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Department of Forensic Science

VIRGINIA

DEPARTMENT

BLOODSTAIN PATTERN

TRAINING MANUAL

FORENSIC SCIENCE

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1 INTRODUCTION

1.1 Purpose and Scope

1.1.1 The purpose of this document is to provide the Department of Forensic Science with qualified personnel capable of classifying stain patterns and providing scene reconstruction. It is intended to develop a person with a good scientific background into a qualified forensic examiner by providing the trainee with the knowledge and application of accepted procedures of bloodstain pattern analysis, as well as the legal significance and evidentiary value of the analysis.

1.1.2 The program will provide exposure to experimentations, tests, techniques, and procedures presently used and accepted by the courts and bloodstain pattern analysts. Additionally, it will provide exposure to the relevant literature available in the field. Exposure to legal aspects and testimony will be continuous throughout the training.

1.1.3 Upon completion of this course the trainee will be able to independently conduct complex examinations, convey conclusions both verbally and in writing, and provide effective court testimony as an expert witness.

1.2 Coordination of the Program

1.2.1 The training coordinator will be an experienced examiner.

1.2.2 Any inter-laboratory training should be arranged through the appropriate coordinators.

1.3 Training Period

1.3.1 The length of the training period is a highly variable matter and will be left to the determination of the training coordinator. Certain individuals may require less time than others, depending on experience, education, or learning ability. The training time will vary depending on the time required to enroll the trainee in the proper adjunctive training courses.

1.3.2 Throughout the training period, the trainee will assist with casework, only under the direct supervision of a qualified examiner to familiarize the trainee with different forms of case evidence, documentation, packaging, and applied analytical techniques.

1.4 Location of Training

1.4.1 The bulk of an individual's training will occur in the Central Laboratory.

1.5 Training Goals

1.5.1 The training should culminate so that the trainee successfully completes the following modules.

1.5.2 The History of Bloodstain Pattern Analysis.

1.5.3 Bloodstain Pattern Analysis Terminology and Definitions.

1.5.4 Physical Properties of Blood.

1.5.5 Size, Shape and Distribution.

1.5.6 Common Pattern Types (Categories) and Spatter Characteristics.

1.5.7 Origin Determination.

1.5.8 Bloodstain Examination Equipment and Supplies.

- 1.5.9 Blood Detection.
- 1.5.10 Bloodstain Evidence Photography and Documentation.
- 1.5.11 Crime Scene Procedures and Documentation.
- 1.5.12 Examination Procedures.
- 1.5.13 Report Writing and Court Presentation.
- 1.5.14 Complete Competency Examination.
- 1.5.15 Complete Basic 40 hour Bloodstain Course.
- 1.5.16 Complete Advanced 40 hour Bloodstain Course.
- 1.5.17 Complete DFS "Blood Identification" Training.
- 1.5.18 Complete Mock Trial.

1.6 Mock Trials

1.6.1 Each case a forensic examiner analyzes has the potential of involving him/her as an expert witness in courtroom testimony. The trainee must never underrate this important aspect of the work. It is the training coordinator's responsibility to ensure that the trainee is thoroughly prepared for legal questioning. This can be done by a combination of mock trial, prearranged as well as impromptu question and answer sessions, pertinent literature review, and observation of courtroom testimony given by experienced examiners.

1.6.2 A mock trial may take place after the trainee has completed a block of this training protocol and a practical examination of a case incorporating that block of training.

1.6.3 After all phases of this training protocol have been satisfactorily completed; a final mock trial will incorporate all aspects of this training program and will be held subsequent to the final practical examination of a fabricated case.

1.7 Guidelines for Comprehensive Oral Examination and Final Comprehensive Mock Trial

1.7.1 Prior to the final mock trial, a technical oral examination of the trainee will be conducted by the section supervisor of the bloodstain section and Department management to ascertain the technical knowledge of the individual. This will be limited to two (2) hours.

1.7.2 After the examination, supervision/management will assess the trainee's performance.

1.7.3 The outcome of the oral examination will be:

1.7.3.1 Satisfactory.

1.7.3.2 Not satisfactory.

1.7.3.2.1 If the panel determines that the trainee's performance was not satisfactory, steps must be taken to effect the appropriate action.

1.7.4 A taped final mock trial will follow the successful completion of the technical oral examination.

1.7.5 The final mock trial will not exceed three (3) hours.

- 1.7.6 The atmosphere of the trial will be formal. That is, it will be conducted in the same manner as a real courtroom situation. This includes conduct, protocol, and all other aspects.
- 1.7.7 Harassment of the expert witness by defense counsel or prosecutor will be kept to the minimum necessary to achieve the desired goal. Questioning by both the prosecutor and defense attorney should be relevant and realistic.
- 1.7.8 The trial may be stopped at any time upon the request of any of the involved parties.
- 1.7.9 Immediately following the trial, the trainee may be released while the Department Director or his designee, the Section Supervisor of the Bloodstain Pattern Section, and trial participants to evaluate the trainee's performance.
- 1.7.10 The outcome of the trial evaluation will be:
- 1.7.10.1 Satisfactory.
- 1.7.10.2 Not satisfactory.
- 1.7.10.2.1 If the panel determines that the trainee's performance was not satisfactory, steps must be taken to effect the appropriate action.
- 1.7.11 This evaluation may be followed by a short performance critique.
- 1.7.12 The training coordinator will review the videotape with the individual as soon as possible. Other participants/observers should provide any comments to the training coordinator as soon as possible.

1.8 Transition from Trainee to Examiner

- 1.8.1 After the new bloodstain pattern analyst has successfully completed this training, there follows a period of adjustment. The job of the training coordinator is to insure that this transition from training to real life takes place as smoothly as possible.
- 1.8.2 All of the newly qualified examiner's casework should be monitored for a period of at least six (6) months following certification by the Department. All of the newly qualified examiner's reports must be reviewed prior to release by the supervisor or designee. Approximately four (4) to six (6) months after qualification, the trainee will complete a training Program evaluation form (DFS Document 100-F121), in accordance with QM Section 19.5.5.
- 1.8.3 The supervisor, or designee, will accompany the newly qualified examiner to court for the first few cases.

1.9 Instructions for the Training Coordinator

- 1.9.1 The intent of the training program is to ensure that each and every trainee is provided with certain basic principles and fundamentals necessary for the complete education of an examiner in the Bloodstain Pattern Section. All of the listed topics must be incorporated into the program. However, education and prior experience of the trainee will be used as a guide to determine the amount of time devoted to each topic. Some of the topics will suggest an order of events and this ranking should be followed.
- 1.9.2 The training coordinator will document the completion of each required training task by the trainee on the designated checklist for that aspect of training. The checklist for each training topic is located at the end of this training manual.
- 1.9.2.1 The completed checklists will be retained by the trainee in the appropriate sections of his/her training notebook.

- 1.9.2.2 One copy of all completed checklists will accompany the training coordinator's final report stating that all aspects of the training program have been completed satisfactorily.
- 1.9.2.3 The trainee will be evaluated on his/her performance during the course of the program. These should be monthly written evaluations of the trainee's progress. The training report is due on each trainee within five working days of the end of the month to the Physical Evidence Program Manager and the Director of the laboratory where the training is being provided. Should a trainee demonstrate a deficiency which may impact successful completion of the training program, the Training Coordinator will notify the trainee's Supervisor, the Physical Evidence Program Manager and the Laboratory Director within five working days.
- 1.9.3 The monthly training report should include:
- 1.9.3.1 A summation of the progress made during the month.
- 1.9.3.2 An evaluation of the trainee's notebook.
- 1.9.3.3 An evaluation of the progress during the month, to include:
- 1.9.3.3.1 Problem areas, as applicable, and their solutions or proposed solutions.
- 1.9.3.3.2 Trainee's strong points.
- 1.9.3.3.3 Trainee's weak points and suggested remedies.
- 1.9.3.3.4 Statement concerning trainee's overall performance.
- 1.9.3.3.5 Plans for the upcoming month.
- 1.9.4 This report will be in memorandum format. Each memorandum will become a part of the training history of the trainee and will be used to document the trainee's progress toward qualification. The monthly report format is located at the end of this section.
- 1.9.5 A review of the checklists with the trainee at the end of each month will enhance the training coordinator's ability to prepare the monthly written evaluation, and may also give the trainee a greater sense of accomplishment. The coordinator is to discuss this evaluation with the trainee. Any comments by the trainee are to be included with the report.
- 1.9.6 When the trainee has satisfactorily completed all training requirements, a memorandum will be issued by the Section Supervisor to the Physical Evidence Program Manager recommending that the person be qualified to perform the specified duties of an examiner in the section. The Physical Evidence Program Manager will forward a written recommendation through the QAC to the Department Director (or appropriate designee) for certification in accordance with Section 19.6.1 of the Quality Manual. If the trainee cannot meet the criteria expected of him/her during the period allowed for training in each of the areas, steps will be taken to effect the appropriate action.

1.10 Instructions for the Trainee

- 1.10.1 The trainee is expected to keep a loose-leaf notebook on all work completed. The completed checklist for each training topic and the training coordinator's monthly reports will also be included in the notebook. This notebook will be checked monthly by the training coordinator.
- 1.10.2 The notebook should be organized by subject. Within each subject category, the types of tests, examinations or experiments observed and performed; notes and comments on each type of test; and the review of pertinent literature should be included.

1.11 Assessment/Training of Experienced Personnel

The responsibility for assessing the degree of qualifications of newly hired personnel who have previously successfully completed a qualifying training program of instruction in Bloodstain Pattern Analysis shall lie with the Section Supervisor, the Physical Evidence Program Manager and other designated management.. In order to substitute for the entirety of the training specified in this manual, the qualifying course must have been formally structured, must have covered all appropriate facets of Bloodstain Pattern Analysis, must have been administered by a reputable organization (or individual), and the duration must not have been less than one year (full-time). Methods of verifying the completion or prior training could include reviewing the individual's job application, personal interview, review of transcripts or prior training records, checking references, consulting with previous training coordinators, administering a series of practical exams, and/or written and/or oral technical exams. Newly hired personnel shall not be considered for certification by the Department Director (or appropriate designee) to begin any actual casework until each has successfully completed at least one competency test, consisting of a practical test, a technical oral examination and a final mock trial . Once the employee has been evaluated, the Section Supervisor shall provide a recommendation in writing to the Physical Evidence Program Manager who will forward a written recommendation for the certification through the QAC to the Department Director (or appropriate designee) in accordance with Section 19.6.1 of the Quality Manual. A copy of the signed memorandum shall be retained by the Section Supervisor. The employee's Supervisor should monitor the new employee's casework for a period of at least six (6) months following certification by the Department. In addition, the supervisor, or designee, will accompany the newly qualified examiner to court for the first few court appearances.

1.12 Orientation

- 1.12.1 Before beginning the training program, an orientation of the new employee will include an introduction to the operating facilities and personnel. A work/study area will be assigned by the Section Supervisor. In addition, the following documents will be covered: Quality Manual; Departmental Administrative Policies; Regional Operating Procedures (ROP); Section Procedures Manual; Section Training Manual; DFS Safety Manual; organizational chart of the Department of Forensic Science.
- 1.12.2 An introduction to the technical capabilities of all regional laboratories, to include the regional boundaries and areas of overlap will be discussed.
- 1.12.3 The outline of the training program and the expectations of both the TC and the trainee will be discussed.
- 1.12.4 An explanation of the operation of local, state and federal law enforcement agencies and court systems will be provided.
- 1.12.5 The duties of a forensic bloodstain pattern analyst will be clarified.
- 1.12.6 The employee will also be introduced to the Department's LIMS system.

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2 The History of Bloodstain Pattern Analysis

2.1 Objectives

- 2.1.1 To understand the evolution of the Bloodstain Pattern Analysis discipline.
- 2.1.2 To understand the work of Dr. Eduard Piotrowski in Vienna in 1885.
- 2.1.3 To understand the work of early American Scientists who studied the Bloodstain Pattern discipline (Dr. Paul L. Kirk & Prof. Herbert L. MacDonell)
- 2.1.4 To understand the current status & developments within the discipline.
- 2.1.4 To understand the value of Bloodstain Pattern Analysis as it relates to Criminal Investigations.
- 2.1.5 To understand the role of the “International Association of Bloodstain Pattern Analysts”.

2.2 Methods of Instruction

2.2.1 Lecture/Discussion/Literature Reading

- 2.2.1.1 The lecture and discussion will include historical information presented in the Literature References mentioned in Section 2.2.2

2.2.2 Literature

- 2.2.2.1 Piotrowski, Eduard, Origin, Shape, Direction and Distribution of the Bloodstains following Head Wounds Caused by Blows, The Institute of Forensic Medicine of the k. k. University in Vienna, March 1895
- 2.2.2.2 MacDonell, H. L., “Flight Characteristics and Stain Patterns of Human Blood” and “Bloodstain Pattern Interpretation”, Washington, U. S. Department of Justice, LEAA, N.I.L.E.C.J., 1971
- 2.2.2.3 Eckart, W.G. and James, S. H., Interpretation of Bloodstain Evidence at Crime Scenes, New York, Elsevier, 1989
- 2.2.2.4 Bevel, T. and Gardner, R. M., Bloodstain Pattern Analysis, New York, CRL Press, 1997
- 2.2.2.5 MacDonell, H. L., “Segments of History: The Literature of Bloodstain Pattern Interpretation Segment 00: Literature through the 1800’s”, IABPA Newsletter
- 2.2.2.6 MacDonell, H.L., “Segments of History in the Documentation of Bloodstain Pattern Interpretation” Segment 01: 1901-1910”, IABPA Newsletter
- 2.2.2.7 MacDonell, H.L., “Segments of History: The Literature of Bloodstain Pattern Interpretation Segment 02: Literature from 1911 through 1920”, IABPA Newsletter
- 2.2.2.8 MacDonell, H.L., “Segments of History: The Literature of Bloodstain Pattern Interpretation Segment 03: Literature from 1921 through 1930”, IABPA Newsletter

2.2.3 Evaluation/Assignment

- 2.2.3.1 Read the four segments prepared by Professor Herbert L. MacDonell (2.2.2.5 – 2.2.2.8). Choose three events that are felt to be significant to the advancement of bloodstain analysis. Describe thoroughly in writing what challenges and advantages these events will have in work as a bloodstain analyst.

2.2.3.2 Literature Study – Prepare a paper on a particular aspect of Bloodstain History.

2.3 Modes of Evaluation

2.3.1 Review and grading of assignments.

2.3.2 Question and answer session.

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3 BLOODSTAIN PATTERN ANALYSIS TERMINOLOGY & DEFINITIONS

3.1 Objectives

- 3.1.1 To understand and become familiar with the accepted terminology used in the Bloodstain Pattern Analysis field, in accordance with the IABPA (International Association of Bloodstain Pattern Analysts).
- 3.1.2 To understand how terminology applies to case situations and written reports.

3.2 Methods of Instruction

- 3.2.1 Discussion
 - 3.2.1.1 Bloodstain terminology and definitions will be discussed in accordance with the exercises 3.2.2.1 and 3.2.2.2
- 3.2.2 Assignments
 - 3.2.2.1 A packet will be provided that includes four different bloodstain workshop glossaries and two lists of terminology recommended by the I.A.B.P.A. at ten years apart (1985 and 1995). Read this information to become familiar with bloodstain terms. Compare the differences and slight changes throughout the years from personal preferences in regard to phrasing and defining. The assignment is to take the current DFS handout entitled 'Bloodstain Pattern Analysis Terminology & Definitions' and write a description which will compare and contrast the DFS working definitions to the other terminology lists.
 - 3.2.2.2 Complete the exercise provided from Judy Bunker's 1993 workshop. Realize that there are only seven (7) targets and a possible ten (10) answers so not all answers will be used. Upon completion, write a description of how terminology or phrasing gave concerns or altered opinions in choices.

3.3 Modes of Evaluation

- 3.3.1 Review and grading of assignments.
- 3.3.2 Question and answer session.

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4 PHYSICAL PROPERTIES OF BLOOD

4.1 Objectives

- 4.1.1 To learn the components of blood as they relate to the study of Bloodstain Pattern Analysis.
- 4.1.2 To understand the principles of fluid dynamics as they relate to the study of Bloodstain Pattern Analysis.
- 4.1.3 To understand the principles of physics as they relate to the study of Bloodstain Pattern Analysis.

4.2 Methods of Instruction

- 4.2.1 Discussion/Lecture
 - 4.2.1.1 Fluid Dynamics (cohesion, surface tension and viscosity)
 - 4.2.1.2 Drying time
 - 4.2.1.3 Clotting time
 - 4.2.1.4 Volume of Blood drops
 - 4.2.1.5 Size of stain
 - 4.2.1.6 Surface effects
 - 4.2.1.7 Terminal velocity
 - 4.2.1.8 Effect of Blood Thinners
 - 4.2.1.9 Capillary action
- 4.2.2 Review of Videos
 - 4.2.2.1 Movement & the Center of Gravity, Introductory Concepts In Physics, 1987 Films for the Humanities & Sciences, Inc.
 - 4.2.2.2 Falling Motion, Introductory Concepts In Physics, 1987 Films for the Humanities & Sciences, Inc.
 - 4.2.2.3 Inertia, Introductory Concepts In Physics, 1987 Films for the Humanities & Sciences, Inc.
 - 4.2.2.4 Introduction to Relative Motion, Introductory Concepts In Physics, 1987 Films for the Humanities & Sciences, Inc.
 - 4.2.2.5 Momentum, Introductory Concepts In Physics, 1987 Films for the Humanities & Sciences, Inc.
 - 4.2.2.6 Blood In Motion, Aspects of Bloodstain Analysis, Metropolitan Police Forensic Science Laboratory, London, 1993
- 4.2.3 Literature Reference
 - 4.2.3.1 Wonder, A. Y., Blood Dynamics, Academic Press, 2001
 - 4.2.3.2 Anderson, J. W., "Capillarity Distortion Analysis"
IABPA 1993 Annual Training Conference

- 4.2.3.3 Hurley, M. N., Pex, J. O. "Sequencing of Bloody Shoe Impressions by Blood Spatter and Blood Droplet Drying Times", Oregon State Police Crime Laboratory
- 4.2.3.4 White, B., "Bloodstain Patterns on Fabrics: The Effect of Drop Volume, Dropping Height and Impact Angle", Can. Soc. Forensic Science J. Vol.19, No. 1 (1986)
- 4.2.3.5 Laber, T. L. "Diameter of Bloodstain as a Function of Origin, Distance Fallen, and Volume of Drop"
Minnesota Forensic Science Laboratory
- 4.2.3.6 Epstein, B., Laber, T. L., "Preliminary Results – Clotting Time Studies"
Minnesota Forensic Science Laboratory
- 4.2.3.7 Lee, H., "Procedures for Determination – The Volume of Dried Bloodstain"
- 4.2.3.8 Christman, D. V., "A Study to Compare and Contrast Animal Blood to Human Blood Product"
Snohomish County Medical Examiner's Office, Washington
- 4.2.3.9 Donohue, P. G., "Blood thinner can cause bruises"
Richmond Times-Dispatch, May 21, 1996
- 4.2.3.10 Raymond, M. A., Smith, E. R., Liesegang, J., "The Physical Properties of Blood-Forensic Considerations"
Science & Justice, Journal of the Forensic Science Society 1996: 36(3) 153-160
- 4.2.3.11 Bunker, J., "Blood Dynamics (In motion and on impact)"
April 22, 1991
- 4.2.3.12 Pizzola, P. A., Roth, S. and Deforest, P. R.,
"Blood Droplet Dynamics – I and II"
Journal of Forensic Sciences, JFSCA, Vol.31 No.1, Jan. 1986 pp. 36-49
- 4.2.4 Assignments/Experimentation
- 4.2.4.1 Several articles and handout materials referencing miscellaneous aspects of fluid dynamics have been provided. Review this information and prepare a brief written outline of aspects and issues to be discussed. Fluid dynamics will be discussed and how these physical properties influence stains and the interpretation of them.
- 4.2.4.2 Passive Drops from different heights
- 4.2.4.2.1 Using a pipette release three drops on each target surface at heights of 3 inches, 6 inches, 12 inches, 24 inches, 36 inches, 48 inches, and 60 inches.
- 4.2.4.2.2 Target surfaces include Tile, Carpet, Brick, Blotter Paper, Glass, and Poster Board.
- 4.2.4.2.3 Document with notes and photography each target surface result at each height.
- 4.2.4.2.4 Note the type of disruption created when each stain hits the surface (smooth edges, scalloped, spines, satellites, or combination).
- 4.2.4.2.5 Once dry, measure each diameter measurement in millimeters.
- 4.2.5 Evaluate blood drop stains on fabrics mounted on cardboard.

- 4.2.5.1 Fabrics include water repellant treated sheet (Scotch Guard), a paper towel, a bath towel, panty hose (panty & hose materials), cotton/polyester sheet, and the outside surface of worn jeans.
- 4.2.5.2 Document, through descriptive notes, the differences in appearance of the stains and the potential influence of the fabric on the stain appearance.
- 4.2.6 Different originating surfaces.
 - 4.2.6.1 Use these tools to coat a surface with blood for dripping experiment: knife, wooden board, tire iron, hammer, screwdriver, switch blade, butcher knife.
 - 4.2.6.2 Use at least two different surfaces on each tool to allow blood to drip.
 - 4.2.6.3 Drip at least three drips from each surface.
 - 4.2.6.4 Allow blood to drip without movement of the tool.
 - 4.2.6.5 Document the stain sizes and compare with other originating surfaces.
- 4.2.7 Drip pattern on different surfaces.
 - 4.2.7.1 Use a tile floor, paper, carpet, and a sidewalk for the surfaces.
 - 4.2.7.2 Drip one drop at a time (blood into blood) into the same area until 5 ml is used.
 - 4.2.7.3 Document the amount of satellite spatter created at the different stages of the drip pattern and contrast the surface influence.
- 4.2.8 Larger volume drops on different surfaces.
 - 4.2.8.1 Use a tile floor, paper, carpet, and a sidewalk for the surfaces.
 - 4.2.8.2 Drop the entire 5 ml volume all at once.
 - 4.2.8.3 Document the characteristics of each stain pattern and contrast to the patterns created by one drop at a time.
- 4.2.9 Horizontal movement at different speeds and different heights.
 - 4.2.9.1 From a height of 3 to 6 inches from a papered surface, allow blood to drip off fingers while traveling at a brisk walk for a distance of 6 to 10 feet.
 - 4.2.9.2 From a height at knee level from a papered surface, allow blood to drip off fingers while traveling at a brisk walk for a distance of 6 to 10 feet.
 - 4.2.9.3 From a height of waist level from a papered surface, allow blood to drip off fingers while traveling at a brisk walk for a distance of 6 to 10 feet.
 - 4.2.9.4 Do the same experiments from the same heights but increase speed to a rapid pace much faster than a brisk walk.
 - 4.2.9.5 Document the differences in sizes, shapes, and satellite spatter created between the heights and the difference in travel speed.
- 4.2.10 Hands moving while dripping blood swinging back and forth.
 - 4.2.10.1 Walk and swing bloody hands over some butcher block paper on the floor.

4.2.10.2 Document observations.

4.3 Modes of Evaluation

4.3.1 Review and grading of assignments.

4.3.2 Question and answer session.

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5 SIZE, SHAPE AND DISTRIBUTION**5.1 Objectives**

- 5.1.1 To understand the distinguishing characteristics related to size, shape and distribution of bloodstain evidence.
- 5.1.2 To understand how the characteristics of size, shape and distribution assist in the analysis of bloodstain evidence.

5.2 Methods of Instruction

- 5.2.1 Lecture and Discussion
 - 5.2.1.1 Size Determination
 - 5.2.1.2 Shape Determination
 - 5.2.1.3 Measurements and angle-of-incidence Determination
 - 5.2.1.4 Distribution Determination

5.3 Literature References

- 5.3.1 Gardner, R. M., "Deformation Levels in Blood Droplets Created by Impact Events"
United States Army Criminal Investigation Command
- 5.3.2 Gardner, R. M., "Modeling Impact Spatter as a Method of Differentiation"
IABPA Training Conference, September 24, 1992
- 5.3.3 Englert, R., "Bloodstain Patterns"
A Reprint with Permission of Herbert Leon MacDonell
- 5.3.4 Adair, Thomas W., "False Wave Cast-Off; Considering the Mechanisms of Stain Formation"
Arapahoe County Sheriff's Office, Littleton, CO.
- 5.3.5 Stephens, B. G., M.D. and Allen, T. B., M.D., "Back Spatter of Blood from Gunshot Wounds – Observations and Experimental Simulation"
Journal of Forensic Sciences. JFSCA Vol.28 No.2 April 1983 pp 437-439
- 5.3.6 Christman, D.V., "Expired Bloodstain Patterns"
Snohomish County Medical Examiner Medicolegal Death Investigator
- 5.3.7 Laber, T., "Bloodspatter Classification"
Minnesota Bureau of Criminal Apprehension

5.4 Experiments

- 5.4.1 Compare balloon pop results to static pool struck with blunt object
 - 5.4.1.1 Balloon pop
 - 5.4.1.1.1 Using balloons supplied to you, pop one at each distance away from the wall at distances of 6", 18", 24", and 36".
 - 5.4.1.1.2 Each balloon should contain a small amount of blood inside (~ ¼ of a glass pipette).

- 5.4.1.3 Document the difference in sizes, shapes, and distribution of the stains between each distance.
- 5.4.1.4 Document a size range and a predominant stain size.
- 5.4.1.5 Be sure to document floor pattern observations also.
- 5.4.2 Wood striking a static pool
 - 5.4.2.1 Take a wooden board and strike an amount of blood on an elevated surface approximately 1 foot from a wall.
 - 5.4.2.2 Document observations of the changes to the static pool.
 - 5.4.2.3 Document the sizes, shapes, and distribution of the stains on the wall and floor.
 - 5.4.2.4 Document a size range and a predominant stain size.
 - 5.4.2.5 Be sure to document floor pattern observations also.
- 5.4.3 Have blood drawn & create expired patterns
 - 5.4.3.1 Cough – place blood in mouth and start coughing at each distance.
 - 5.4.3.2 Stand 6”, 18”, 24”, and 36” away from the wall.
 - 5.4.3.3 Document your observations.
 - 5.4.3.4 Be sure to document floor pattern observations also.
 - 5.4.3.5 Compare coughing observations to results from balloon pop experiments.
 - 5.4.3.6 Sneeze – place blood in mouth and emulate sneeze at each distance.
 - 5.4.3.7 Stand 6”, 18”, 24”, and 36” away from the wall.
 - 5.4.3.8 Document your observations.
 - 5.4.3.9 Be sure to document floor pattern observations also.
 - 5.4.3.10 Compare sneezing observations to results from coughing experiments.
 - 5.4.3.11 Compare sneezing observations to results from balloon pop experiments.
 - 5.4.3.12 Spit – place blood in mouth and spit at each distance.
 - 5.4.3.13 Stand 6”, 18”, 24”, and 36” away from the wall.
 - 5.4.3.14 Document your observations.
 - 5.4.3.15 Be sure to document floor pattern observations also.
 - 5.4.3.16 Compare spitting observations to results from coughing and sneezing experiments.
 - 5.4.3.17 Compare spitting observations to results from balloon pop experiments.
- 5.4.4 Compare impact and expired observations to drip pattern satellites created in experiments in 4.2.7

- 5.4.5 Create a hand clap impact
 - 5.4.5.1 Place a small amount of blood on the palm and clap creating spatter on wall at each distance.
 - 5.4.5.2 Stand 6", 18", 24", and 36" away from the wall.
 - 5.4.5.3 Document your observations.
 - 5.4.5.4 Be sure to document floor pattern observations also.
 - 5.4.5.5 Compare to results from previous experiments.
- 5.4.6 Finger flicks
 - 5.4.6.1 Cover fingers on one hand and 'flick' fingers creating spatter patterns.
 - 5.4.6.2 Stand 6", 18", 24", and 36" away from the wall.
 - 5.4.6.3 Document your observations.
 - 5.4.6.4 Be sure to document floor pattern observations also.
 - 5.4.6.5 Compare to results from previous experiments.
- 5.4.7 Dropped items into static pool.
 - 5.4.7.1 Drop a heavy item into a static pool from each distance.
 - 5.4.7.2 Drop from 6", 18", 24" and 36" above the floor.
 - 5.4.7.3 Document your observations.
 - 5.4.7.4 Be sure to document wall pattern observations also.
 - 5.4.7.5 Repeat experiment with a lighter item.
 - 5.4.7.6 Document your observations.
 - 5.4.7.7 Compare to results from all previous experiment.
- 5.4.8 Stepping into a static pool.
 - 5.4.8.1 Create a pool of blood on the floor using approximately 5 ml of blood.
 - 5.4.8.2 Step gently into the pool of blood.
 - 5.4.8.3 Document your observations of the alteration of the static pool.
 - 5.4.8.4 Document your observations of any spatter/stains created.
 - 5.4.8.5 Document your observations of the shoe used to step into the pool.
 - 5.4.8.6 Document your observations of the clothing worn at the time.
 - 5.4.8.7 Repeat the experiment creating a new pool of blood and now stomping into the static pool.
 - 5.4.8.8 Document all previously described observations.

5.4.8.9 Repeat the experiment creating a new pool of blood and now jumping into the static pool.

5.4.8.10 Document all previously described observations.

5.4.9 Simulated arterial.

5.4.9.1 Using the supplied syringe and tube, release amount on wall from each distance and each angle.

5.4.9.2 Stand 6", 18", 24", and 36" away from the wall.

5.4.9.3 Use an approximate 20 degree angle, a 45 degree angle, and a 90 degree angle when spurting toward the wall.

5.4.9.4 Document your observations.

5.4.9.5 Using the supplied syringe and tube, release the total amount in the syringe while moving it from left to right.

5.4.9.6 Document your observations.

5.4.9.7 Using the supplied syringe and tube, release amount toward the floor from each distance and each angle.

5.4.9.8 Spurt 6", 18", 24", and 36" above the floor.

5.4.9.9 Use an approximate 20 degree angle, a 45 degree angle, and a 90 degree angle when spurting toward the floor.

5.4.9.10 Document your observations.

5.4.9.11 Repeat the vertical and horizontal surface experiments varying the amount of pressure used to force the plunger in the syringe.

5.4.9.12 Document your observations.

5.4.9.13 Compare the results.

5.4.9.14 Arterial Rain – Release the blood in the syringe in straight forward manner the length of the room.

5.4.9.15 Document your observations of the stains created on the floor between the location of the syringe and the far wall.

5.4.9.16 Document your observations of the pattern created on the far wall.

5.5 Assignments

5.5.1 Please read the seven articles listed in 5.3 and write answers to the following questions:

5.5.1.1 What are distinct characteristics between "low", "medium", and "high" velocity impact patterns?

5.5.1.2 What other events may produce stain patterns with characteristics of impact?

5.5.1.3 What are the effects of porous/non-porous and smooth/textured target surfaces?

- 5.5.1.4 In your opinion what would be proper to state in a written report?
 - 5.5.2 Describe in writing how the experiment observations influenced the answers to the questions in 5.5.1.
 - 5.5.3 Complete the five impact puzzles supplied by utilizing what you have learned about sizes, shapes, and distribution and their relationship within an impact pattern.
- 5.6 Modes of Evaluation**
- 5.6.1 Review and grading of assignments.
 - 5.6.2 Question and answer session.

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6 COMMON PATTERN TYPES

6.1 Objective

6.1.1 To understand how the size, shape and distribution of stains at the scene or found on items of evidence allows stains to be placed in one of five categories.

6.1.1.1 Passive (falling dripping)

6.1.1.2 Projected

6.1.1.3 Arterial

6.1.1.4 Impact

6.1.1.5 Contact Transfer

6.2 Methods of Instruction

6.2.1 Lecture & Discussion

6.2.1.1 Bloodstains fall into one of five major categories (see Section 6 in the Bloodstain Procedure Manual).

6.2.2 Literature References

6.2.2.1 Christman, D. V., "Handwriting on the Wall – Bloodstain Pattern Analyses can be a Key Signature in Interpreting the scene of a Crime", Police, November 1994

6.2.2.2 LeRoy, H. A., "Bloodstain Pattern Interpretation", Identification Newsletter, Canadian Identification Society, Vol.6 issue 1 January 1983

6.2.2.3 Sweet, M. J., "Velocity Measurements of Projected Bloodstains from a Medium Velocity Impact Source", Canadian Society of Forensic Science Journal Vol. 26, No.3 (September 1993)

6.2.2.4 Byrne, E. F., and Lohmueller, K. E., "Bloodstains Never Lie: An Introduction to bloodstain Interpretation" June, 1997

6.2.2.5 Barnes, D., "Intermittent Projected Bloodstains", Crime Scene Unit, Ohio Bureau of Criminal Identification and Investigation, 1997

6.2.2.6 Bevel, T., "Geometric Bloodstain Interpretation" FBI Law Enforcement Bulletin, May 1983

6.2.3 Exercises

6.2.3.1 Review the stains on the miscellaneous fabrics and evaluate the observations. Write your response to the question: Does fabric alter results of common spatter characteristics?

6.2.3.2 Complete observation notes in reference to the Swipe & Impact Pattern Sequence posters. Determine the sequence of the patterns and record reasoning for the determination.

6.2.3.3 Complete observation notes in reference to the Expired versus Impact posters. Record the characteristics which allow you to distinguish the difference in the mechanism creating the patterns.

6.2.3.4 Complete observation notes in reference to Mechanism/Pattern match exercise. Record the characteristics which allow you to distinguish the type of event or mechanism which created the pattern.

6.2.3.5 Complete observation notes in reference to the Swipe Directionality posters. Record the characteristics which allow you to distinguish the direction of the movement creating the patterns.

6.2.3.6 Complete observation notes in reference to the Viscosity Comparison posters.

6.2.4 Experiments

6.2.4.1 Cast-off experiments

6.2.4.1.1 Using a ball bat, spread ample blood on the surface and perform a full overhead swing.

6.2.4.1.2 Document the results and record your observations.

6.2.4.1.3 Using a ball bat, spread ample blood on the surface and perform a full batters sideways swing.

6.2.4.1.4 Document the results and record your observations.

6.2.4.1.5 Using a ball bat, spread ample blood on the surface and perform an action of sudden termination in the swing of the bat.

6.2.4.1.6 Document the results and record your observations.

6.2.4.1.7 Perform sideways swing cast-off patterns using a hammer, your arm with your fingers spread apart, your arm with your fingers tight together, a board, and a knife.

6.2.4.1.8 Document the results and record your observations.

6.2.4.1.9 Compare the characteristics between the cast-off patterns.

6.2.4.2 Hand Contact experiments

6.2.4.2.1 Place blood on your hand and hit the wall with some force with the palm side of your hand.

6.2.4.2.2 Document the results and record your observations.

6.2.4.2.3 Place blood on your hand and touch the wall with the palm side of your hand.

6.2.4.2.4 Document the results and record your observations.

6.2.4.2.5 Compare and contrast the differences in the patterns created.

6.2.4.2.6 First wet your hand, then place blood on your hand and hit the wall with some force with the palm side of your hand.

6.2.4.2.7 Document the results and record your observations.

- 6.2.4.2.8 First wet your hand, then place blood on your hand and touch the wall with the palm side of your hand.
- 6.2.4.2.9 Document the results and record your observations.
- 6.2.4.2.10 Compare and contrast the differences between all the contact patterns created.
- 6.2.4.2.11 Repeat the previous contact experiments using the back of your hand instead of the palm side of your hand.
- 6.2.4.2.12 Document the results and record your observations.
- 6.2.4.2.13 Compare and contrast the differences between all the contact patterns created.
- 6.2.4.3 Contact with fabric
- 6.2.4.3.1 Use a bloodied towel and perform a contact transfer using the palm side of your hand.
- 6.2.4.3.2 Document the results and record your observations.
- 6.2.4.3.3 Use a bloodied towel and perform a contact transfer using the back side of your hand.
- 6.2.4.3.4 Document the results and record your observations.
- 6.2.4.3.5 Compare and contrast the differences between the contact patterns.
- 6.2.4.4 Contact with wig
- 6.2.4.4.1 Place blood on a wig and let sit for the following times before touching the wig to the wall.
- 6.2.4.4.2 Use times of 10 seconds, 20 seconds, 30 seconds, and 1 minute.
- 6.2.4.4.3 Document the results and record your observations for each time interval.
- 6.2.4.4.4 Place some blood on the wig and swipe it on the vertical surface.
- 6.2.4.4.5 Document the results and record your observations.
- 6.2.4.4.6 Place some blood on the wall and wipe through it with the wig.
- 6.2.4.4.7 Document the results and record your observations.
- 6.2.4.4.8 Place some blood on the wall, wait 5 minutes, wipe through it with the wig.
- 6.2.4.4.9 Document the results and record your observations.

6.2.5 Assignments

- 6.2.5.1 Read and critique the intern project report titled “Bloodstain Pattern Analysis: Weapons and the Cast-Off Pattern They Make”.

- 6.2.5.2 Read and critique the intern project report titled “Bloodstain Pattern Analysis: Arterial Spurting Project”.
- 6.2.5.3 Read and critique the intern project report titled “The Effects of Fabrics and Contaminants on Bloodstain Appearance at Various Heights and Impact Angles”.
- 6.2.5.4 Review the “Trauma” booklet. Record at least three observations which will be imperative to reviewing bloodstain patterns.

6.3 Mode of Evaluation

- 6.3.1 Review and grading of exercises, experiments, and assignments.
- 6.3.2 Question and Answer Session.

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7 ORIGIN DETERMINATION

7.1 Objectives

- 7.1.1 To understand the validity and usefulness of a source of origin determination in case work.
- 7.1.2 To understand the multiple ways to determine and/or document a three dimensional blood source and to be able to discuss the advantages & disadvantages of these techniques.

7.2 Method of Instruction

- 7.2.1 Lecture and Discussion
- 7.2.1.1 String Reconstruction of an Impact (see Section 7 in the Bloodstain Procedures Manual)
- 7.2.2 Literature References
- 7.2.2.1 Kercheval, J., "Basic Bloodstain Concepts for Area of Origin Calculations...Part 1" MAAFS Newsletter, April 1999 Vol. 27, No.2
- 7.2.2.2 MacDonell, H. L., "Bloodstain Patterns, No More Strings, No More Computer, Just Simple Mathematics, That's all it Takes", Laboratory of Forensic Science, Corning, New York
- 7.2.2.3 Griffin, T. J. and Anderson, J. W., "Out on a Tangent with Bloodstain Pattern Interpretation", February 21, 1993
- 7.2.2.4 Podworny, E. J. and Carter, A. L., "Computer Modeling of the Trajectories of Blood Droplets and Bloodstain Pattern Analysis with a PC Computer", IABPA Training Conference, 1989.
- 7.2.2.5 Wilson, F. E. and Schuessler, D., "Automated Geometric Interpretation of Human Bloodstain Evidence"
- 7.2.2.6 Gardner, R. and Bevel, T., "Chapter V Bloodstain Mathematics", 1990
- 7.2.3 Assignment
- 7.2.3.1 Write a paper on the validity and usefulness of a source of origin determination in case work after reading the articles packet (Literature References 7.2.2). Review the multiple ways to determine and/or document a three-dimensional blood source and prepare as part of your paper discussion on the advantages or disadvantages of the different ways.
- 7.2.4 Exercise
- 7.2.4.1 In order to better prepare for an eventual mock court situation, as well as, future crime scene work, practical exercises will be incorporated into the bloodstain analyst training curriculum. The trainee will be given an impact pattern to string back to a source of origin. Documentation to be turned in should include: (1) descriptions of the stain pattern, (2) the measurements and mathematical figures for your chosen ten stains, (3) the height, distance from an adjacent wall, and the range from a wall for the blood source, and (4) the mathematical workup validating the source location utilizing the tangent method on three of your chosen stains.

7.3 Modes of Evaluation

- 7.3.1 Grading of assignment.
- 7.3.2 Evaluation of exercise.

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8 BLOODSTAIN EXAMINATION EQUIPMENT & SUPPLIES

8.1 Objectives

- 8.1.1 To develop an understanding of the equipment and supplies needed to conduct Bloodstain Pattern Analysis.

8.2 Method of Instruction

8.2.1 Discussion

- 8.2.1.1 Review the items of equipment & supplies as follows:

- Tripod
- Safety Glasses
- Camera with Lenses
- Lab Coat/Jumpsuit
- Flash with bracket, flash attachments
- Gloves, booties
- Batteries (for flash, flashlight, camera meter)
- Black Marker
- Film
- Pens/Pencils (assorted colors)
- Bloodstain Scales
- Sketch Forms
- 6" Scales with millimeter
- Graph Paper
- Protractor
- Chartpak Graphic Tape/Different Colors
- String
- Thread
- Flashlight
- Loupe/Magnifier
- Thumb Tacks
- Distilled Water
- Magnifying Glass
- Hemastixs
- Cotton Tip Swabs
- Plastic Bags
- Glassine Envelopes
- Notebook/Paper
- Tweezers
- Adhesive Tapes (1" white tape/duct tape/2" tape)
- Scissors

8.3 Modes of Evaluation

- 8.3.1 Discuss the purpose of each item with the Training Officer.

9 BLOOD DETECTION

9.1 Objectives

- 9.1.1 To develop a basic understanding of the theory and procedures for the combined PTMB color test.
- 9.1.2 To become acquainted with the sensitivity and stability of the reagents.
- 9.1.3 To determine the specificity and limitations of the various chemicals.
- 9.1.4 To acquire a thorough understanding of the use of controls.

9.2 Methods of Instruction

9.2.1 Lecture and Discussion

9.2.2 Literature

- 9.2.2.1 Cox, M. "A Study of the Sensitivity and Specificity of Four Presumptive Test for Blood", JFS Vol.36: 1503-1511 (Sept. 1999).
- 9.2.2.2 Culliford, Bryan, The Examination and Typing of Bloodstains in the Crime Laboratory, U.S. Department of Justice, U.S. Government Printing Office, Washington DC (1971). [Handout]
- 9.2.2.3 Gaensslen, R.E., Sourcebook in Forensic Serology, Immunology and Biochemistry, U.S. Department of Justice, U.S. Government Printing Office, Washington, DC (1983).
- 9.2.2.4 Garner, D.D., Cano, K. M., Peimer, R.S., and Yeshion, T.E., "An Evaluation of Tetramethylbenzidine as a Presumptive Test for Blood," JFS, Vol. 21:816-821 (1976).
- 9.2.2.5 Kirk, Paul L., Crime Investigation, John Wiley and Sons, New York, NY (1974).
- 9.2.2.6 Saferstein, R., Ed., Forensic Science Handbook, Prentice-Hall, Inc., Englewood Cliffs, NJ (1982).
- 9.2.2.7 Forensic Biology Training Manual, Virginia Division of Forensic Science.

9.2.3 Student Exercises

- 9.2.3.1 Perform the combined PTMB color test on bloodstains of varying strengths (1:10 through 1:10,000 dilution), 5 bloodstains of varying ages, and a minimum of 20 bloodstains subjected to various contaminants such as super glue, fingerprint powder, ninhydrin, redwop powder (rhodamine base), bleach, soap, motor oil, luminal, mold, and environmental conditions (heat, moisture, heat and moisture combined, decomposition, etc...). Test substances reported to give false positives.
- 9.2.3.2 Observe the specificity and sensitivity of the test performed. Compare this information to the literature.
- 9.2.3.3 Instruction by and observation of qualified examiners performing the test
- 9.2.3.4 Test unknown stains as provided by training coordinator or designate.
- 9.2.3.5 Read applicable literature.

9.3 Modes of Evaluation

9.3.1 Knowledge

9.3.1.1 Review of notes in training notebook by training coordinator.

9.3.1.2 Oral and practical examination.

9.3.2 Skills

9.3.2.1 Observation by training coordinator or designate

9.3.2.2 Satisfactory performance on training exercises.

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10 BLOODSTAIN EVIDENCE PHOTOGRAPHY AND DOCUMENTATION

10.1 Objectives

- 10.1.1 To understand the methodology of properly documenting bloodstain patterns using photography, sketching and notes.

10.2 Methods of Instruction

10.2.1 Lecture and Discussion

- 10.2.1.1 Documentation of Stains and Stain Patterns (See Section 5 of the Virginia Department of Forensic Science Bloodstain Procedure Guide for guidance in this section.)

10.2.2 Literature Reference

- 10.2.2.1 Findley, J.F., Findley, J.C., "Ultraviolet Light and Bloodstain Analysis", Georgia Public Safety Training Center

- 10.2.2.2 "Hungarian Red – Blood Stain", informal flyer and accompanying article, from ODV, Inc., P. O. Box 180 S. Paris, ME 04281

- 10.2.2.3 Schiro, G., "Bloodstain Photography", Louisiana State Police Crime Laboratory, Baton Rouge, LA 70896

- 10.2.2.4 Mosher, S.L., Engels, Rich, "LUMINOL PHOTOGRAPHY", Broward Sheriff's Office, Forensic Services

- 10.2.2.5 Haskins, K. A., Watkins, T. G., Milch, H. and Stick, R., "Polaroid Film Used to Capture Bloodstain Patterns and Latent Footwear Impression's Enhanced with Luminol", Michigan State Police Forensic Division

- 10.2.2.6 "Crime Scene Schematic", MAFS Bloodstain Workshop, 1987

- 10.2.2.7 "Notes and Sketching (in reference to bloodstain patterns)", MAFS Bloodstain Workshop, 1987

- 10.2.2.8 Raymond, M. A. and Hall, R. L., "An Interesting Application of Infra-Red Reflection Photography to Blood Splash Pattern Interpretation", Elsevier Forensic Science International, 31 (1986) 189-194

- 10.2.2.9 Grispingo, R. R. J., "Luminol and the Crime Scene", The Prosecutor, Summer 1991

10.3 Modes of Evaluation

- 10.3.1 There are twelve targets available, each with a stain circled. Please use the attached worksheet to record measurement information. Then choose any three to photograph digitally and print out hard copies. Repeat measurements on the hard copies and compare the angle calculations to those from the original stains.

- 10.3.2 Attached are three scenarios accompanied by a few photographs of each situation. Obviously, there is not the benefit of actually seeing the scene and there is only someone else's minimum number of photographs from which to render an opinion. This is often the reality of case situations. Please review the photographs and answer, if possible, the scenario questions. If it is not possible to fully answer the questions, please explain.

- 10.3.3 The group discussion on Bloodstain Evidence Photography will include issues referencing:

- Assignments 1 & 2

- Basic Documentation of Bloodstain Evidence
- What are the problems with a case in which the only evidence submitted are photographs?
- What are the capabilities and/or limitations in relying on someone else's photographs for analysis?
- Special Techniques in Photography
- Special Films
- Dye Staining
- Luminol
- Alternate Light Sources

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11 BLOODSTAIN PATTERN ANALYSIS – MISCELLANEOUS INTERPRETATION

11.1 Objective

11.1.1 To understand the methodology of Bloodstain Pattern Analysis

11.2 Literature References

- 11.2.1.1 Ristenbout, R. R., III and Shaler, R. C., “A Bloodstain Pattern Interpretation in a Homicide Case Involving an Apparent ‘Stomping’”, Journal of Forensic Sciences, JFSCA, Vol.40 No.1 January 1995 pp. 139 – 145
- 11.2.1.2 Epstein, B., “Examination of Bloody Clothing”, presented at the IABPA Conference at Colorado Springs, 1992
- 11.2.1.3 MacDonell, H. L. and Brook, B. A., “Detection and Significance of Blood in Firearms” Legal Medannv. 1977, Vol.1977 pp. 183-199
- 11.2.1.4 Yeshion, T. E., “The Forensic Application of Luminol as a Presumptive Blood Test”, Florida Department of Law Enforcement. Proceedings of the VI International Symposium of Bioluminescence and Chemiluminescence, Cambridge, September 1990.
- 11.2.1.5 Gifford, W. D., “Bloodstain Survival in Water”, Anchorage Police Department IABPA News, September 1999

11.3 Training Tools

- 11.3.1 Cresap, T. R., “Bloody Bare Footprints – What Size Will They Make?”, Air Force Office of Special Investigation
- 11.3.2 Bevel, T., “A System for Crime Scene Reconstruction”, Oklahoma City Police Department
- 11.3.3 Gardner, R.M., “Considerations in Crime Scene Analysis”, Special Agent – Army
- 11.3.4 Gifford, W., “Limiting Angles Prove Crucial In Court”, Anchorage Police Department
- 11.3.5 Sadowski, W. D., “Bloody Latent Print on Fabric: A Capital Murder Case”, Indianapolis – Marion County Forensic Services Agency, Indianapolis, Indiana, 1991
- 11.3.6 Englert, R., “Pulverized Bright Green Threads and High Velocity Blood Spatter Unravel the Mystery of a Crime”, A Homicide Study with no body, Forensic Consultants, Inc, 1992
- 11.3.7 Varnon, J., Courtney, M., Ekis, T.R., “Self-wounding of Assailants during Stabbing and Cutting Attacks”, Fort Worth Texas Police Department and Forensic Consultant Services
- 11.3.8 A Preliminary Study of “How Fire May Effect Crime Scene Bloodstains”, a joint project between the Halifax Regional Forensic Support Section of the Royal Canadian Mounted Police and the Level II Arson Course of the Canadian Investigative Fire School.

11.4 Experiments & Discussion

- 11.4.1 Pour a pool of blood and proceed to step into the pool. Photograph and document the results of staining on your shoes and jeans. Now stomp and then later jump into pools of blood. Photograph and document the effects of each action on shoes and jeans. The intensity of these events will be compared and discussed to determine whether or not these type events can create spatter which can be confused with impact and if the presence of bloody shoe impressions are necessary to confirm “stomping”.

11.4.2

Perform the two exercises included in the packet from “The Crime Laboratory”. These exercises will be a lead-in to experimentation and subsequent discussion of “Examination of Bloody Clothing”, “Bloody Latent Print on Fabric.....”, “Bloodstain Survival in Water”, and “How Fire May Effect Crime Scene Bloodstains”. Bring in an old article of clothes – create wipe, contact transfer (impress), spatter, and soak stains onto different areas of the cloth article. Photograph and document a description of the result of each stain. Now take spray bottle and spritz each stain area (with water) at different time intervals. Photograph and document at each interval until comfortable with an effect and/or an established pattern of disturbance that the spritzing creates. Now take a separate, dry section of material with dried spatter outside to expose it to flame. Document the results.

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12 REPORT WRITING AND COURT TESTIMONY**12.1 Objectives**

- 12.1.1 To understand the elements of writing a clear and understandable report concerning Bloodstain Pattern Analysis.
- 12.1.2 To understand how to clearly, accurately and understandably present technical Bloodstain Pattern testimony.

12.2 Methods of Instruction

- 12.2.1 Review of Training Tools/Report Writing
 - 12.2.1.1 MAFS Bloodstain Workshop Outline
 - 12.2.1.2 Several DFS Reports
- 12.2.2 Review of Training Tools/Court Testimony
 - 12.2.2.1 MAFS Bloodstain Workshop Outline
 - 12.2.2.2 DFS Transcripts, Notes, and Report of Margie Harris' cases C98-20, T95-7788, and C97-6481
 - 12.2.2.3 Paul Kirk Transcript from the Sam Sheppard case
 - 12.2.2.4 Police Science Legal Abstracts and Notes-Scientific Evidence in the Sheppard case
 - 12.2.2.5 Bevel, T. and Gardner, R., "The Bloodstain Pattern Lab Manual" –reprint
 - 12.2.2.6 Michigan v. Budzyn
 - 12.2.2.7 Court decision of the admissibility of bloodstain testimony from Norman Reeves
 - 12.2.2.8 Compton v. Commonwealth, 219 Va. 716, 250 S.E. 2d 749 (1979)
 - 12.2.2.9 Stewart v. Commonwealth, 245 Va. 222, 427, S.E. 2d 394 (1993)
 - 12.2.2.10 Smith v. Commonwealth, 265 Va., 021583, S.E.2d (2003)

12.3 Modes of Evaluation

- 12.3.1 Discussion and Review of Elements Studied
- 12.3.2 Preparation for Mock Trial
 - 12.3.2.1 The student has been provided with the following: (1) a transcript of Paul Kirk's testimony in the Sam Sheppard case; (2) a legal abstract in reference to the scientific evidence in the Sheppard case; (3) Norman Reese's testimony admission challenge; (4) general articles referencing court preparation; (5) Michigan v. Budzyn case information from the INTERNET reference opposing bloodstain expert opinions; (6) Margie Harris' testimony transcript, certificate of analysis, and notes from DFS#C98-20; (7) testimony transcript, certificate of analysis and notes from DFS#C97-6481; (8) testimony transcript, certificate of analysis, and notes from DFS # T95-7788. The trainee will review all this material in preparation for the following exercise.

12.3.2.2 Perform the two exercises from the Bloodstain Examiner's 1999 Seminar provided to the trainee. Write extensive notes on each pattern. Include range of stain sizes, overall pattern distribution size, the distance between stains within the distribution, the absence or presence of stain shape differences, the continuity or chaotic nature of the stain distribution within the pattern, and if the pattern is "consistent with" or "characteristic of" a particular category. The trainee will write a certificate of analysis which includes all nine (9) patterns.

12.3.2.3 The next step is to prepare a list of questions as if the defense attorney will challenge the certificate of analysis and your bloodstain testimony in a court of law.

12.3.3 LIMS exercise

12.3.3.1 Go into the LIMS training environment. Once in the training environment – enter the nine posters as evidence to create information for the certificate of analysis. Use Margie Harris as the submitting/investigating officer, Jane Doe as the victim, and Ann Davis as the suspect. This process to write a certificate of analysis (aka report writing) will acquaint the trainee with the process to write a report and the functions of the LIMS.

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