear reproduction of the inks luminescence in the visible part of the spectrum.

This type of imaging must be carried out in an area designed for this activity where one can control the type and intensity of lighting.

The following steps are used to produce ultraviolet reflected images:

12.1. PLACE THE QUESTIONED DOCUMENT ON THE COPY
STAND UNDER THE DAGE-MTI 81 IR VIDEO CAMERA.
12.1.1.   BELOW IS THE TYPICAL COPYSTAND AND
LIGHTING SETUP.

**DAGE-MTI
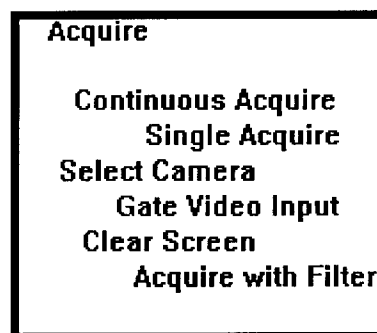#81 IR-VIDEO
CAMERA WITH
CRIMESCOPE
#CS-16 LIGHT
SOURCE**

DAGE-MTI INFRARED → VIDEO CAMERA

IN THE DARK

U.V. FILTER NO. 2A [ABSORBS U.V.]

CRIMESCOPE CS-16

U.V. RADIATION

SUBJECT   REMOTE FLEXIBLE ARM AND LIGHT GUIDE

COPYING ULTRAVIOLET FLUORESCENCE
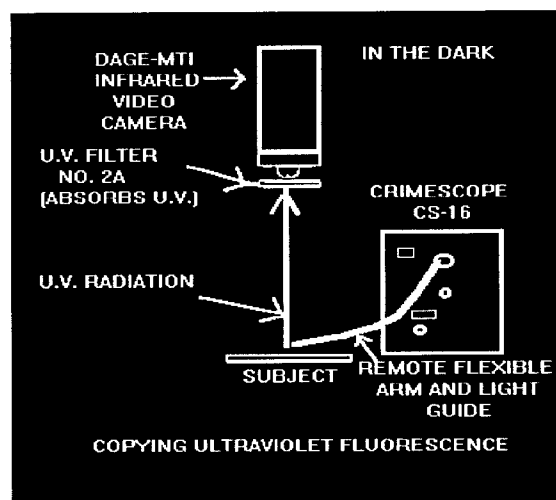
12.2. PLACE A U.V. FILTER (NO. 2A) IN THE CAMERA'S FILTER HOLDER.

12.3. TURN ON THE U.V. LIGHTS OR USE THE LIGHT GUIDE FROM THE CRIMESCOPE CS-16 LIGHT SOURCE.

12.4. USING THE IBIS SOFTWARE PACKAGE ON A 486 COMPUTER WITH AT LEAST 16 MB OF RAM, ACQUIRE THIS IMAGE DIGITALLY ON CONTINUOUS ACQUIRE; YOU WILL NEED TO ADJUST THE LENS OPENING IN ORDER TO ACHIEVE GOOD DENSITY. WE NORMALLY USE A NIKON 35MM, 55MM OR A 105MM MACRO LENS.
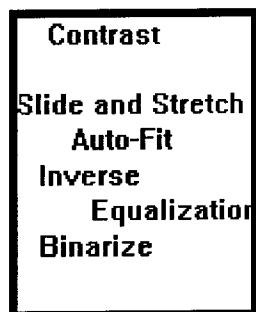
  12.4.1. LENS SELECTIONS RELATES TO THE SIZE OF THE QUESTIONED DOCUMENT:
  35MM--81/2 INCHES X 11 INCHES OR A CHECK
  55MM--AN ENDORSEMENT OR SIGNATURE
  105MM---JUST ONE NAME OR SEVERAL LETTERS

12.5. BELOW IS THE ACQUIRE MENU FROM THE IBIS PROGRAM. CLICK ON CONTINUOUS ACQUIRE.

```
Acquire

     Continuous Acquire
          Single Acquire
     Select Camera
          Gate Video Input
     Clear Screen
          Acquire with Filter
```

MANY TIMES IF THE IMAGE IS FAINT THE GATE VIDEO INPUT OPTION IS USED (SET AT #2 OR #3 TO START WITH). THIS PROCEDURE WILL INCREASE THE DENSITY OF THE IMAGE.

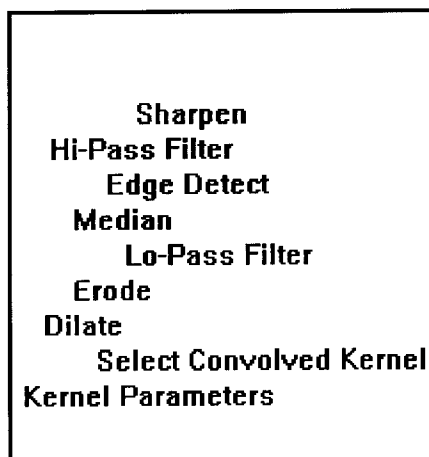**12.6. USE THE CONTRAST MENU TO CHANGE THE CONTRAST OR BRIGHTNESS IN THE IMAGE:**

```
┌─────────────────┐
│ Contrast        │
│                 │
│Slide and Stretch│
│     Auto-Fit    │
│ Inverse         │
│       Equalizatio│
│ Binarize        │
│                 │
└─────────────────┘
```

12.6.1. <u>SLIDE AND STRETCH</u>: WITH THIS SELECTION A SLIDER BAR IS ACTIVATED DISPLAYING VALUES OF 0.5 TO 3.0 UNITS OF DENSITY. BY MOVING THE MOUSE; UNTIL YOU GET A PLEASING IMAGE, YOU THEN CLICK ON THE LEFT MOUSE BUTTON.

12.6.2. <u>AUTO-FIT</u>: AUTOMATICALLY SELECTED WHAT THE COMPUTER FEELS IS THE CORRECT CONTRAST

12.6.3. <u>INVERSE</u>: PRODUCES AN IMAGE WHICH IS A NEGATIVE IMAGE.
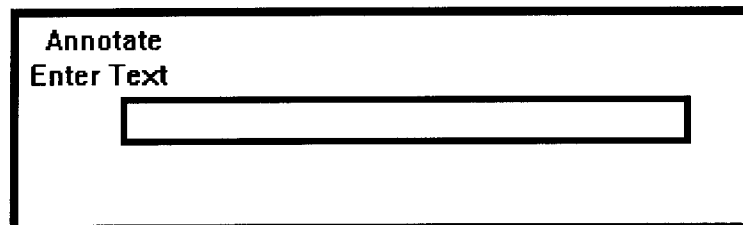
12.7. SELECT THE SHARPEN OPTION, CLICK ONCE ON SHARPEN.

```
┌──────────────────────────┐
│                          │
│        Sharpen           │
│     Hi-Pass Filter       │
│         Edge Detect      │
│       Median             │
│           Lo-Pass Filter │
│       Erode              │
│     Dilate               │
│         Select Convolved Kernel │
│    Kernel Parameters     │
│                          │
└──────────────────────────┘
```

FILTERING CAN BE USED TO SHARPEN OR BLUR AN IMAGE, TO ENHANCE HIGH FREQUENCY DETAILS, TO DETECT EDGES, OR TO LIGHTEN OR DARKEN AN OVERALL IMAGE BY EXPANDING LIGHT OR DARK AREAS.

12.7.1. **TO SHARPEN AN IMAGE USE THE <u>HI-PASS</u> OR <u>SHARPEN</u> FILTERING OPTIONS.**

12.7.2. **TO BLUR AN IMAGE, USE THE <u>LO-PASS</u> OR MEDIAN FILTERING   OPTIONS.**

12.7.3. **TO DETECT OR ENHANCE EDGES IN AN IMAGE, SELECT THE SOBEL, PHASE, OR HORIZONTAL,VERTICAL, LAPLACIAN, AND ROBERS FILTERS AS SUBMENU CHOICES.**

12.8. SELECT THE ANNOTATE OPTION:

```
┌─────────────────────────────────────────┐
│  Annotate                                │
│  Enter Text                              │
│      ┌─────────────────────────────┐     │
│      │                             │     │
│      └─────────────────────────────┘     │
│                                          │
└─────────────────────────────────────────┘
```

WITH THIS YOU CAN ENTER TEXT AND CASE NO. ON YOUR IMAGE.

12.9. SAVE THE IMAGE TO A COMPUTER FILE BY SELECTING FILE FUNCTION.

```
         File Functions

            Restore Image File
   Save Image File
            Delete Image Fue
   Image Directory
            Printrak Save
```

12.9.1. **FROM THIS MENU FILE FUNCTIONS ARE AS FOLLOWS:**

SAVE A FILE

PULL UP A FILE FROM MEMORY,

OR DELETE AN IMAGE FILE.

12.10. **PRINT THE IMAGE BY SELECTING THE PRINT OPTION:**

```
   Print Parameters

   Number of Prints   1
     Size of Prints    Medium
     Orientation       Portrait
     Text Size:        Small

   Comment
                   [                      ]
```

c:\document\uvlum.wpd

REFERENCES:

Barnes, David, " <u>Document Processing System User's Manual</u>", IBIS Imaging
Systems

Hilton, Ordway, "<u>New Dimensions in Infrared Luminescence Photography</u>",
Journal of Forensics Sciences, JFSCA, Vol. 26, No 2, April 1981, pp 319-
324.

Kodak's "<u>Applied Infrared Photography</u>", Publication #M-28, 1972 edition.
pp. 51-57.

Kodak's "<u>Kodak Infrared Films</u>", Publication #N-17, 1981 edition, pp. 2-7.

Media Cybernetics, "<u>Image-Pro Plus Image Processing System Version 2.0</u>",
1992.

Sanders, Robert C., "<u>Questioned Documents Photography Techniques</u>" The
Evidence Photographer's International Council's Workshop (Atlanta,
Ga. April 13 thru 15, 1980), pp. 1-29.

Young, W. Arthur, Thomas A. Benson, George T. Eaton, Kodak's "<u>Copying</u>
<u>and Duplication in Black-and-White and Color</u>", Publication #M-1,
1984, pp. 50-53.

TECHNICAL PROCEDURES MANUAL AUTHORITY ENDORSEMENT

SECTION I.12

I HAVE REVIEWED THE TECHNICAL PROCEDURES FOR ULTRAVIOLET LUMINESCENCE IMAGING AND APPROVE THESE PROCEDURES FOR USE BY THE NORTH CAROLINA STATE BUREAU OF INVESTIGATION FORENSIC ANALYST UNDER MY SUPERVISION.

SIGNED_____ DATED_____
DAVID C. DUNN
SUPERVISING AGENT IN CHARGE
NCSBI QUESTIONED DOCUMENTS SECTION

_____

_____

TECHNICAL PROCEDURE TERMINATION AND ARCHIVE:

EFFECTIVE THIS_____DAY OF_____OF THE YEAR_____, THE USE OF THIS PROCEDURE IS HEREBY DISCONTINUED BY MY AUTHORITY AND BEING PLACED IN THE HISTORICAL AND ARCHIVAL SECTION OF THIS MANUAL FOR REFERENCE.(REFER TO SECTION K)

SIGNED:_____TITLE:_____.

NCSBI QUESTIONED DOCUMENTS SECTION

I.13. IMAGING WITH ALDUS PHOTO STYLER VER. 2.0

13.1. TURN ON THE HP SCANNER

13.2. DOUBLE CLICK ON THE PHOTO STYLER ICON UNDER APPLICATIONS GROUP:

APPLICATIONS

PhotoStyler

13.2.1   THIS MENU BAR APPEARS

File   Edit   Select   Image   Effects   View   Window   Help

13.3. IN ORDER TO SCAN CHOSE ACQUIRE FROM THE SCAN SUBMENU UNDER THE FILE MENU:

13.3.1   THEN SELECT ACQUIRE

File   Edit   Select   Image   Effects   View   Wind

File	
New...	Sh^N
Open...	^O
Restore...	Sh^R
Close	Sh^Q
Close All	Sh^C
Save	^S
Save As...	Sh^S
Import	▶
Export	▶
Scan	Select Scanner...
Print	Acquire...
Soft Proof...	
Preferences	▶
1 c:\ken1\dave1.tif	
2 c:\ken1\alston1.tif	
3 c:\ken1\alston.tif	
4 c:\ken1\bkg.tif	
5 c:\ken1\dave.tif	
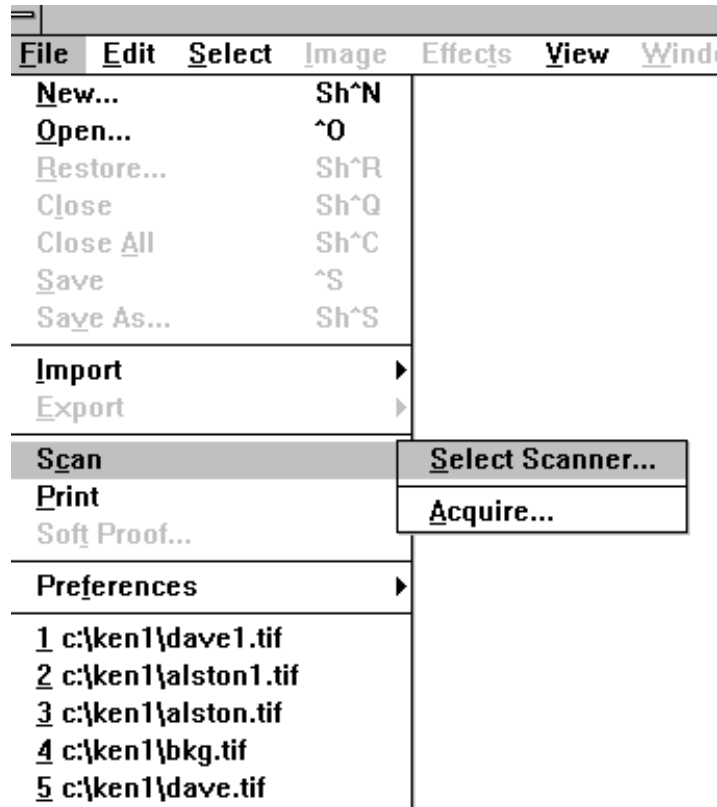
13.3.2   **TIPS FOR PRODUCING THE BEST POSSIBLE SCAN:**

13.3.2.1   **KNOW WHAT THE FINAL OUTPUT DEVICE WILL BE AND ITS REQUIREMENTS.**

13.3.2.2   **CLEAN THE GLASS ON THE SCANNER.**

```
─  ▢            DeskScan II            ▼
 File  Edit  Custom  Tools        Help

 Type:  │ Millions of Colors      │ ±
 Path:  │ PhotoStyler / LaserJet 4 [F │ ±

 Brightness              Contrast
 ◄ □  ►   ◖◗   ◄ ●  ►
 ●   157  ○       ◉  170  ◐

 12  %   Scaling: 100 %   1600 %
 ◄ □              ►
 Width:   1.44 in  Height:  1.75 in

 Size:   ⅔  ▦  ⚖  🔒
 73K

 │ Preview │   │ Zoom │   │ Final │
```

13.3.2.3   **USE HIGH-QUALITY ARTWORK, USE THE ORIGINAL PHOTO.**

13.4. THIS WILL BRING UP THE HP DESKSCAN II BOX

-SCALING RELATES TO THE SIZE OF THE IMAGE ON THE VIDEO MONITOR.

-NONE OF THESE SETTINGS EFFECT "RESOLUTION" OF THE VIDEO MONITOR.

**-UNDER CUSTOM-
PRINT PATH SET THE RESOLUTION OF YOUR PRINTER.**

13.4.1   PRESS FINAL AND THE IMAGE WILL BE SCANNED INTO PHOTO STYLER.

13.5. THE RESOLUTION COMMAND ALLOWS YOU TO CHANGE THE DEFINED RESOLUTION OF AN IMAGE WITHOUT ADDING OR DELETING PIXELS. IT DOES, HOWEVER, CHANGE THE IMAGE DIMENSIONS. FOR EXAMPLE, IF YOU HAVE AN IMAGE THAT HAS A RESOLUTION OF 300 PIXELS PER INCH. IF YOU USE THE RESOLUTION COMMAND TO SET THE RESOLUTION TO 100 PPI, YOU   HAVE NOT CHANGED THE NUMBER OF PIXELS IN THE   IMAGE; RATHER, YOU HAVE REDEFINED HOW MANY   PIXELS THERE ARE IN EACH INCH. THEREFORE, THE   HEIGHT AND WIDTH OF THE 100 DPI IMAGE ARE EACH   THREE TIMES GREATER THAN THE HEIGHT AND WIDTH   OF THE 300 DPI.

BECAUSE THE RESOLUTION... COMMAND DOES NOT CHANGE THE TOTAL NUMBER OF PIXELS IN THE IMAGE, IT CANNOT INCREASE THE SHARPNESS OR LEVEL OF DETAIL OF AN IMAGE.

13.5.1   THE RESOLUTION COMMAND IS FOUND UNDER THE IMAGE

SECTION OF THE MENU BAR.

Tools

13.5.2   LEAVE THE   SMART
RESOLUTION   SET ON BEST.

Change Resolution

Current Resolution: 96.00   Pixels/Inch

New Resolution
- Display   96.00
- Printer   300.00

HP LaserJet IIP on LPT1:
- User-Defined: 72.00   (1.00..4800.00)

Output Size   Original   New

216 Pixels   216 Pixels
282 Pixels   282 Pixels

OK   Cancel   Smart Resolution...

Smart Resolution

lpi: 53.00

Quality:
- Best
- Good
- Fair

OK   Cancel
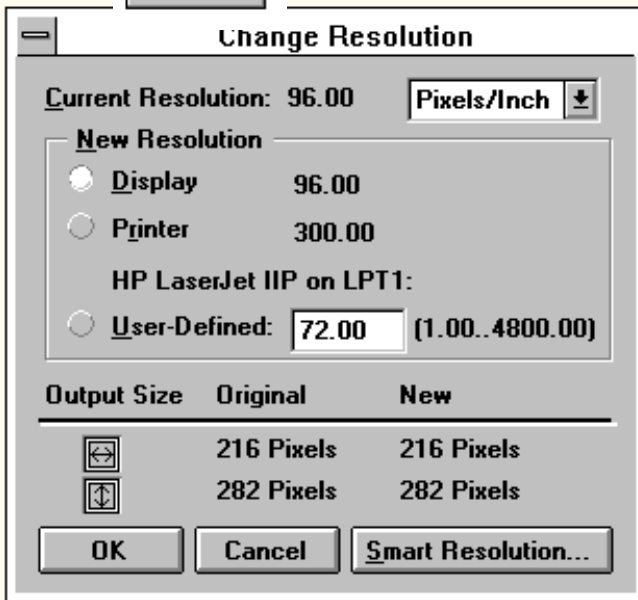
13.6. THE TOOL BAR:

-THIS IS THE TOOL BOX

-THIS IS A PAINT BRUSH
-THIS IS THE FREE SELECTION TOOL

-THIS IS THE MAGIC WAND USED TO SELECT
COMPLEX SHAPES THE BACKGROUND MUST BE ALL ONE COLOR.

-THIS IS THE CROPPING TOOL

-CHANGES ZOOM LEVELS
-SELECTS THE INVERSE

-SELECTS BACKGROUND OR
FOREGROUND COLOR

Open Image File

File **N**ame:
rhonda.tif rhonda3.tif

Directories:
c:\seals

r.tif
rhonda.tif
rhonda2.tif
rhonda3.tif

c:\
seals

List Files of **T**ype:
All Formats

Dri**v**es:
c: sbi

☑ Op**e**n Copy   Working Size:

Open   Op**t**ions...   **B**rowse...   **C**MS...

Cancel   **I**nfo...   Al**b**um...   **P**review>>

THIS IS THE
SELECT GROUP BUTTON-------
IMAGE
EDITING GROUP BUTTON----------

SELECTS A
RECTANGLE AREA---------------

SELECTS AN ELLIPTICAL AREA----------------
SELECTS A LINE OF PIXELS---------------------
MOVES THE IMAGE INSIDE WINDOW------

-
PLACES TEXT IN AN IMAGE--------------------
-
PICKS A COLOR FROM A IMAGE-------------
-   **SELECTS ALL--------------------------------------**
-

13.7. CREATING A COMPOSITE
IMAGE:

13.7.1 SELECT THE FILES TO   OPEN:

13.7.2.   CHECK OPEN   COPY

13.7.3.   PRESS CTRL AND

Tools
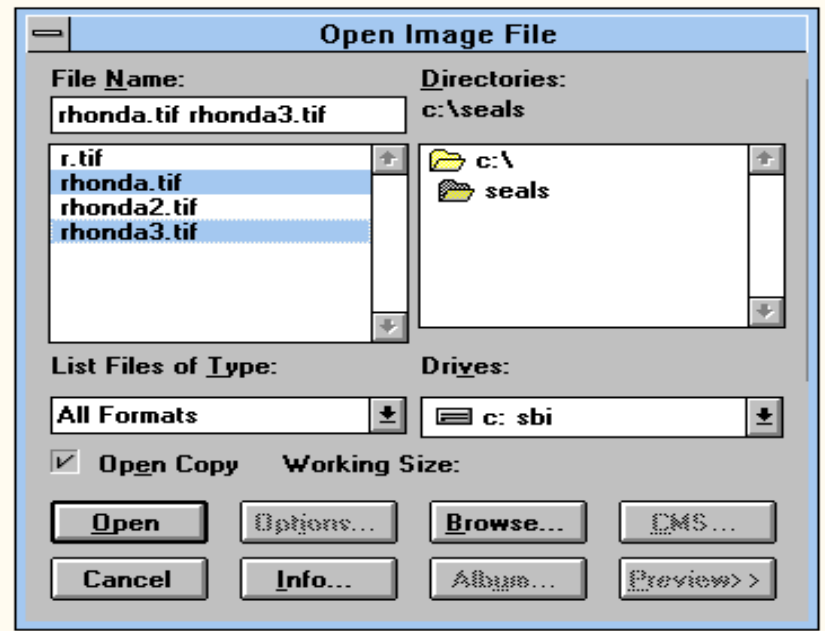
CLICK ON FILES **TO BE OPEN.**

13.7.4.. CLICK OPEN.

13.7.5. MAKE SURE THE UNDO ENABLED ON THE EDIT MENU HAS A CHECKMARK BY IT.

13.7.6.
TO UNDO YOUR LAST ACTION PRESS CTRL + Z
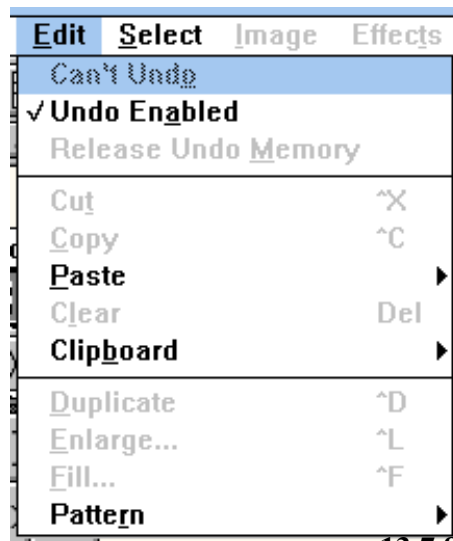
13.7.7.
CLICK THE SELECTION GROUP BUTTON---------------

13.7.8. SELECT THE MAGIC WAND-----------

13.7.9.   USE THE FOLLOWING SETTINGS ON THE MAGIC WAND TOOL RIBBON:

COMPARED BY: RGB

SIMILARITY: 5

ANTI-ALIASING: CHECKED

=BUTTON: HIGHLIGHTED

13.7.10.

CLICK ON THE TITLE BAR OF THE FILE YOU ARE WORKING ON.

> **CLICK ON THE BACKGROUND COLOR- IT HELPS TO HAVE A SOLID COLOR SO YOU MAY HAVE TO ERASE, OR USE CUT AND PASTE TO DO THIS.**

13.7.11.   IF YOU CANNOT GET A SOLID COLOR BACKGROUND USE THE FREE SELECT TOOL TO TRACE YOUR SUBJECT.
> **THE BACKGROUND IS NOW SELECTED. CLICK THE INVERT BUTTON ON THE TOOL PALETTE TO ISOLATE YOUR SUBJECT.**

---THE BLACK AND WHITE ONE

YOUR SUBJECT IS NOW SELECTED

13.7.12.   **PLACE THE CURSOR ON THE SUBJECT AND IT WILL TURN INTO A FOUR-HEADED ARROW. YOU CAN NOW CLICK AND DRAG THE SUBJECT INTO THE NEW IMAGE WINDOW, IT WILL APPEAR AS A SMALL WHITE BOX.**

13.7.13.   **RELEASE THE MOUSE BUTTON**

13.7.17.   **YOU CAN CLICK AND DRAG THE SUBJECT IN THE IMAGE WINDOW TO POSITION IT.**

13.7.18.   **WHEN YOUR ARE IN THE DESIRED POSITION CLICK THE RIGHT MOUSE BUTTON TO MERGE THE SELECTION WITH THE UNDERLYING IMAGE.**

13.8.   BE SURE TO SAVE YOU NEW FILE.

(HOW TO SAVE A FILE:)

13.8.1. CLICK ON FILE ON THE MENU BAR:
13.8.2. FOR A COMPLETELY NEW FILE SELECT (SAVE AS)
13.8.3.   TO UP DATE AN OLD FILE SELECT (SAVE)

13.8.4. A FILE MANAGEMENT SCREEN WILL NOW APPEAR:
13.8.5.   SELECT THE DIRECTORY YOU WANT TO STORE THE IMAGE IN.
13.8.6.   GIVE THE FILE A NAME, AND SELECT THE FILE TYPE

13.8.7. CLICK ON SAVE.
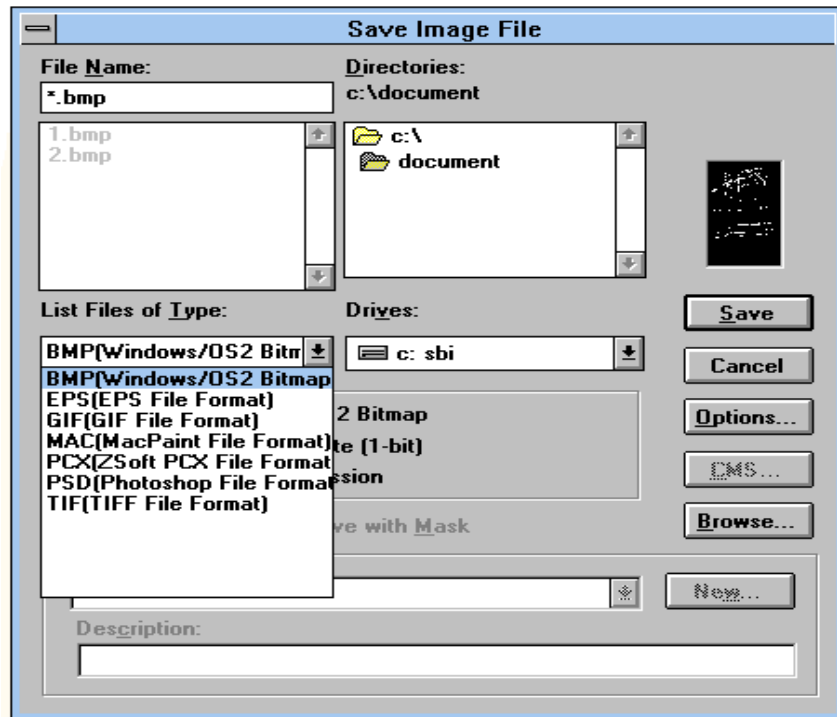
13.9.   PHOTO STYLER KEY SHIFTS:

COMMANDS	KEYS
ON LINE HELP	F1
UNDO	CONTROL + Z
ZOOM OUT	SHIFT + Z
ZOOM IN	PRESS Z AND CLICK MOUSE
SHOW ALL COMMAND	CTRL+SHIFT+Z

SAVE YOUR FILE	**CTRL+S**
DISPLAY THE PRACTICE PAD	**F9**
TO SET THE CLONE SOURCE	**SHIFT+MOUSE**
TO MOVE IMAGE	**PRESS S AND DRAG THE MOUSE**

13.10. **HOW TO PRINT THE PHOTOSTYLER IMAGE:**

    13.10.1. **CLICK ON THE FILE SELECTION ON THE MENU BAR.**

    13.10.2. **SELECT THE PRINT OPTION AND THE FOLLOWING INFORMATION BOX WILL APPEAR**
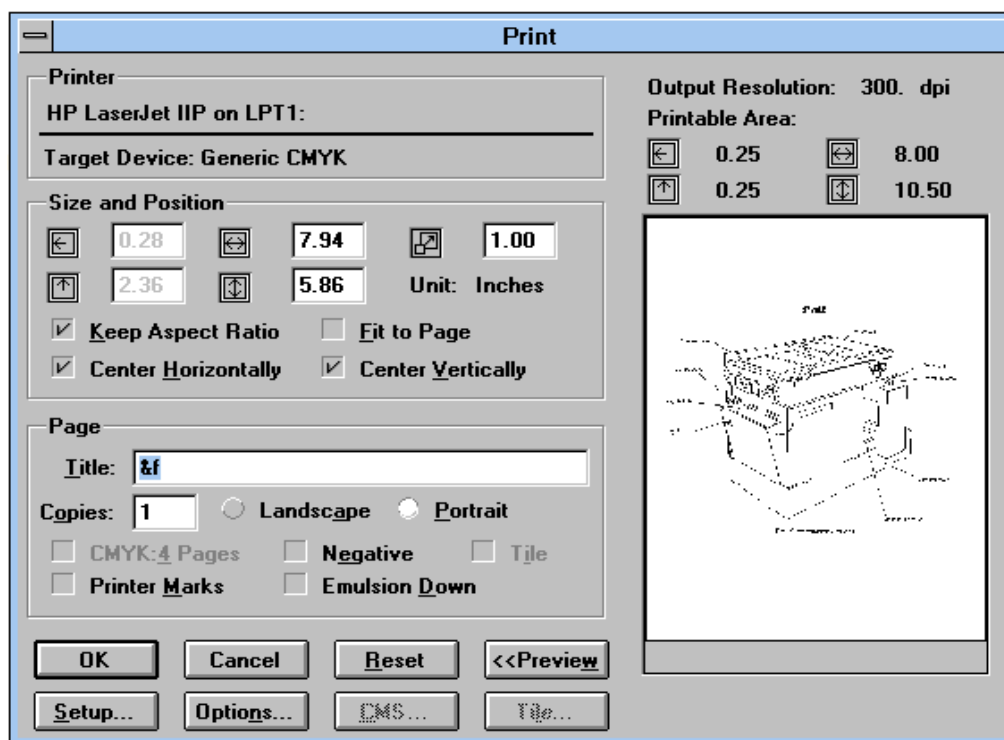
13.13.3.   SELECT (OK) AND PRINTING WILL START

REFERENCES:

Peterman, David, Dan Hemenway, Janet Williams, Kirsten Laine and Sarah Benn, <u>ALDUS Photostyler Special Edition User Manual Version 2.0"</u>, July 1993.

C:\DOCUMENT\PHOTOSTY.WPD

TECHNICAL PROCEDURES MANUAL AUTHORITY ENDORSEMENT

SECTION I.13

I HAVE REVIEWED THE TECHNICAL PROCEDURES FOR IMAGING WITH ALDUS PHOTO STYLER VERSION 2.0 AND APPROVE THESE PROCEDURES FOR USE BY THE NORTH CAROLINA STATE BUREAU OF INVESTIGATION FORENSIC ANALYST UNDER MY SUPERVISION.

SIGNED_____   DATED_____
DAVID C. DUNN
SUPERVISING AGENT IN CHARGE
NCSBI QUESTIONED DOCUMENTS SECTION

_____

_____

TECHNICAL PROCEDURE TERMINATION AND ARCHIVE:

EFFECTIVE THIS_____DAY OF_____OF THE YEAR_____, THE USE OF THIS PROCEDURE IS HEREBY DISCONTINUED BY MY AUTHORITY AND BEING PLACED IN THE HISTORICAL AND ARCHIVAL SECTION OF THIS MANUAL FOR REFERENCE.(REFER TO SECTION K)

SIGNED:_____TITLE:_____.

NCSBI QUESTIONED DOCUMENTS SECTION

<u>I.14. USING IBIS IMAGING PROGRAMS</u>

THE FIRST MENU IS BELOW

```
06/15/95          Jmenu Version 2.22          08:54:47 am



   Main Menu
1  IBIS IMAGING SOFTWARE
2
3  IMAGEPRO DOS
4
5  TAPE BACKUP
6
7  Load Network
8  WINDOWS
9
0  Configuration
```

14.1. TO RUN THE IBIS PROGRAMS USE THE MOUSE TO CLICK ON #1.

14.1.1   THEN THE FOLLOWING MENU APPEARS:

14.1.2.   YOU CAN NOW BRING UP AN IMAGE FROM THE FILE OR ACQUIRE A NEW IMAGE.

14.1.3.   YOU CAN ALSO DO ENHANCEMENTS SUCH AS CONTRAST ADJUSTMENTS AND FILTER CONTROL.

```
                    IBIS Imaging System 2.35
F1 - Help                          F10 - Clear Screen


   Main Menu

   File Functions
   Acquire
   Contrast Adjustment
   Filters
   Manipulations
   Analysis
   Measurements
   Annotate
   Print
   Clear Screen
```

14.1.4. *YOU CAN PRINT AND ANNOTATE FROM THIS SCREEN*

14.2. THE FIRST OPTION IS FILE FUNCTIONS WHICH ARE SHOWN BELOW:

FROM THIS MENU YOU CAN DO ALL YOUR FILE FUNCTIONS:

> *14.2.1.* *SAVE A FILE*
>
> *14.2.2.* *PULL UP A FILE FROM MEMORY,*
>
> *14.2.3.* *OR DELETE A IMAGE FILE.*

```
File Functions

        Restore Image File
Save Image File
      Delete Image Fıe
Image Directory
     Printrak Save
```

14.3. THE MOST USED SELECTION FORM THE MAIN MENU IS ACQUIRE:

```
Acquire

    Continuous Acquire
       Single Acquire
Select Camera
     Gate Video Input
Clear Screen
     Acquire with Filter
```

14.3.1. *FOR MOST APPLICATIONS USE THE CONTINUOUS ACQUIRE OPTION WHICH WORKS WELL WITH THE IR VIDEO CAMERA.*

14.3.2. *GATING WORKS WELL WITH IR LUMINESCE*

14.3.3. *UNDER THE SELECT CAMERA MENU: SELECT WHICH IR VIDEO CAMERA TO USE OR YOU CAN SELECT TO ACQUIRE FROM THE MICROSCOPE CAMERA OR THE PANASONIC 7150 VIDEO CASSETTE PLAYER.*

```
         Acquire
      Select Camera
         RS-170
CCIR 625 / 50 Interlaced
      Dage 81 Non-Interlaced
Dage 81 Interlaced

    Acquire with Filter
```
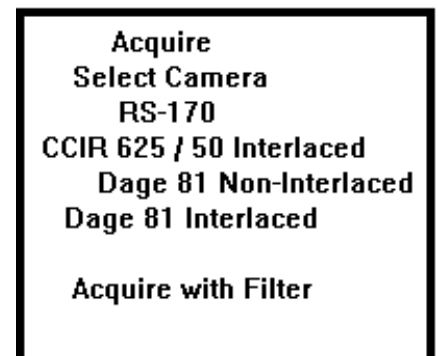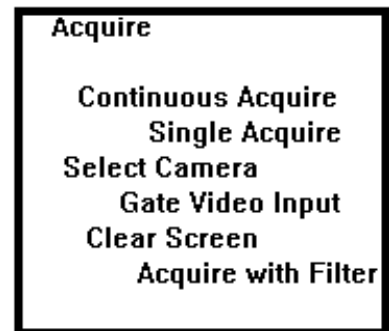
14.3.4.   *AFTER ACQUIRING THE IMAGE CAN MOVE BACK TO THE MAIN MENU BY CLICKING ON THE MOUSE.*

14.4.   *ONCE BACK IN THE MAIN MENU ADJUST CONTRAST AND DO FILTERING.*
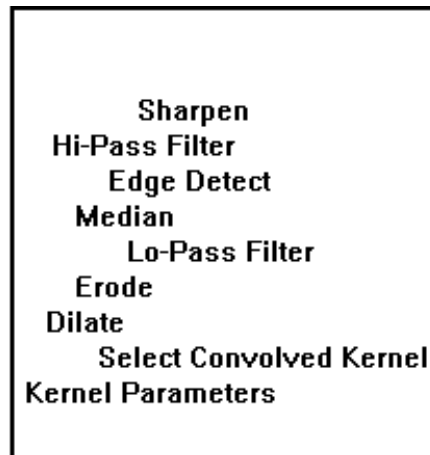
```
            Sharpen
        Hi-Pass Filter
            Edge Detect
        Median
            Lo-Pass Filter
        Erode
    Dilate
        Select Convolved Kernel
    Kernel Parameters
```

FILTERING CAN BE USED TO SHARPEN OR BLUR AN IMAGE, TO ENHANCE HIGH FREQUENCY DETAILS, TO DETECT EDGES, OR TO LIGHTEN OR DARKEN AN OVERALL IMAGE BY EXPANDING LIGHT OR DARK AREAS. ADDITIONALLY, FILTERS CAN BE "FINE-TUNED" BY CHANGING THE SCALE AND BOOST VALUES TO COMBINE CONTRAST ENHANCEMENT WITH FILTERING.

   14.4.1.   **TO SHARPEN AN IMAGE USE THE <u>HI-PASS </u>OR <u>SHARPEN</u> FILTERING OPTIONS.**

   14.4.2.   **TO BLUR AN IMAGE, USE THE <u>LO-PASS</u> OR MEDIAN FILTERING OPTIONS.**

   14.4.3.   **TO DETECT OR ENHANCE EDGES IN AN IMAGE, SELECT   THE   SOBEL, PHASE, OR HORIZONTAL,VERTICAL,   LAPLACIAN, AND ROBERS FILTERS AS SUBMENU   CHOICES.**

14.5. THE CONTRAST MENU IS USED TO CHANGE THE CONTRAST OR BRIGHTNESS IN AN IMAGE USING PIXEL REDISTRIBUTION OPERATIONS.

```
Contrast

Slide and Stretch
     Auto-Fit
Inverse
          Equalization
Binarize
```

14.5.1. <u>SLIDE AND STRETCH</u> **: WITH THIS SELECTION YOU WILLACTIVATE A SLIDER BAR DISPLAYING VALUES FROM 0.5 TO 3.0. BY MOVING THE MOUSE WITH NO BUTTONS PRESSED UNTIL YOU GET THE DESIRED VALUE- CLICK THE LEFT BUTTON ON THE MOUSE AND THE CHANGES WILL BE APPLIED TO YOUR IMAGE.**

14.5.2. <u>AUTO-FIT</u> **WILL GENERALLY PRODUCE A BRIGHTER, HIGHER CONTRAST IMAGE.**

14.5.3. <u>INVERSE</u> **PRODUCES A IMAGE WHICH LOOKS MUCH LIKE A PHOTOGRAPHIC NEGATIVE.**

14.6. IN THIS MENU YOU CAN: ZOOM INTO THE IMAGE. POSITION THE CURSOR WHERE DESIRED ON THE IMAGE. PRESS THE RIGHT BUTTON TO ZOOM IN AND THE LEFT BUTTON TO ZOOM OUT. THE ZOOMED IMAGE CENTERS ON THE CURSOR POSITION. EACH ZOOM IS 2X MAGNIFICATION (ZOOM OUT +2, +4, +8 AND +16. YOU CAN ZOOM IN -2, -4, AND -10).

```
Manipulations

Zoom
     Scale
Interpolation
     Rotate
  Flip
Mirror
     Subtraction
Average
```

14.6.1 SCALE- BY USING THIS SELECTION YOU CAN SCALE THE IMAGE.
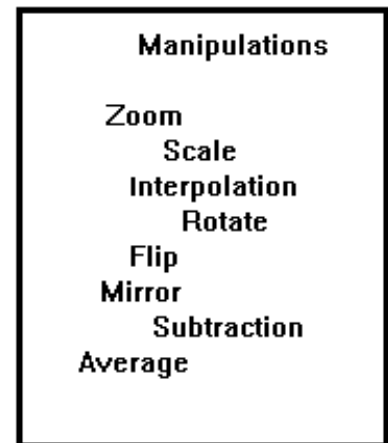
14.6.2. <u>INTERPOLATION</u>   PERFORM LOGICAL OR ARITHMETIC OPERATIONS BETWEEN AN IMAGE AND A MATHEMATICAL CONSTANT

14.6.3. <u>ROTATE</u>-   THE IMAGE WILL ROTATE 45 DEGREES WITH EACH PUSH OF THE MOUSE.

14.6.4. <u>FLIP</u>- THIS WILL FILP THE IMAGE

14.6.5. <u>MIRROR</u>- THIS WILL GIVE YOU A MIRROR IMAGE

14.6.6. <u>SUBTRACTION</u>- SUBTRACT THE BACKGROUND OF AN IMAGE CORRECT FOR NONUNIFORM LIGHTING.

14.6.7 <u>AVERAGE</u>- AVERAGE THE CONTENTS OF TWO OR MORE IMAGES

```
Analysis

Line Profile
     Area Histogram
FFT
```
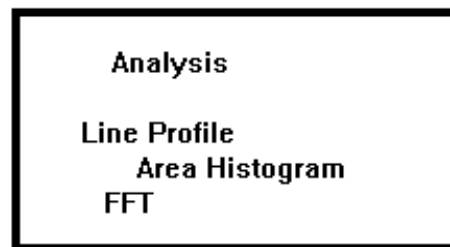
14.7. <u>ANALYSIS IS THE NEXT MENU:</u> THESE OPERATIONS ALLOW THE GATHERING OF DATA THAT DESCRIBE CHARACTERISTICS OF AN IMAGE. THEN THE GATHERED DATA CAN BE USED TO DEVELOP STRATEGIES FOR SOLVING PROBLEMS USING IMAGE MANIPULATION.

14.7.1. <u>*LINE PROFILE ANALYSIS-*</u> *IS A MATHEMATICAL PLOT THAT DESCRIBES THE INDEX VALUE OF EACH PIXEL ALONG A LINE. THIS IS DISPLAYED AS A TWO DIMENSIONAL GRAPH.*

14.7.2. <u>*HISTOGRAM ANALYSIS-*</u> *IS A MATHEMATICAL CURVE THAT DESCRIBES THE DYNAMIC RANGE AND CONTRAST IN AN IMAGE.*

14.7.3.   FFT- FAST FOURIER TRANSFORM MENU IS USED TO TRANSLATE AN IMAGE FROM A SPATIAL CONTEXT (BASED ON X, Y COORDINATES) TO A FREQUENCY REPRESENTATION.

14.7.4.   THE FFT MENU ALLOW YOU TO:

14.7.4.1   CONVERT A SPATIAL IMAGE TO A FREQUENCY REPRESENTATION.

14.7.4.2.   APPLY MASK TO THE FREQUENCY TRANSFORM TO ELIMINATE NOISE OF PERIODIC PATTERNS IN THE ORIGINAL IMAGE.

14.7.4.3.   SET MASK ATTENUATION (affects the strength of the mask's effects).

14.7.4.4.   RECORD AND PLAY CUSTOM FILTERS (mask sequences).

14.7.4.5.   CONVERT THE FREQUENCY TRANSFORM BACK INTO A SPATIAL REPRESENTATION.

14.8.   THE NEXT MENU OPTION IS MEASUREMENTS:

```
Measurements

Calibrate
        Measure Line
    Measure Area/Perimeter
```
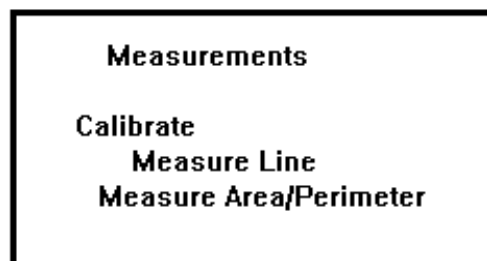
14.9. THE NEXT MENU IS ANNOTATE:

14.9.1.   WITH THIS YOU CAN ENTER TEXT AND CASE NO. AND OTHER INFORMATION ONTO

YOUR PRINT.
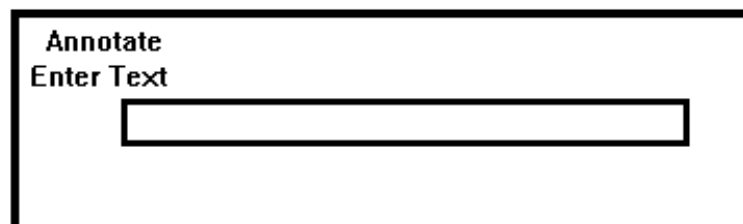
```
Annotate
Enter Text
```

```
Print Parameters

Number of Prints   1
  Size of Prints     Medium
  Orientation        Portrait
    Text Size:       Small

Comment
                   ┌─────────────────────┐
                   └─────────────────────┘
```

14.10. THE NEXT MENU IS THE PRINT MENU WHICH CONTROLS THE SIZE AND NUMBER OF PRINTS.

```
┌──────────────┐
│ Clear Screen │
│              │
└──────────────┘
```

14.11.   THE LAST SELECTION IS THE CLEAR SCREEN:

REFERENCES:

Barnes, David, " Document Processing System User's Manual", IBIS Imaging Systems

Media Cybernetics, "Image-Pro Plus Image Processing System Version 2.0", 1992.

TECHNICAL PROCEDURES MANUAL AUTHORITY ENDORSEMENT

SECTION I.14

I HAVE REVIEWED THE TECHNICAL PROCEDURES FOR THE IBIS IMAGING PROGRAMS AND APPROVE THESE PROCEDURES FOR USE BY THE NORTH CAROLINA STATE BUREAU OF INVESTIGATION FORENSIC ANALYST UNDER MY SUPERVISION.

SIGNED_____   DATED_____
DAVID C. DUNN
SUPERVISING AGENT IN CHARGE
NCSBI QUESTIONED DOCUMENTS SECTION

_____

  _____

TECHNICAL PROCEDURE TERMINATION AND ARCHIVE:

**EFFECTIVE THIS_____DAY OF_____OF THE YEAR_____,
THE USE OF THIS PROCEDURE IS HEREBY DISCONTINUED BY MY AUTHORITY AND BEING PLACED IN THE HISTORICAL AND ARCHIVAL SECTION OF THIS MANUAL FOR REFERENCE.(REFER TO SECTION K)**

SIGNED:_____TITLE:_____.

I.15. USING THE ASKSAM TYPEWRITER TYPE STYLE CLASSIFICATION PROGRAM

15.1. LOADING THE TYPE PROGRAM FROM WINDOWS:

15.1.1.   GO INTO FILE MANAGER IN WINDOWS

15.1.2.   SELECT THE C: DRIVE

15.1.3.   FIND THE <u>TYPE </u>DIRECTORY ON THE DIRECTORY TREE

15.1.4.   UNDER THE TYPE DIRECTORY FIND THE <u>TY.BAT</u> FILE, DOUBLE CLICK ON IT. THIS WILL START THE PROGRAM.
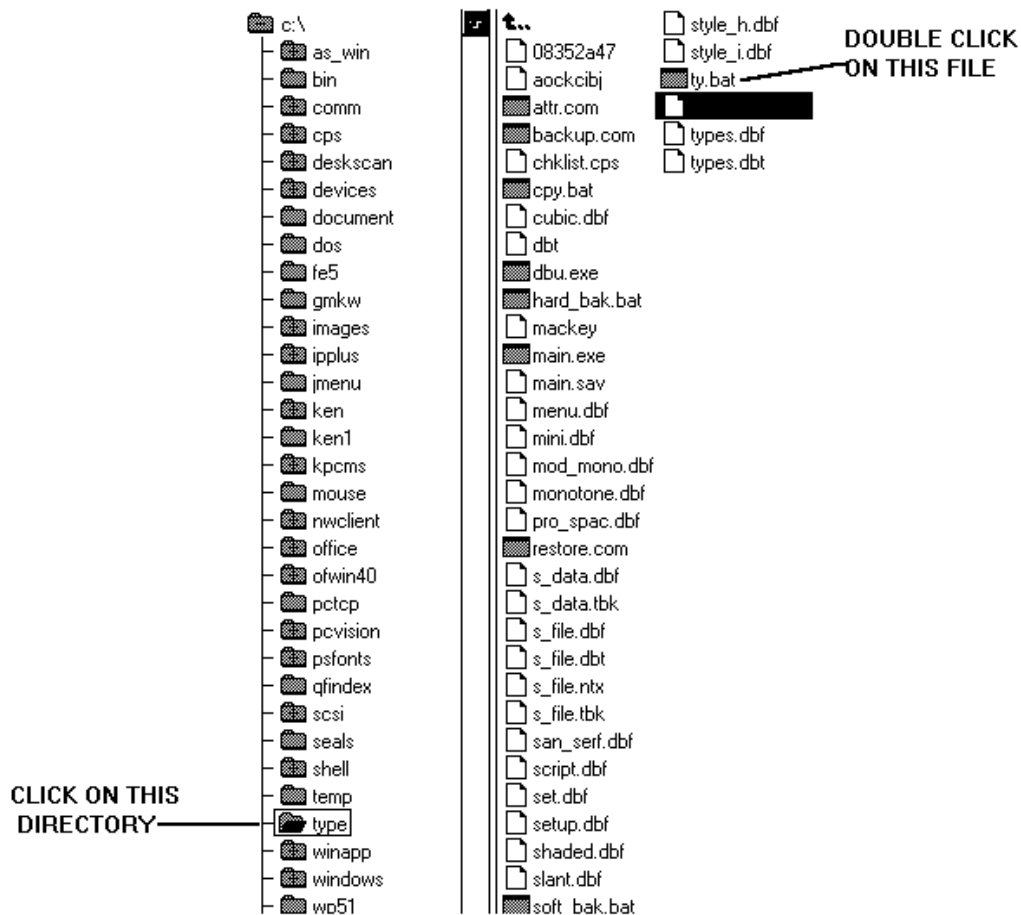
15.2. LOADING THE TYPE PROGRAM FROM THE DOS PROMPT:

    15.2.1.   **ENTER C:**

    15.2.2.   **TYPE IN "CD TYPE" PRESS ENTER**

    15.2.3.   **TYPE IN "TY.BAT" PRESS ENTER; THIS WILL START THE PROGRAM**

15.3. THE TYPE PROGRAM IS MENU DRIVEN AND BY USING THE UP/DOWN ARROWS YOU CAN USE ALL ITS FUNCTIONS.

    15.3.1.   **ENTER INFORMATION ABOUT THE QUESTIONED TYPEWRITING**

    15.3.2.   **SELECT THE QUERY FUNCTION AND THE PROGRAM WILL GIVE YOU THE POSSIBLE MATCHES.**

15.3. EXITING THE PROGRAM

    15.3.1   **SELECT THE EXIT PROGRAM COMMAND WITH THE LEFT/RIGHT ARROWS THEN PRESS ENTER.**

15.5. ADDITIONAL INFORMATION CAN BE FOUND IN THE ASKSAM TYPEWRITER MANUAL.

REFERENCES:

McKinney, Jr., Ph.D., "Users Guide AskSam the Information Manager" 1993
      Seaside Software, Inc., Perry, Florida

C:\DOCUMENT\ASKSAM1.WPD

TECHNICAL PROCEDURES MANUAL AUTHORITY ENDORSEMENT

SECTION I.15

I HAVE REVIEWED THE TECHNICAL PROCEDURES FOR THE ASK-SAM TYPE STYLE CLASSIFICATION PROGRAM AND APPROVE THESE PROCEDURES FOR USE BY THE NORTH CAROLINA STATE BUREAU OF INVESTIGATION FORENSIC ANALYST UNDER MY SUPERVISION.

SIGNED_____ DATED_____
DAVID C. DUNN
SUPERVISING AGENT IN CHARGE
NCSBI QUESTIONED DOCUMENTS SECTION

_____

_____

TECHNICAL PROCEDURE TERMINATION AND ARCHIVE:

EFFECTIVE THIS_____DAY OF_____OF THE YEAR_____, THE USE OF THIS PROCEDURE IS HEREBY DISCONTINUED BY MY AUTHORITY AND BEING PLACED IN THE HISTORICAL AND ARCHIVAL SECTION OF THIS MANUAL FOR REFERENCE.(REFER TO SECTION K)

SIGNED:_____TITLE:_____.

NCSBI QUESTIONED DOCUMENTS SECTION

17.1. INFRARED REFLECTANCE IMAGING

USING THE DAGE-MTI CCD72 COOLED CAMERA
AND THE VARISPEC FILTER SYSTEM

This type of imaging is used by the Questioned Documents Section to remove obscuring matter such as bank stamps, white out, obliterated writing of any sort, when the ink is transparent to infrared light. By exposing the questioned document to infrared radiation (quartz lights, photo floods, crimescope CS-16) we can remove this obscuring matter.

In infrared imaging, use is made of the invisible infrared rays as distinguished from the visible rays of the spectrum. A special filter (780nm or a Kodak Wratten #87) is placed in front of the DAGE-MTI infrared video camera lens to exclude the visible rays and allow only the infrared rays to reach the camera
tube. This leaves a clear reproduction of the obscured matter.

This type of imaging must be carried out in an area designed for this activity where one can control the type and intensity of lighting.

The following steps are used to produce infrared reflected images:

17.1. PLACE THE QUESTIONED DOCUMENT ON THE COPY STAND UNDER THE DAGE-MTI CCD 72 IR VIDEO CAMERA.
 17.1.1. BELOW IS THE TYPICAL COPYSTAND SETUP.

DAGE-MTI CCD 72 IR-VIDEO CAMERA WITH CRIMESCOPE #CS-16 LIGHT SOURCE

DAGE MTI CCD 72 COOLED CAMERA AND THE VARISPEC FILTER SYSTEM
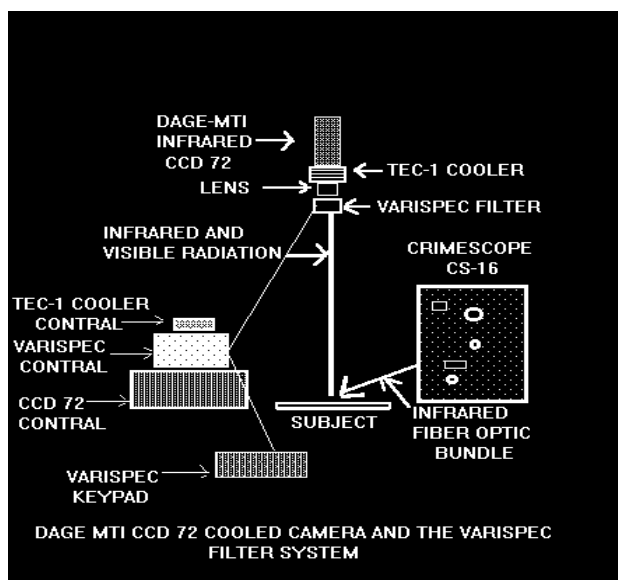
17.2 PLACE THE VARISPEC FILTER IN THE CAMERA'S FILTER HOLDER. WITH THIS FILTER SYSTEM YOU CAN KEY IN THE DISIRED FILTER NANOMETER RANGE.

17.3. TURN ON THE COPY LIGHTS OR USE THE INFRARED LIGHT GUIDE FROM THE CRIMESCOPE CS-16 LIGHT SOURCE.

17.3a THE COOLED DAGE MTI CCD72 CAMERA PROVIDES HIGH RESOLUTION IMAGES IN ULTRA LOW LIGHT. BY GATING YOUR CAMERA FOR HUNDREDS OR EVEN THOUSANDS OF FRAMES, YOU CAN BUILD UP AN ACCEPTABLE SIGNAL FROM A VERY WEAK IMAGE. THE LONGER YOU INTEGRATE, THE STRONGER YOUR SINGAL.

17.4. USING THE IBIS SOFTWARE PACKAGE ON A 486 COMPUTER WITH AT LEAST 16 MB OF RAM, ACQUIRE THIS IMAGE DIGITALLY ON CONTINUOUS ACQUIRE;
ADJUST THE LENS OPENING IN ORDER TO ACHIEVE GOOD DENSITY. USE A NIKON 35MM, 55MM OR A 105MM MACRO LENS.

    17.4.1. LENS SELECTIONS RELATES TO THE SIZE OF THE QUESTIONED DOCUMENT:
        35MM--81/2 INCHES X 11 INCHES OR A CHECK
        55MM--AN ENDORSEMENT OR SIGNATURE
        105MM---JUST ONE NAME OR SEVERAL LETTERS

17.5. BELOW IS THE ACQUIRE MENU FROM THE IBIS PROGRAM. CLICK ON CONTINUOUS ACQUIRE.
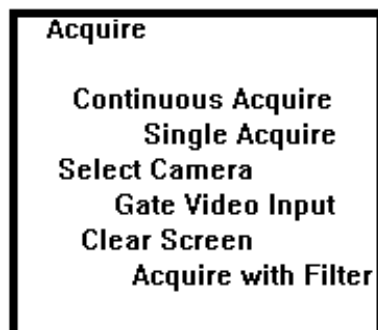
Acquire

Continuous Acquire
Single Acquire
Select Camera
Gate Video Input
Clear Screen
Acquire with Filter

MANY TIMES IF THE IMAGE IS FAINT THE GATE VIDEO INPUT OPTION IS USED (SET

AT #2 OR #3 TO START WITH).   THIS PROCEDURE WILL INCREASE THE DENSITY OF   THE IMAGE. WITH THE DAGE CCD72 COOLED IR CAMERA, YOU CAN GATE UP TO 12,800 FRAMES. AT 30 FRAMES A SECOND THAT'S MORE THAN SEVEN MINUTES OF INTEGRATION.

17.6. **NEXT USE THE CONTRAST MENU TO CHANGE THE CONTRAST OR BRIGHTNESS IN THE IMAGE:**

```
┌─────────────────────┐
│ Contrast            │
│                     │
│ Slide and Stretch   │
│     Auto-Fit        │
│ Inverse             │
│        Equalization │
│ Binarize            │
│                     │
└─────────────────────┘
```

17.6.1.   **SLIDE AND STRETCH: WITH THIS SELECTION A SLIDER BAR IS ACTIVATED DISPLAYING VALUES OF 0.5 TO 3.0 UNITS OF DENSITY. BY MOVING THE MOUSE; THE DENSITY CAN BE PROPERLY ADJUSTED TO THE LEVEL NECESSARY TO DEPICT THE QUESTIONED WRITING, THAT IS UNDER THE OBSCURING MATTER. YOU THEN CLICK ON THE LEFT MOUSE BUTTON.**

17.6.2.   **AUTO-FIT: AUTOMATICALLY SELECTS WHAT THE COMPUTER FEELS IS THE CORRECT CONTRAST**

17.6.3.   **INVERSE: PRODUCES AN IMAGE WHICH IS A NEGATIVE IMAGE.**

17.7. NEXT SELECT THE SHARPEN OPTION; NORMALLY JUST ONE CLICK ON SHARPEN WILL DO.

FILTERING CAN BE USED TO SHARPEN OR BLUR AN IMAGE, TO ENHANCE HIGH FREQUENCY DETAILS, TO DETECT EDGES, OR TO LIGHTEN OR DARKEN AN OVERALL IMAGE BY EXPANDING LIGHT OR DARK AREAS.

17.7.1. TO SHARPEN AN IMAGE USE THE HI-PASS OR SHARPEN FILTERING OPTIONS.

17.7.2. TO BLUR AN IMAGE, USE THE LO-PASS OR MEDIAN FILTERING OPTIONS.

17.7.3. TO DETECT OR ENHANCE EDGES IN AN IMAGE, SELECT THE SOBEL, PHASE, OR HORIZONTAL,VERTICAL, LAPLACIAN, AND ROBERS FILTERS AS SUBMENU CHOICES.
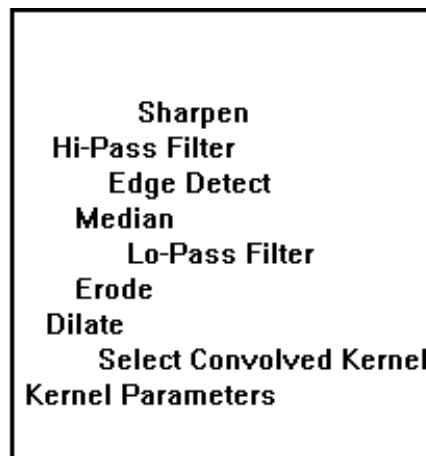
17.8. NEXT WE SELECT THE ANNOTATE OPTION:

```
Annotate
Enter Text

┌─────────────────────────────┐
│                             │
└─────────────────────────────┘
```
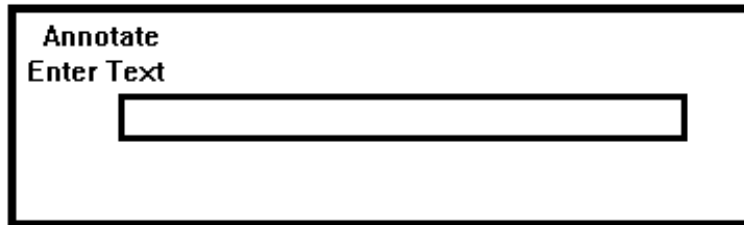
WITH THIS YOU CAN ENTER TEXT AND CASE NO.
ON YOUR IMAGE.

17.9. NEXT WE SAVE THE IMAGE TO A COMPUTER FILE BY SELECTING FILE FUNCTION.

```
File Functions

        Restore Image File
Save Image File
        Delete Image File
Image Directory
        Printrak Save
```

17.9.1.   FROM THIS MENU ALL FILE FUNCTIONS CAN BE RUN USING: :

SAVE A FILE

PULL UP A FILE FROM MEMORY,

OR DELETE AN IMAGE FILE.

17.10. PRINT THE IMAGE BY SELECTING THE PRINT OPTION:

Print Parameters

Number of Prints   1
 Size of Prints   Medium
 Orientation   Portrait
  Text Size: Small

Comment

REFERENCES:

Barnes, David, " Document Processing System User's Manual", IBIS Imaging
    Systems

Hilton, Ordway, "New Dimensions in Infrared Luminescence Photography",
    Journal of Forensics Sciences, JFSCA, Vol. 26, No 2, April 1981, pp 319-
    324.

Kodak's "Applied Infrared Photography", Publication #M-28, 1972 edition.
    pp. 51-57.

Kodak's "Kodak Infrared Films", Publication #N-17, 1981 edition, pp. 2-7.

Sanders, Robert C., "Questioned Documents Photography Techniques" The
    Evidence Photographer's International Council's Workshop (Atlanta,
    Ga. April 13 thru 15, 1980), pp. 1-29.

Young, W. Arthur, Thomas A. Benson, George T. Eaton, Kodak's "Copying
    and Duplication in Black-and-White and Color", Publication #M-1,
    1984, pp. 50-53.

TECHNICAL PROCEDURES MANUAL AUTHORITY ENDORSEMENT

SECTION I.17

I HAVE REVIEWED THE TECHNICAL PROCEDURES FOR THE INFRARED REFLECTANCE IMAGING USING THE DAGE-MTI CCD72 COOLED CAMERA AND THE VARISPEC FILTER SYSTEM AND APPROVE THESE PROCEDURES FOR USE BY THE NORTH CAROLINA STATE BUREAU OF INVESTIGATION FORENSIC ANALYST UNDER MY SUPERVISION.

SIGNED: _David C. Dunn_____ DATED: _5-9-97_

DAVID C. DUNN
SUPERVISING AGENT IN CHARGE
NCSBI QUESTIONED DOCUMENTS

_____

_____

TECHNICAL PROCEDURE TERMINATION AND ARCHIVE:

EFFECTIVE THIS_____DAY OF _____OF THE YEAR_____, THE USE OF THIS PROCEDURE IS HEREBY DISCONTINUED BY MY AUTHORITY AND BEING PLACED IN THE HISTORICAL AND ARCHIVAL SECTION OF THIS MANUAL FOR REFERENCE. (REFER TO SECTION K)

SIGNED:_____ TITLE:_____

18. USING THE WILD MZ8 STEREO MICROSCOPE FOR IMAGING WITH THE MTI VE 1000 HIGH RES. CAMERA

This type of imaging is used by the Questioned Documents Section to see magnification of the details on documents not visible to the eye.   This allows the examiner to see toner beads from photocopying, indentions from indented writing and if paper fibers have been disturbed.   The Wild MZ8 is a modern steromicroscope which through innovation in design and technology allows the examiner to see many of the details not visible to the naked eye.

Imaging is accomplished by attaching a B&W high resulation MTI VE 1000 video camera to the Wild MZ8 and acquiring the image digitized with our Ibis software and the Ibis 486 computer system.
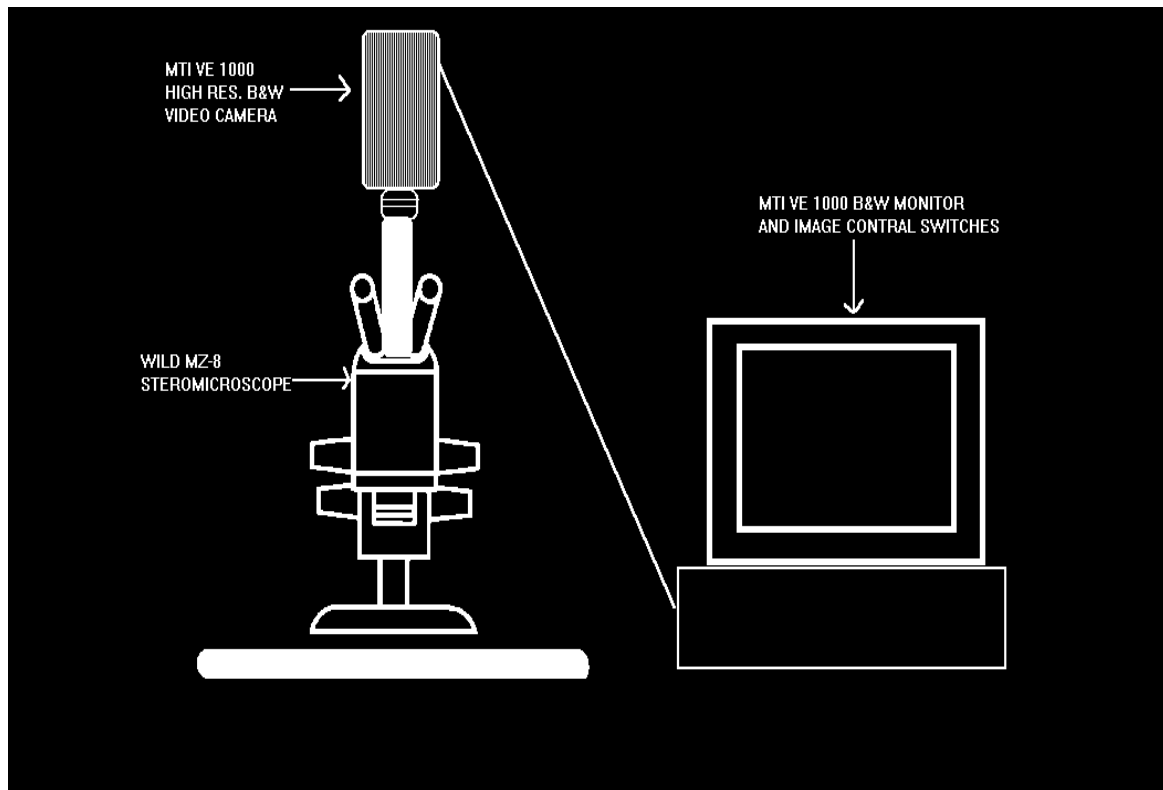
This type of imaging must be carried out in an area designed for this activity where one can control the type and intensity of lighting. The type of lighting

normally used is a ring light or fiber optics light tubes.

The following steps are used to produce images from the Wild MZ8.

18.1. PLACE THE QUESTIONED DOCUMENT UNDER THE MICROSCOPE   STAGE.

18.2. TURN ON THE   MTI VE-1000 DIGITAL 5000 VIDEO CAMERA

18.3. TURN ON THE   RING LIGHT OR THE FIBER OPTICS LIGHT

18.4. ADJUST THE MICROSCOPE

18.4.1.   BELOW IS A PHOTOGRAPH SHOWING THE DIFFERENT CONTROLS OF THE WILD MZ8:
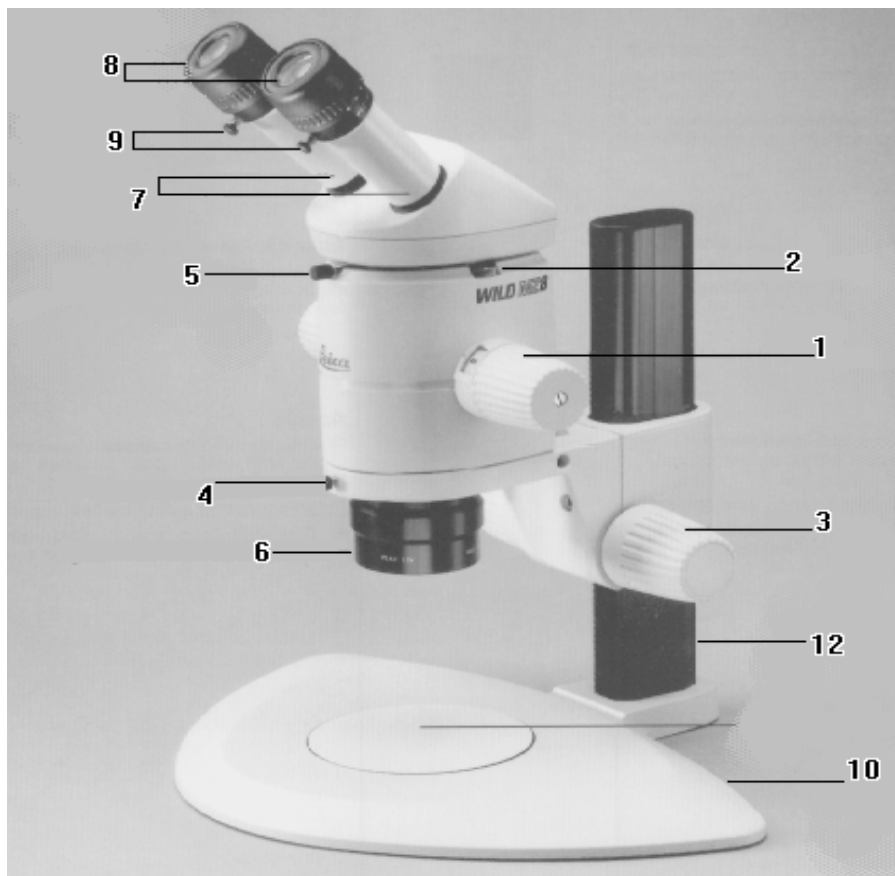
#1- MAGNIFICATION CHANGER 8:1 ZOOM

#2-KNURLED RING ENGAGES THE 8 MAGNIFICATION
    STEPS.

#3-FOCUSING DRIVE: LARGER KNOB IS COARSE FOCUSING
    SMALLER KNOB IS THE FINE FOCUSING.

#4-SECURING SCREW: HOLDS THE OPTICS CARRIER IN
    MICROSCOPE CARRIER.

#5-SECURING SCREW: HOLDS THE BINOCULAR TUBE TO THE
    OPTICS CARRIER.

#6-1.0X PLANO OBJECTIVE

#7-ADJUSTABLE EYEPIECE TUBES: INTERPUPILLARY
    DISTANCE   IS ADJUSTABLE

#8-WIDE ANGLE EYEPIECES FOR SPECTACLE WEARERS

#9-SECURING SCREWS WHICH HOLD THE EYEPIECES IN
    THE BINOCULAR TUBE

#10-INCIDENT-LIGHT BASE

#11-STAGE PLATE

#12-SIDE-FACED COLUMN WITH FOCUSING DRIVE HOUSING

18.4.2.   ZOOM IN ON THE SUBJECT USING #1.

18.4.3.   FOCUS ON THE SUBJECT USING #3.

18.5. USING THE IBIS SOFTWARE PACKAGE ON A 486 COMPUTER
WITH AT LEAST 16 MB OF RAM, ACQUIRE THIS IMAGE

DIGITALLY ON CONTINUOUS ACQUIRE.

18.5.1   UNDER THE SELECT CAMERA OPTION SELECT THE RS-170.

18.6. BELOW IS THE ACQUIRE MENU FROM THE IBIS PROGRAM. CLICK ON CONTINUOUS ACQUIRE.
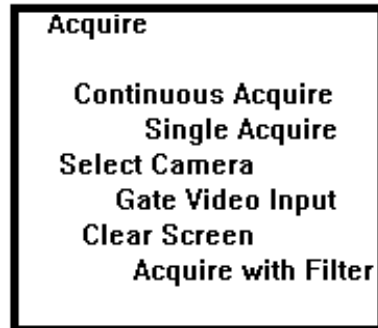
```
Acquire

     Continuous Acquire
          Single Acquire
  Select Camera
          Gate Video Input
  Clear Screen
          Acquire with Filter
```

MANY TIMES IF THE IMAGE IS FAINT THE <u>GATE VIDEO</u> INPUT OPTION IS USED (SET AT #2 OR #3 TO START WITH). THIS PROCEDURE WILL INCREASE THE DENSITY OF THE IMAGE.

18.7. USE THE CONTRAST MENU TO CHANGE THE CONTRAST OR BRIGHTNESS IN THE IMAGE:

```
Contrast

Slide and Stretch
         Auto-Fit
Inverse
          Equalization
Binarize
```
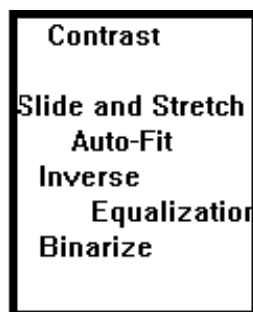
18.7.1.   <u>SLIDE AND STRETCH</u>: WITH THIS SELECTION A
SLIDER BAR IS ACTIVATED DISPLAYING VALUES
OF 0.5 TO 3.0 UNITS OF DENSITY. BY MOVING THE
MOUSE; CLICK ON THE LEFT MOUSE BUTTON WHEN
OPTIMUM DENSITY IS OBTAINED.

18.7.2.   <u>AUTO-FIT</u>: AUTOMATICALLY SELECTED WHAT THE
COMPUTER FEELS IS THE CORRECT CONTRAST

18.7.3.   <u>INVERSE</u>: PRODUCES AN IMAGE WHICH IS A NEGATIVE
IMAGE.

18.7.4.   SELECT THE SHARPEN OPTION AND CLICK ONCE USING
THE LEFT BUTTON ON THE MOUSE.
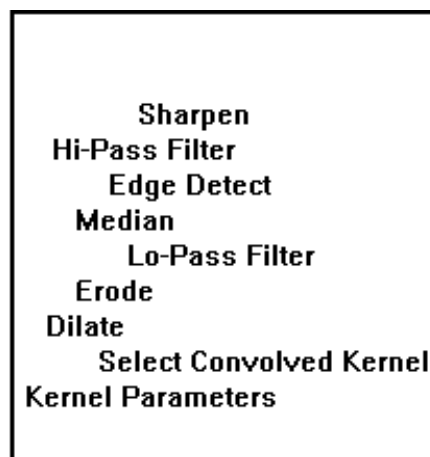
```
Sharpen
Hi-Pass Filter
      Edge Detect
Median
      Lo-Pass Filter
   Erode
Dilate
      Select Convolved Kernel
Kernel Parameters
```

FILTERING CAN BE USED TO SHARPEN OR BLUR AN IMAGE,
TO ENHANCE HIGH FREQUENCY DETAILS, TO DETECT
EDGES, OR TO LIGHTEN OR DARKEN AN OVERALL IMAGE
BY EXPANDING LIGHT OR DARK AREAS.

18.8.1.   TO SHARPEN AN IMAGE USE THE <u>HI-PASS </u>OR <u>SHARPEN</u>
FILTERING OPTIONS.

18.8.2.   TO BLUR AN IMAGE, USE THE <u>LO-PASS</u> OR
MEDIAN FILTERIN OPTIONS.

18.8.3.   TO DETECT OR ENHANCE EDGES IN AN IMAGE,
SELECT THE SOBEL, PHASE, OR

**HORIZONTAL,VERTICAL, LAPLACIAN,
AND ROBERS FILTERS AS SUBMENU CHOICES.**

18.9. SELECT THE ANNOTATE OPTION:

```
Annotate
Enter Text

[                                    ]
```
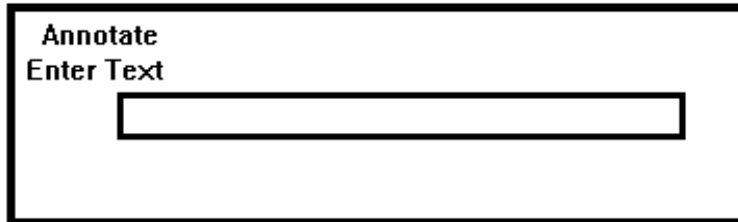
*WITH THIS YOU CAN ENTER TEXT AND CASE NO.
ON YOUR IMAGE.*

**18.10.   NEXT WE SAVE THE IMAGE TO A COMPUTER FILE BY
SELECTING FILE FUNCTION.**

```
File Functions

        Restore Image File
Save Image File
        Delete Image File
Image Directory
        Printrak Save
```

**18.10.1.   FROM THIS MENU PERFORM ALL FILE
FUNCTIONS:**

SAVE A FILE

PULL UP A FILE FROM MEMORY,

OR DELETE AN IMAGE FILE.

18.11. **PRINT THE IMAGE BY SELECTING THE PRINT OPTION:**

Print Parameters

Number of Prints   1
  Size of Prints   Medium
  Orientation   Portrait
  Text Size: Small

Comment

REFERENCES:

Barnes, David, " Document Processing System User's Manual", IBIS Imaging
    Systems

Delly, John Grutav, "Photography Through the Microscope" Kodak
    publication No. P-2, 1980.

Wild/Leica's "Wild MZ 8 User Manual", Switzerland, 1994.

c:\document\VE1000.wpd

TECHNICAL PROCEDURES MANUAL AUTHORITY ENDORSEMENT

SECTION I.18

I HAVE REVIEWED THE TECHNICAL PROCEDURES FOR THE WILD MZ8 STEREO MICROSCOPE WITH THE MTI VE 1000 CAMERA SYSTEM AND APPROVE THESE PROCEDURES FOR USE BY THE NORTH CAROLINA STATE BUREAU OF INVESTIGATION FORENSIC ANALYST UNDER MY SUPERVISION.

SIGNED: _D. C. Dunn_ DATED: _5-9-97_
DAVID C. DUNN
SUPERVISING AGENT IN CHARGE
NCSBI QUESTIONED DOCUMENTS

TECHNICAL PROCEDURE TERMINATION AND ARCHIVE:

EFFECTIVE THIS_____DAY OF _____OF THE YEAR_____, THE USE OF THIS PROCEDURE IS HEREBY DISCONTINUED BY MY AUTHORITY AND BEING PLACED IN THE HISTORICAL AND ARCHIVAL SECTION OF THIS MANUAL FOR REFERENCE. (REFER TO SECTION K)

SIGNED:_____ TITLE:_____

I.19.1. DPS-2000 OPERATING INSTRUCTIONS

19.1. The Dage-MTI inc. unit is used for calibrating the camera for the highest possible signal-to-noise ratio for the purpose of "on chip integration and densitometry applications. This produces the highest quality video image. With the exception of enhance, once calibrated, further adjustment of the camera's signal should be performed by adjusting the input gain and black level of the DPS-2000.
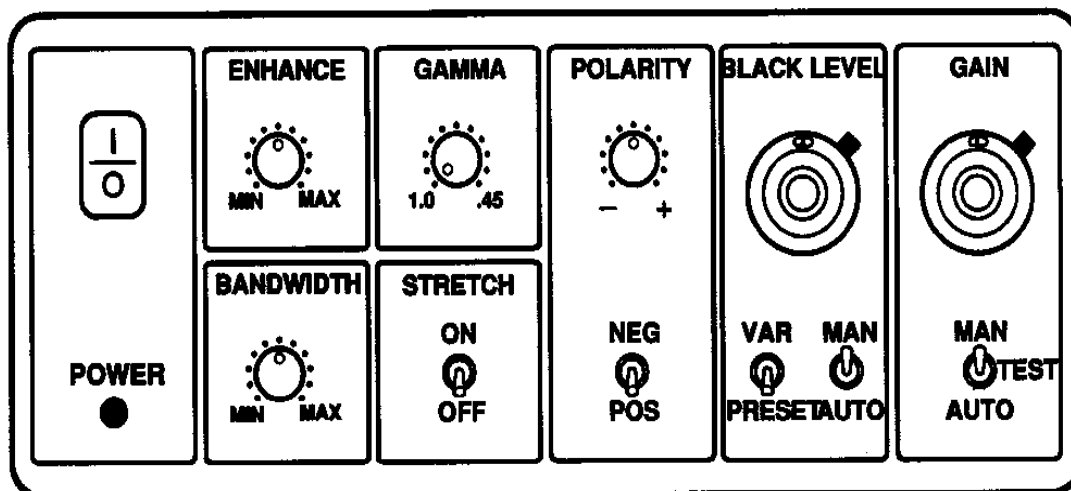
CALIBRATION PROCEDURE OF THE DPS-2000

19.1.1.　　　**Set the hi-low gain switch on the rear panel of camera control unit to low.**

19.1.2.　　　**Set enhance and bandwidth to 12 o'clock or half max.**

19.1.3.　　　**Set gama to 1.0.**

19.1.4.　　　**Set stretch to off.**

19.1.5.   Set polarity switch to pos.

19.1.6.   Set black level to preset and man.

19.1.7.   Set gain to man and turn knob fully counterclockwise to 000.

19.2. The purpose of this calibration is to allow the video input signal to pass entirely through the DSP-2000 processor without altering any grey level, black through white. This allows the operator to monitor the true video level of the input signal using the ten step video level indication and thus properly adjust the black and white levels of the video input signal either at its source, or by using the DSP-2000 input gain and black level controls. For best operation adjust the video input level such that Steps 2-9 are fully illuminated with Steps 1 and 10 being just extinguished.
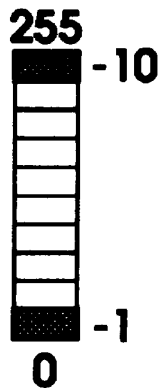
19.2.1   Adjust input gain and black levels until green calibration lights come on.

19.2.2.   Switch from live to proc.

19.2.3.   Set palette to four and mode paint.

19.2.4. Set enhance to min.

19.2.5. Adjust post process contrast, bright, and gamma until green calibration lights come on.

19.2.6. Switch back to live.
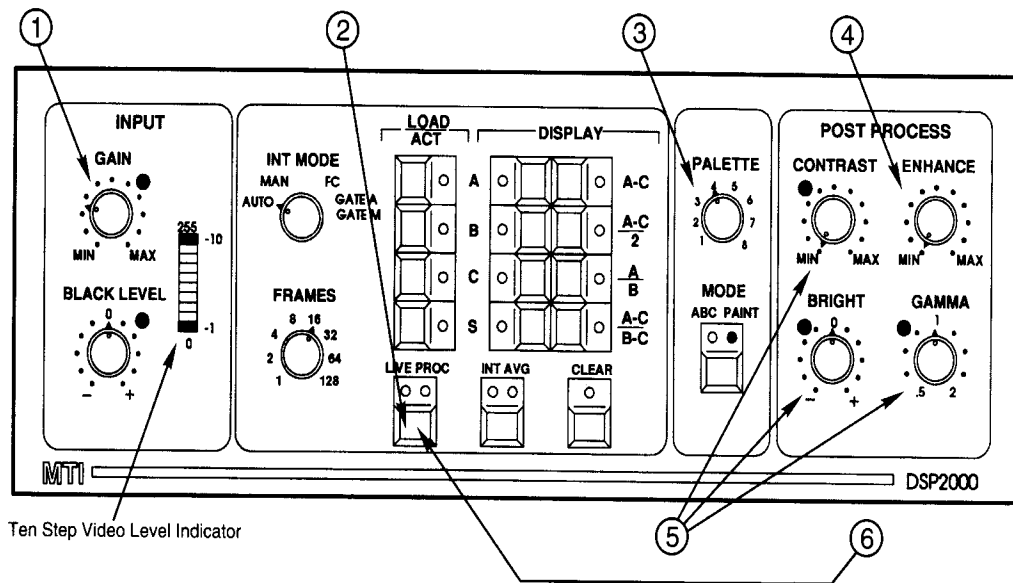
19.2.7 The DSP-2000 is now in calibration.

Ten Step Video Level Indicator

19.3. JUMPING INTEGRATING/GATING: The main function of jumping

integration is to determine the frame number and input gain values required to reach a certain sensitivity level for a specific specimen. When the jumping integration is begun, the frame number is increased only after each integration cycle is completed, until the whitest picture information saturates or loses detail or the RGB color monitor shows red.

If the whites do not saturate or red does not appear on the color monitor, set frames to "1" and change the int/mode switch from gate "A" to gate "M" thus multiplying each division by 100x, and begin again.
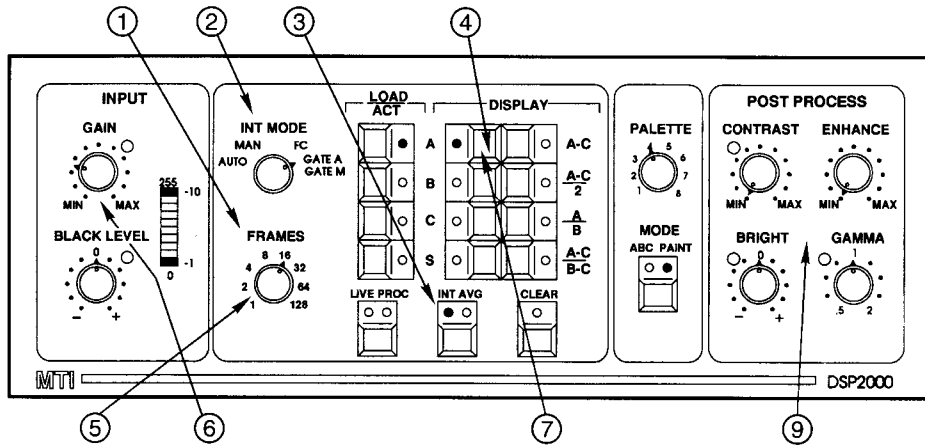
Once whites saturate or red appears, the frame number is reduced by one division and the DSP-2000's input gain is increased until whites just begin to saturate, or red begins to appear on the color monitor, again waiting for the completion of each integration cycle before increasing the gain.

Memories "B", "C" and "S" may now be loaded using the same frame number and input gain values.

If the frame number or input gain is changed, then all memories must be reloaded using new values.

19.3.1. Set frames to sixteen.

19.3.2. Set int mode to gate "A".

19.3.3. Set int/ave to int.

19.3.4. Push display "A" three times rapidly to start jumping integration.

19.3.5. Increase frame number, after each integration cycle is completed, until whites saturate, or red appears on the color monitor. If whites don't saturate, or red doesn't appear, return frames to "1" switch int/mode from gate "A" to gate "M". This multiplies the frame number by 100X, and repeats the sequence again until whites saturate or red appears on the color monitor. Now reduce the frame number one division.

19.3.6. Now slowly increase input gain, waiting for each integration cycle to be completed, and continue cycles until whites just start to saturate or red begins to appear on the color monitor.

19.3.7. To stop jumping integration cycle push display "A" once to store image in memory "A".

19.3.8. Memories "B", "C" and "S" may now be loaded. If frame number or input gain is changed for memory "A", then memories "B", "C" and "S" must be reloaded with the new values.

19.3.9. Adjust contrast, bright, enhance, and gamma for the most pleasing image.

REFERENCES:

Bogen, John "<u>DPS - 2000 Operating Instructions</u>", Dage-MTI Inc.

SECTION I.19

I HAVE REVIEWED THE TECHNICAL PROCEDURES FOR THE DPS-2000 OPERATING INSTRUCTIONS AND APPROVE THESE PROCEDURES FOR USE BY THE NORTH CAROLINA STATE BUREAU OF INVESTIGATION FORENSIC ANALYST UNDER MY SUPERVISION.

SIGNED _D. C. Dunn_____   DATED _11-21-97_
DAVID C. DUNN
SUPERVISING AGENT IN CHARGE
NCSBI QUESTIONED DOCUMENTS SECTION

_____

_____

TECHNICAL PROCEDURE TERMINATION AND ARCHIVE:

EFFECTIVE THIS_____DAY OF_____OF THE
YEAR_____, THE USE OF THIS PROCEDURE IS HEREBY
DISCONTINUED BY MY AUTHORITY AND BEING PLACED IN THE
HISTORICAL AND ARCHIVAL SECTION OF THIS MANUAL FOR
REFERENCE.(REFER TO SECTION K)

SIGNED:_____TITLE:_____

I.20. OMNIPAGE PRO (OCR) SOFTWARE

OCR is optical character recognition: the process of transferring text from printed pages into an editable computer file--without retyping.

A scanner is more than a copy machine, simply transferring an image into the computer. A scanner translates a page into data by dividing up the image into millions of dots or bits (usually 40,000 to 90,000 per square inch). It then assigns a value to each dot, depending upon wether it is inked, partially inked, or blank.

The composite document stored in your computer is the map of these dots, or a bitmap. Your computer sees this data not as editable text, but as one bit mapped image, editable only with image editing tools.

OCR is the process of translating this image into edible text. Text characters are designed by assigning a code corresponding to the keys on the keyboard to each letter, number, or symbol. The most common code set is the ASCII (American Standard Code for Information Interchange) table of character equivalents.

Caere Omnipage is a page-recognition program that incorporates feature-analysis OCR technology. Feature-analysis OCR analyzes individual character features rather than trying to match shapes as the matrix-matching method did.
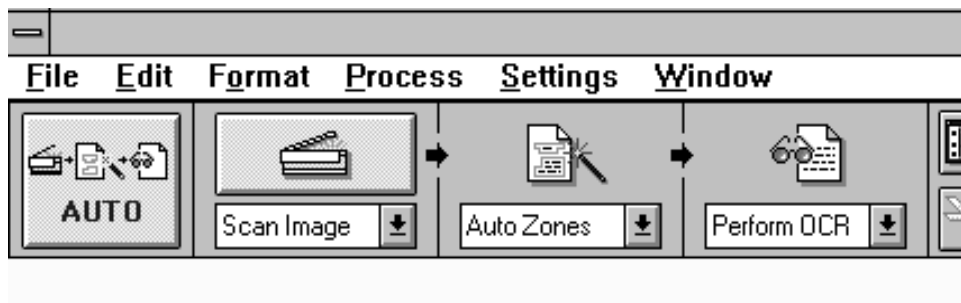
I.20.1 **Select the Settings**
-Click the drop-down list under each process button and select these options:
-Scan Image
-Auto Zones
-Perform OCR

I.20.2. **Scan the Page**
-Place the page into the scanner making sure it is aligned correctly.

-Click the AUTO button or choose auto in the Process menu.

-Automatically drawn zones appear on the image to show how text will be ordered.

-OmniPage makes three recognition passes over the page: cyan, light blue, and dark blue.

-OmniPage opens the recognized page in a maximized text window.

I.20.1. **Choose TILE VERTICAL in the Windows menu so that you can see both the zone and text windows.**
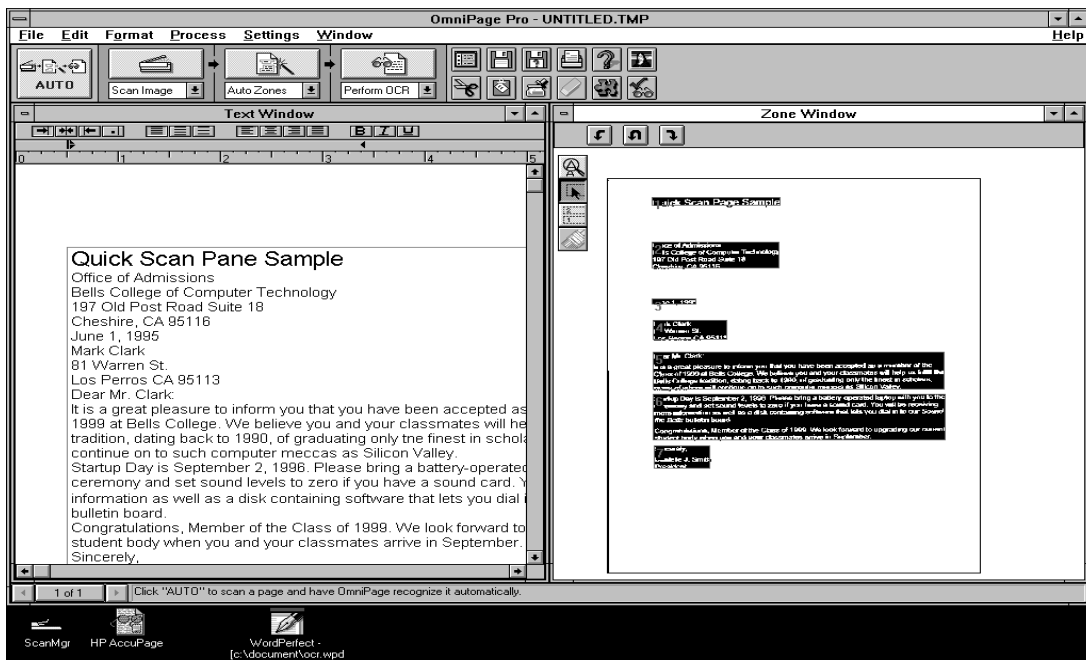
-The Zone window shows the scanned image of the page. Note that although you can see the text, you cannot select words or letters, or edit the text in any way. The text window shows the recognized, editable text.

I.20.4.	**Double-click the word Computer in the text window.
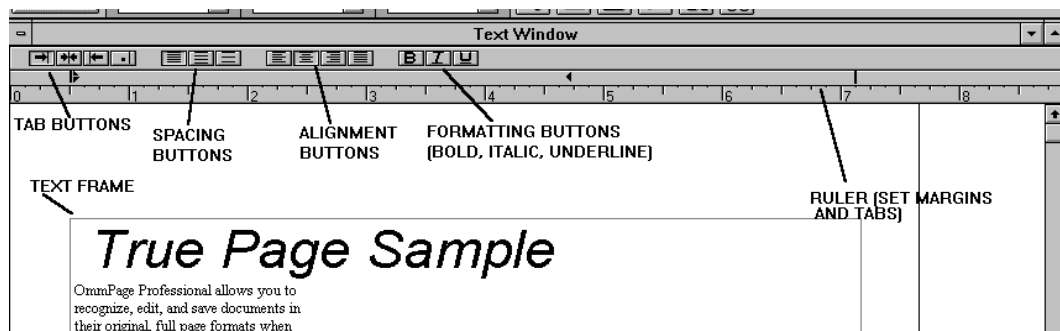The Verification window opens to show the image of the word as it was scanned originally.**

dmissions

ge of Computer Technology

st Road Suite 18

Startup Day is September 2, 1996. Please bring a battery-operated laptop with you to the ceremony and set sound levels to zero if you have a sound card. You will be receiving m

-You can retype the highlighted word if necessary while the Verification window is still open. This is a quick way to edit
text		**without using the spell checker.**

The recognized document opens in a new maximized text window.

I.20.5.	**The Text Window**

-The document's font and paragraph formatting are retained but page layout is not. Text is displayed in one column with the graphic at the end.

Text Window

TAB BUTTONS   SPACING BUTTONS   ALIGNMENT BUTTONS   FORMATTING BUTTONS (BOLD, ITALIC, UNDERLINE)   RULER (SET MARGINS AND TABS)

TEXT FRAME

True Page Sample

OmniPage Professional allows you to recognize, edit, and save documents in their original, full page formats when

I.20.6.	**Choose Tile Vertical or the Tile Horizontal in the Windows menu. The text and zone windows tile for easy viewing.**

I.20.7. Compare the recogniqed document in the text window to the scanned image in the zone window. OmniPage highlights any words it had trouble recognizing.

-Green: suspects, words that may not have been recognized correctly, are highlighted in green.

-Red tilde: reflects, or unrecognizable characters, are marked
with a red tilde (-).

I.20.8. Select a word in the text.
-If you double-click the word, the Verification window opens.
You can still edit the word if this window is open. Click anywhere outside the Verification window to close it.

I.20.9. Click the Bold button in the text window.
The text becomes bold.

I.20.10. Experiment with the other tools in the text window to see how
they affect your text.

I.20.11. <u>Check Recognition</u>
-the True Page Sample has black, crisp text on a clean white background and so should have few, if any, recognition errors. Check Recognition, however also allows you to add words to your user dictionary as well as correct recognition errors.

I.20.12. Click on the text window to make it active.

I.20.13. Click the Check Recognition button or choose Check Recognition in the Edit menu.
-the check recognition window appears. It displays the image and text of any questionable or unrecognizable word.
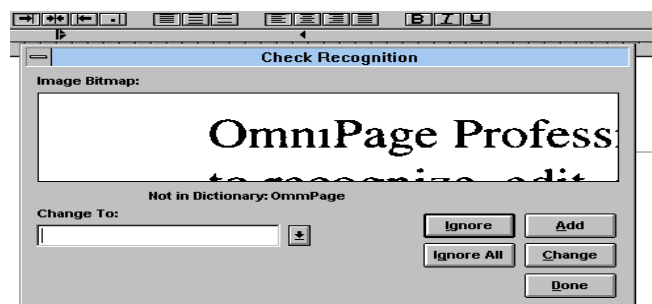
I.20.14. Correct any errors in the text.

<u>**-if words are misspelled**</u>**: correct the spelling in the change to edit box and click change. Select a word in the list and click change to replace the word in the text. Alternatively, type the proper word in the change to edit box.**

<u>**-if the word is correct:**</u>** click Add to add the word to the User Dictionary. The word will still be flagged if it is a suspect (green) word and it occurs again.**

Click Ignore All to ignore all instances of the currently flagged word in the document. OmniPage automatically moves to the next word after you click a button.

Click done if you want to end the spell check.

I.20.15. <u>Save the Document</u>: You save the document as a Caere Document (a special OmniPagee format), reopen it, and save it as a word-processing file.

-Click on <u>save as</u> Button in the file menu.

-Select CAERE

-Type file name

-Click OK

I.20.16. <u>Reopen the Document</u>: Choose Open Document in the File Menu box.

-Select the Caere file needed

-Locate and open the file.

I.20.17. To save the document as a Word-Processing File
-Click on Save As

-Select the Word Perfect option

-type in the file name and click on OK

REFERENCES:

Caere Corporation, "<u>OmniForm Version 2 for Windows 95/NT/3.1</u>", 1996, Los Gatos, California 95030

Caere Corporation, "<u>OmniPage Pro Image Assistant</u>", 1993, Los Gatos, California 95039

c:\document\ocr.wpd

SECTION I.20

I HAVE REVIEWED THE TECHNICAL PROCEDURES FOR OMNIPAGE
PRO (OCR) SOFTWARE PACKAGE OPERATING INSTRUCTIONS AND
APPROVE   THESE PROCEDURES FOR USE BY THE NORTH CAROLINA
STATE BUREAU OF INVESTIGATION FORENSIC ANALYST UNDER MY
SUPERVISION.

SIGNED _____   DATED _11-21-97_
DAVID C. DUNN
SUPERVISING AGENT IN CHARGE
NCSBI QUESTIONED DOCUMENTS SECTION

TECHNICAL PROCEDURE TERMINATION AND ARCHIVE:

EFFECTIVE THIS_____DAY OF_____OF THE
YEAR_____, THE USE OF THIS PROCEDURE IS HEREBY
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HISTORICAL AND ARCHIVAL SECTION OF THIS MANUAL FOR
REFERENCE.(REFER TO SECTION K)

SIGNED:_____TITLE:_____

I.21.VARISPEC TUNABLE IMAGING FILTER

The Varispec tunable imaging filter uses electronically controlled liquid crystal elements to select a transmitted wavelength range, while blocking all others.

The Varispec tunable filter provides rapid, vibration less selection of any wavelength in the visible and infrared ranges of the spectrum. VariSpec's unlimited wavelength selection and excellent image quality are valuable in questioned documents work.

The VariSpec filter is a Lot-type birefringent filter in which electronically controlled liquid crystal elements are used to select a transmitted wavelength, while blocking all others. Commands are used to control all aspects of the filter and can include defining a "palette" of wavelengths, and cycling through this "palette" in random or serial fashion.

This filter consists of an optics module and an electronics control module. These two modules are connected by a cable up to two meters in length. The filter transmission is sensitive to polarization of the input beam. Transmission is increased by a factor of two if the input beam is polarized along the transmission axis of the input polarizer.
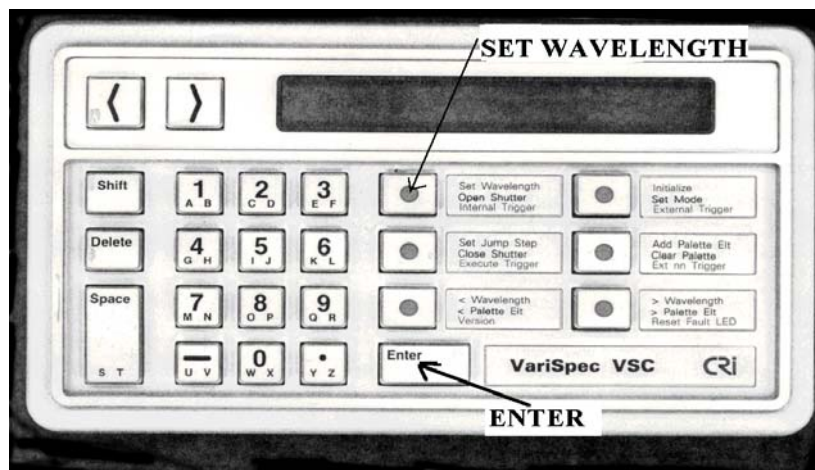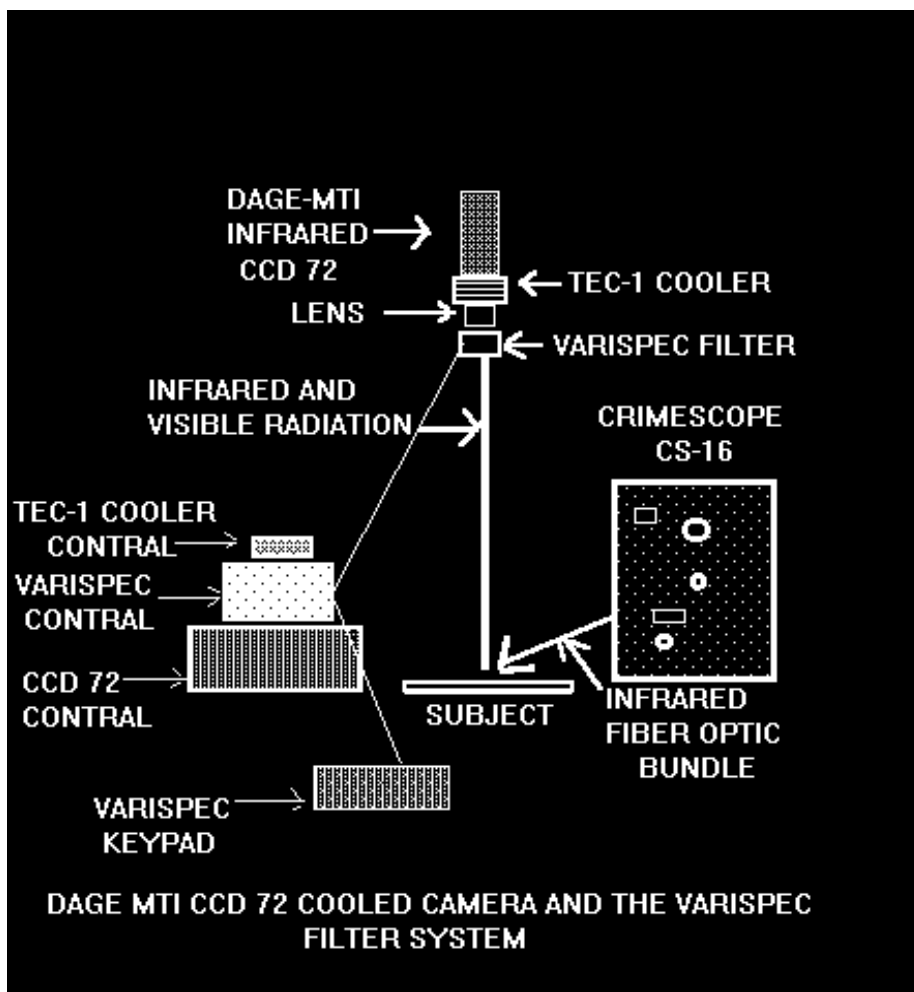

The

VariSpec filter electronics contral module.

I.21.1.   **To use the Varispec filter system: <u>turn on the power</u> of the filter controller. An initialization sequence will take a minute to place the filter in a known state.**

I.21.2.   **Press the <u>(SET WAVELENGTH)</u> button on the key pad.**

I.21.3.   **Using the key pad type in the <u>wavelength number in NM</u>.**

**I.21.4
Press the**   **<u>enter</u>
<u>key</u> to**   **activate
the filter.**

DAGE-MTI
INFRARED →
CCD 72
LENS →
← TEC-1 COOLER
← VARISPEC FILTER
INFRARED AND
VISIBLE RADIATION →
CRIMESCOPE
CS-16
TEC-1 COOLER
CONTRAL →
VARISPEC
CONTRAL →
CCD 72 →
CONTRAL
SUBJECT
INFRARED
FIBER OPTIC
BUNDLE
VARISPEC →
KEYPAD
DAGE MTI CCD 72 COOLED CAMERA AND THE VARISPEC
FILTER SYSTEM

Copystand setup using the Varispec filter system.

I.21.5. **This image can then be used in the ibis imaging software system by** **way of the Dage-MTI CCD 72 camera. (Ref. I.17)**

REFERENCES:

Varispec Tunable Filter User's Manual, Cambridge Research &
Instraumentaion, Inc, dated 7-15-96 revision 4.1 May, 1995; 21 Erie
Street, Cambridge, MA 02139

C:\document\varispec.wpd

SECTION I.21

I HAVE REVIEWED THE TECHNICAL PROCEDURES FOR THE
VARISPEC TUNABLE IMAGING FILTER OPERATING INSTRUCTIONS
AND APPROVE THESE PROCEDURES FOR USE BY THE NORTH
CAROLINA STATE BUREAU OF INVESTIGATION FORENSIC ANALYST
UNDER MY SUPERVISION.

SIGNED _____   DATED _/ /-20-9 7_

DAVID C. DUNN
SUPERVISING AGENT IN CHARGE
NCSBI QUESTIONED DOCUMENTS SECTION


TECHNICAL PROCEDURE TERMINATION AND ARCHIVE:

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SIGNED:_____TITLE:_____

I.22.   POWERPOINT SOFTWARE

I.22.1.   PowerPoint is a complete presentation graphics package.

-Quickly create strong overheads, paper handouts, 35mm slide, or computer screen presentations.

-Augment your presentations with speaker's notes, outline pages, and audience handouts.

-Can import materials created in Microsoft Word and Excel.

I.22.2.   Quick Preview is a demonstration of PowerPoint features. It is available under the help menu. The preview is designed to give you a quick overview of the main features of PowerPoint so you can grasp how the soft ware works and what it can do.
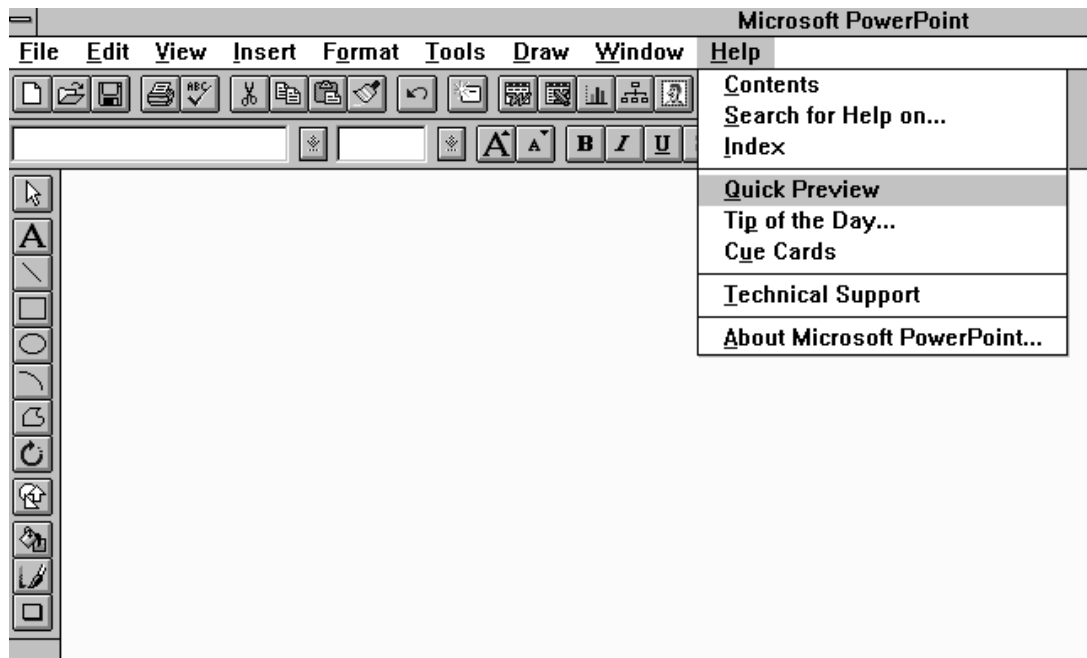
I.22.3.   Cue Cards are procedures that stay on your screen while you work, giving you a brief step-by-step instruction on how to accomplish a task. Cue Cards cover common but sophisticated procedures such as adding a logo to every slide, creating "drill

**down" documents, or adding video to your slides.**

I.22.4. **To use the Cue Cards:**

I.22.4.a. **From the Help menu choose the Cue Cards.**
The Cue Cards screen appears.

I.22.4.b. **Click the topic or procedure you want help with.**
The Cue Cards lead you through the procedure step by step. Cue cards stay on your screen until you close them.

I.22.5. **ToolTips and the Status Bar**
When you position the pointer over one of the toolbar buttons, a yellow box appears telling you the name on
the **button. These boxes are called ToolTips. The status bar shows a longer description of the command while a ToolTip is displayed.**
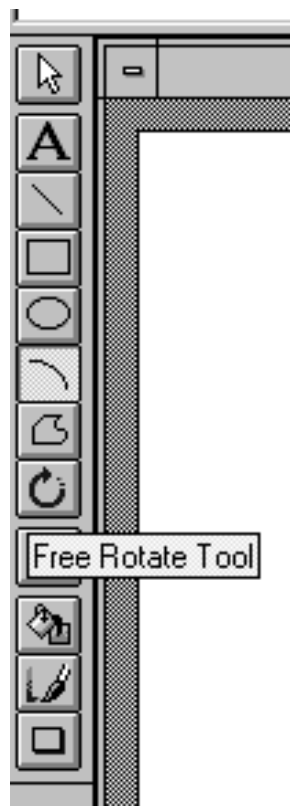
I.22.7.   **Tip of the day**
   **Each time you start PowerPoint, you'll see a PowerPoint tip
               to help you use PowerPoint more effectively. You can view
               tips at any time by choosing the Tip of the day command
               from the Help menu.**

I.22.8.   **Quick Steps for Creating a Presentation:**

I.22.8.a.   **Start PowerPoint by double-clicking on the icon.**

I.22.8.b.   **Use the AutoContent Wizard to create a presentation.
                  -From the file menu, choose New, and then, in the**
New   **Presentation dialog box, select AutoContent Wizard.**
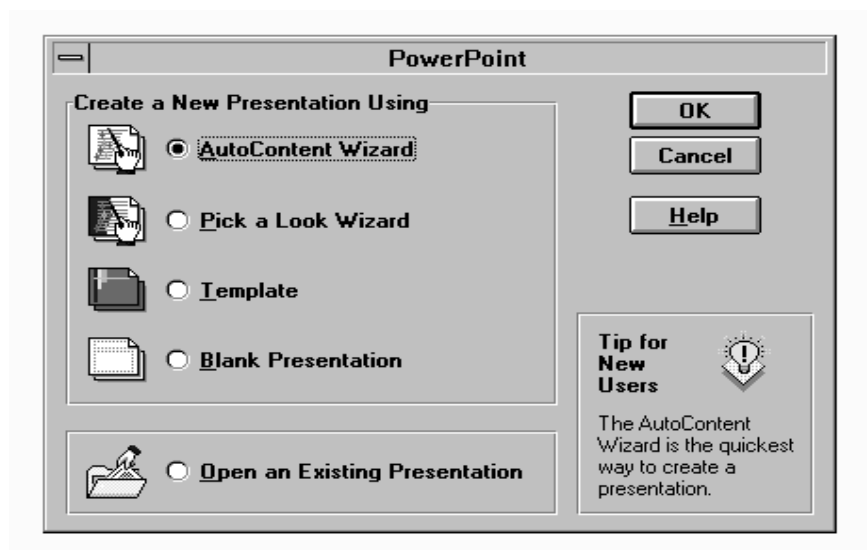

       **-Select the AutoContent Wizard's option button. The AutoContent
Wizard will prompt you to make a title slide and then leads you through
choosing a presentation category. You will get an outline that reflects the
category you have chosen. Type your own ideas over the sample text in the
outline. Switch to Slide view to see your slides.**

I.22.8.c.   **Refine your presentation**
                  To change you presentations look (editing the text, changing
colors,   **changing the order of slides), use the Pick a Look Wizard**
button.

I.22.8.d.   Preview your presentation on-screen
                    -preview your show by clicking the Slide Show button at the
                            bottom of the PowerPoint window. Click the mouse button
to   advance the slides manually.
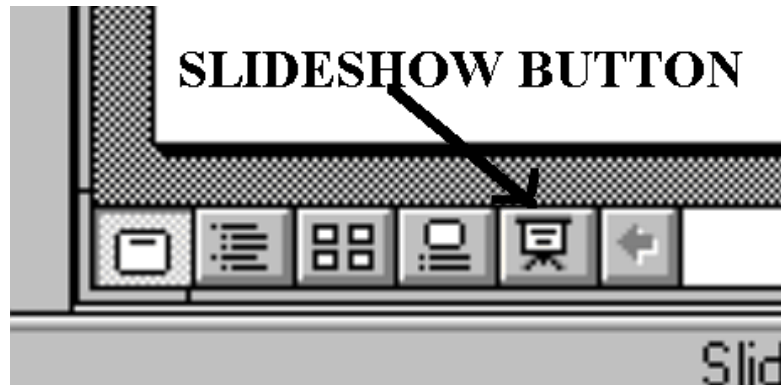
I.22.8.d   Save and Print your presentation

                    Before printing your presentation, it is a good idea to save it
                    using the Save command on the File menu.

                    When you use the Pick a look wizard, PowerPoint sets the
                    output format for you. All you need to do is choose the
Print   dialog box, choose what you want to print to print a
hard   copy.

REFFERENCES:

**Microsoft Corp., Microsoft PowerPoint The Most Popular Presentation
           Graphics Program Version 4.0, 1994 Microsoft Corporation**

c:\document\powerp1.wpd

SECTION I.22

I HAVE REVIEWED THE TECHNICAL PROCEDURES FOR THE
POWERPOINT SOFTWARE PACKAGE AND APPROVE THESE
PROCEDURES FOR USE BY THE NORTH CAROLINA STATE BUREAU
OF INVESTIGATION FORENSIC ANALYST UNDER MY SUPERVISION.

SIGNED _____   DATED _11-20-97_
DAVID C. DUNN
SUPERVISING AGENT IN CHARGE
NCSBI QUESTIONED DOCUMENTS SECTION

_____

_____

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SIGNED:_____TITLE:_____